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The Influence of Various Degrees of the Cognitive Complexity of Tasks on Undergraduate Students' Listening Comprehension Performance: Simultaneous Investigation of ± Intentional Reasoning Demand and ± Few Steps

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Abstract: This study was conducted with the aim of shedding light on how the gradual increase of cognitive task complexity influences high proficiency undergraduate students' listening comprehension and the role of proficiency in mediating cognitive task complexity effect. Another aim of this study was investigating the degree of equality between students' perceived task difficulty and the theoretical expression of task complexity. To that end, high and low proficiency female students studying at a non-profit university in Tehran were selected based on their performance on the Oxford Placement Test. They were asked to perform simple non-intentional reasoning and few-step tasks, complex non-intentional reasoning and many-step tasks, and more complex intentional reasoning and many-step tasks in sequence during 3 sessions based on Robinson's SSARC (stabilize, simplify, automatize, reconstruct, and complexify) model suggestion and express their perception of task difficulty after performing tasks. Results demonstrated that there was a statistically significant difference between high proficiency participants' performance on simple, complex and more complex tasks and between high and low proficiency participants' performances on these three tasks. The equality of participants' perception of task difficulty and the theoretical expression of task complexity was not confirmed. The findings of this study can be used by language teachers, task designers, and test developers to decide on the appropriate degree of complexity of tasks.

Keywords: Cognitive Complexity, ± Few Steps, ± Intentional Reasoning Demand, Listening Comprehension, Perceived Difficulty of Task, SSARC Model

Introduction

To emphasize meaning rather than linguistic form which was based on the linguistic syllabus, researchers introduced the task-based syllabus (Ellis, 2003; Robinson ,2005). Ellis (2003) states tasks are devices that make using language in a social context (pragmatics)instead of simply displaying it possible for learners. The aim of concentrating on communication to increase L2 proficiency can be achieved by using tasks. He also believes that making use of tasks results in more communicative teaching. One of the most significant issues in the task-based syllabus is the order in which tasks should be presented. Researchers (Robinson, 2005; Skehan, 1998) have made various suggestions in this regard. To Robinson (2005) what is an essential

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criterion for sequencing pedagogical tasks is the degree of resemblance between the demands of real-world target tasks and those of pedagogical ones that should be gradually increased. The concept of task complexity is the consequence of the requirement to sequence and grade pedagogical tasks. Which criteria should be applied to sequencing tasks is a moot point. What features of tasks influence decisions as to which tasks should be received by learners prior to the other ones? According to the task-based syllabus, sequencing tasks should be based on the idea of tailoring cognitive and linguistic demands of tasks to learners' current level of development. The threefold aims of the present study were investigating the influence of tasks with various degrees of complexity ,that is, simple, complex , and more complex tasks on the listening comprehension of high proficiency undergraduate students when they are performed in the sequence simple, complex, more complex, comparing these performances with those of low proficiency participants as well as determining the degree of equivalence between students' perceived task difficulty and the theoretical expression of task complexity.

Considering that most studies have investigated the binary variables of task complexity (simple/complex), this study investigated three different levels of task complexity by employing Robinson's (2010) SSARC model. In fact, unlike most studies into the influence of task complexity on listening comprehension, in the current study the gradual increase of task complexity and resource-directing variables concurrently with resource-dispersing ones were investigated. This study was also motivated by the significance of equivalence between learners' language proficiency level and the cognitive demands of tasks for language development as well as understanding other peoples' thoughts in the real world that highly influences speaking skill. To investigate whether learners perceive more complex intentional reasoning and many-step tasks as very difficult, the relationship between students' perceived task difficulty and cognitively more complex tasks was researched. Furthermore, this study sought to investigate the relationship between learners' listening comprehension and those variables of task complexity which have not ever been investigated together. To achieve the above-mentioned aims, the following questions have been addressed:

Research Question One: How do various degrees of the cognitive complexity of ±intentional reasoning and ±few steps variables performed in the sequence simple, complex, more complex affect undergraduate students' listening comprehension?

Research Question Two: How does task complexity affect the listening comprehension of undergraduate students at various levels of language proficiency?

Research Question Three: Is there any relationship between undergraduate students' perceived task difficulty and the theoretical expression of task complexity of ± intentional reasoning and ±few steps variables?

Hypothesis One: There is no statistically significant difference between undergraduate students' listening comprehension performance on simple, complex, and more complex tasks.

Hypothesis Two: There is no statistically significant difference between high proficiency and low proficiency students' listening comprehension performance on simple, complex, and more complex tasks.

Hypothesis Three: There is no statistically significant difference between students' perceived task difficulty and the theoretical expression of task complexity.

Literature Review

2.1. *Robinson's Cognition Hypothesis*

To indicate the crucial role of task-based teaching in paving the way for relevant cognitive processes learners require for developing and using their second language, Robinson (2001a, 2001 b, 2005, and 2007 a) presented the cognition hypothesis. According to Robinson's cognition hypothesis, the cognitive

complexity of tasks is the exclusive criterion for sequencing pedagogical tasks. Robinson's taxonomic Triadic Componential Framework with 3 main categories functions as a tool for investigating the claims of the cognition hypothesis as well as designing and sequencing tasks.

2.2 *Robinson's Triadic Componential Framework*

Within his TCF Robinson (2005) employed 3 concepts of task complexity, condition, and difficulty with various variables each to put forward variables that determine the extent of difficulty and simplicity of performing tasks by learners.

The first one in his TCF– task complexity – refers to tasks' own features. The complexity of tasks depends on the amount of required processing that is different for tasks with different structures and designs (Robinson, 2001a).

The construct of task complexity came to light as a result of the attempt of task-based syllabus practitioners to determine criteria for sequencing or grading tasks methodically in order of their difficulty (from easy /simple to complex or difficult) with the aim of improving learners' interlanguage (Gilabert, 2007).

The second one – task difficulty – comprises two main variables, to wit: ability (e.g., intelligence, language aptitude, memory capacity) and affective variables (e.g., motivation, anxiety, confidence) relating to how able learners are to carry out the task and to the emotions respectively. Task difficulty has to do with learners' opinion on the difficulty of task (Robinson, 2001 b).

The third one – task condition – involves participation and participant variables. Robinson (2005) defines participation variables as the movement of information between learners in a classroom (e.g., one-way versus two-way tasks) and participant variables as the way learners are assigned to a group to do tasks (e.g., same versus different gender).

The idea of incorporating 3 different components within TCF relates to multi-componentiality features of real-world tasks (Robinson, 2003). Task-based language teaching aims to empower learners to carry out real-world tasks that they encounter outside the classroom (Robinson, 2001a). Syllabus designers that sequence pedagogical tasks based on increase in their cognitive complexity aim for convenient L2 development.

2.3. The Expansion of Robinson's Triadic Componential Framework

Robinson (2007 b) expanded his TCF through incorporating new subcategories variables, classification criteria and procedure without making any changes to 3 main categories, to wit task complexity, task condition and task difficulty.

Task complexity as the first main category specifies the extent of cognitive demands task structures place upon learners with the potentiality to be increased or decreased by task designers. Robinson argues it indicates the degree to which task structures engage L2 learners' attention, memory, reasoning and other information processing abilities while they are doing a task (Robinson, 2001 a). The same learner's performances vary across tasks of different levels of cognitive complexity and it is the reason behind why task complexity is referred to as within learner variance (Ellis, 2003).

Two distinct dimensions of task complexity are referred to as resource-directing and resource-depleting dimensions. This distinction has been made based on whether tasks have been made complex by making a change to aspects of the linguistic system or to procedures for performing them (Robinson & Gilabert, 2007).

2.4. Resource-Directing Variables

Variables which have been introduced as components of resource-directing dimensions are 1-tasks with time reference of the present and adjacent events (here-and-now) vis a vis those with time reference of the

past and distant events (there-and-then) 2- tasks with a few and distinct elements vis a vis those with many resembling elements (± few elements) 3- tasks with clear directions of places where something is located in vis a vis those without such directions (± spatial reasoning) 4- tasks which include just facts and information vis a vis those which include the cause and effect and the relationship between events(± causal reasoning) 5- tasks which include just data and information vis a vis those which include explanations about others' intentions , beliefs , and desires and the way they are connected (± intentional reasoning) 6- tasks with events from the point of view of the person to whom they happen vis a vis those with events from the point of view of the person is addressed or talked about (± perspective taking)(Robinson , 2008).

2.5. Resource-Dispersing Variables

To distinguish the variables of resource-dispersing dimensions, the following criteria have been taken into account :1) providing learners with planning time vis a vis not providing them with it , 2) providing learners with background knowledge essential to performing tasks vis a vis not providing them with it , 3) performing a single task vis a vis simultaneous performance of dual or multiple tasks , 4) providing learners with obvious task structure to assist them to follow required steps to performing tasks vis a vis not providing them with it , 5)the quantity of steps to performing a task , namely one-or-few-step tasks vis a vis many-step tasks , 6)the dependency or independency of required steps, namely performing a task which requires not following sequential steps vis a vis performing a task which requires following sequential steps(Robinson, 2008).

As Robinson's TCF indicates, complex tasks require intentional, causal and spatial reasoning, they have many elements and steps, their steps are dependent, and they do not have task structure, learners do not have planning time and prior knowledge, other complex tasks are there-and-then and dual tasks and tasks from third-person perspective. On the contrary, simple tasks do not require intentional, causal and spatial reasoning, they have a few elements and steps, their steps are independent, and they have task structure, learners have planning time and prior knowledge; here-and-now, single tasks and tasks from first-person perspective are also classified as simple tasks (Robinson, 2005).

2.6. The Difference Between Resource-Directing and Resource-Dispersing Variables

Resource-dispersing and directing variables are different in the nature of demands that they put on learners' attentional and memory resources. In the case of resource-directing variables learners need to perform cognitively /conceptually demanding tasks that cause they attend to particular linguistic knowledge, while resource-dispersing variables are demanding in terms of their performance procedure and they don't cause learners attend to particular linguistic knowledge that may play an important role in communication while carrying out tasks (Robinson, 2008).

Robinson claims that increasing task complexity along resource-directing and resource-dispersing dimensions does not equally affect learners' performance. This happens due to the difference between the capability of more complex variables of these two dimensions to direct learners' language resources to specific forms or structures; more complex variables of resource-directing dimensions do this job better than those of resource-dispersing ones. Therefore, unlike performing more complex resource-dispersing tasks which leads to worse results, learners' performance on tasks which have been made more complex along resource-directing dimensions is better.

Based on Robinson's (2008) anticipation, when learners make a mental effort to deal with cognitively/conceptually more demanding and distinctive tasks they become prepared to comprehend and carry out tasks accurately since this allocates their attentional and memory resources to the aspects of L2 system relevant to the task in hand which triggers noticing these aspects and it accelerates grammaticization of L2 concepts. None of the language production domains (accuracy, complexity, and fluency) benefit from performing a task which has been made complex along resource-dispersing dimensions (Robinson,2003). It is considered that the synergetic effect of resource-directing and resource-dispersing dimensions of task complexity on producing tasks is noticeable (Robinson, 2001a).

2.7. Intentional Reasoning

The reasoning demand as one of the variables of resource-directing dimensions is an umbrella term that encompasses intentional, causal, and spatial reasoning.

Intentional reasoning is specified as the ability to succeed in comprehending and accounting for the motives, beliefs and thoughts behind human beings' behavior (Robinson, 2007 a). It is closely related to the theory of mind or mind reading in the field of psychology. Theory of mind deals with the ability to explain what others do based on their underlying intentions, beliefs, feelings and desires (Malle, 2005; as cited in Robinson 2007 a). It can be inferred from the definition of intentional reasoning that it is the social and psychological ability of human beings and occurs in their everyday life (Ishikawa, 2008).

Robinson (2007 a) states that unlike tasks without intentional reasoning (-intentional reasoning) that just refer to human beings' apparent behavior without elucidating their hidden mental states, tasks with intentional reasoning (+ intentional reasoning) refer to accounting for the people's behavior considering their mental states as their stimulators.

2.8. Robinson's SSARC Model

In 2010, Robinson put forward the SSARC model of pedagogic task sequencing. According to this model, tasks should be completed in three steps. In step 1, learners receive tasks which are simple along both resource-directing and dispersing dimensions (e.g., +few elements, + single task). SS stands for the simple and stable state of the current interlanguage system that enables learners to complete tasks of this step. During next step (step 2), learners receive tasks which are complex along resource-dispersing dimensions though simple along resource-directing dimensions (e.g., + few elements, -single task). A stands for automatization of the current interlanguage system that is the result of swift access to this system developed during this step. In the last step (step 3), the tasks employed are complex along both resource-directing and dispersing dimensions (e.g. –few elements, – single task). The results of this step are boosting restructuring the current interlanguage system (R) as well as paving the way for new form-function mappings that occur across resource-directing dimensions; maximum complexity (C) also takes place in this step which leads to the destabilization of the current interlanguage system.

2.9. Researches into Task Complexity and Perceived Task Difficulty

Awwad et al (2017) investigated the relationship between intentional reasoning and learners' speech performance and their subjective rating of task difficulty. They compared participants' performance on the task with less intentional reasoning to their performance on the task with more intentional reasoning; in addition to this they analyzed the results of participants' subjective rating of difficulty of these tasks. The difference between the less and the more intentional reasoning tasks was operationalized by incorporating asking participants to talk about the reasons of the cartoon characters for choosing specific solutions to their problems and characters' reasons for specific behavior after watching two video clips into the more-intentional reasoning condition besides telling and describing occurred events in the video clips which were what participants were asked to do in the less-intentional reasoning condition. Researchers concluded that intentional reasoning plays an important role in participants' perception of task difficulty as well as in raising accuracy and syntactic complexity of their language but on the other hand, increasing intentional reasoning demand of tasks negatively influences lexical diversity and results in inconsistent patterns of fluency.

Farrokhi and Sattarpour (2017) ran a study to check how learners' letter writing tasks are under the main and interaction effects of raising intentional reasoning demand, planning time, and aptitude for learning language. Three tasks which were different in their intentional reasoning demand degrees (low -, medium -, and high-complex tasks) were employed by researchers to find the effects of raising intentional reasoning demand. The degrees of intentional reasoning demand were raised gradually; participants were asked to perform the low-complex task by writing a letter regarding their country to their English-speaking friend that is going to visit their country. Performing the medium-complex task required writing about the

restaurant that participants had chosen from among two restaurants for their friend to visit and providing reasons for choosing this restaurant. To perform the high-complex task, participants had to do what they did in the medium-complex task with the difference that in the high-complex tasks they had to choose a restaurant from among three restaurants and they also had to choose the restaurant based on the preferences of two other friends that are also going to visit their country. Findings of this study confirmed the existence of a positive relationship between raising intentional reasoning demand and lexical and syntactic complexity but a negative relationship existed between raising intentional reasoning demand and fluency, and there was no significant relationship between raising intentional reasoning and accuracy. The results of not giving planning time were producing less fluent and less syntactically complex language. The existence of an interaction effect of reasoning demand and planning time on accuracy was also confirmed. The significant interaction effects of language aptitude and planning time, and language aptitude and reasoning demand were not observed; there was just a three-way interaction effect on accuracy.

Ishikawa (2008) studied the effect of making tasks complex by manipulating intentional reasoning demand dimension on L2 monologic speech. The simple reasoning task which included playing the role of a manager who is responsible for two section members and reporting to the president about hypothetical human relationship changes was made complex by adding two other section members; that is to say, in the complex task the manager was responsible for four section members. The no reasoning version of these tasks included explaining the present relations between section members without reasoning. Raising intentional reasoning demand was associated with producing accurate, complex, and disfluent language, while speech rate remained untouched.

Zare-ee (2013) compared the influence of simple tasks with that of complex tasks on learners' listening comprehension performance and investigated the relationship between learners' perceived task difficulty and the theoretical expression of task complexity as well. Immediacy, adequacy, perspective, and prior knowledge dimensions of task difficulty were manipulated to operationalize task complexity. Immediacy, adequacy , perspective , and prior knowledge were operationalized in less complex condition by the task performed after giving time to learners to check listening items prior to listening to the task, the task performed after listening to the whole of it, the task which was from first-person perspective, and the task performed after giving written prior knowledge to learners , respectively, while in more complex condition immediacy was operationalized by the task performed without giving time to learners to check listening tests items prior to listening to the task, adequacy was operationalized by the task performed after listening to some parts of it , perspective was operationalized by the task which was from third-person perspective, and prior knowledge was operationalized by the task performed without giving learners written prior knowledge. The researcher found that raising task complexity negatively affects listening comprehension performance. Another finding of this study indicated that learners' perceived task difficulty and the theoretical expression of task complexity are related only for immediacy dimension.

Kim and Ventura's (2011) study investigated the effect of three different degrees of task complexity on EFL learners' development of past tense. Reasoning demands of four tasks were manipulated to allow testing the influence of simple (without reasoning demand), +complex (with reasoning demand), and ++ complex tasks (with more reasoning demand) on developing past tense. Findings indicated the usefulness of +complex and ++complex tasks for past tense morphology development in comparison with the simple task, while raising complexity of the +complex task, performing the ++complex task, had no statistically significant effect on past tense development.

Malicka and Levkina (2012) researched the role of task complexity in high and low proficiency learners' linguistic production. To investigate the role of task complexity, researchers manipulated two dimensions of cognitive complexity, ± reasoning demands and ± few elements. Compared to the complex task, the number of elements (furniture items) and the degree of spatial reasoning demands of the simple task were less. In both tasks participants had to explain the places of an apartment that they choose for placing their furniture items in detail as much as possible. The areas of language production influenced by

raising cognitive complexity differed in low and high proficiency groups. High proficiency learners' language production accuracy, lexical, and structural complexity rose. Low proficiency learners' language production fluency rose but the accuracy of their production lowered.

Malicka (2014) studied the influence of cognitive task complexity on learners' speech performance and the mediating role of proficiency in speaking. To this end, the researcher designed three cognitively different tasks, simple, complex, the most complex tasks based on the needs analysis and Robinson's TCF. Simple, complex, and the most complex tasks differed in terms of the number of their elements and the reasoning demands each required; two resource-directing dimensions were operationalized: ± few elements and ± reasoning demands. Speakers' performance was influenced by the degree of cognitive complexity of tasks. The existence of a relationship between speakers' proficiency levels and their speech performance was also observed. Raising cognitive complexity influenced speakers of different levels of proficiency differently.

Robinson's (2007 a) study on intentional reasoning demand investigated the effect of this resource-directing dimension on learners' speech performance, interaction, uptake, and perceived task difficulty. Three narrative tasks with different degrees of intentional reasoning, simple, medium, complex, were used to determine their effects. Unlike simple tasks in which participants were asked to reason about a single character's intention, in more complex tasks participants were asked to reason about some characters' intentions. Raising cognitive complexity was associated with increasing complexity of speech when it was evaluated by specific measures, interaction and uptake. Areas of speech production which remained untouched were accuracy and fluency when they were evaluated through general measures. In addition, participants rated the complex tasks as more difficult.

Awwad and Tavakoli (2022) studied the interaction effects of task complexity, language proficiency, and working memory on learners' oral linguistic performance. They operationalized simplicity and complexity by making a change to the degree of required intentional reasoning. Performing complex tasks (+intentional reasoning tasks) required talking about characters' intentions and thoughts and forecasting their reactions and decisions in the video clips in addition to explaining events that was the requirement for completing simple tasks (-intentional reasoning tasks). They found that learners' language proficiency and working memory interact with task complexity to affect lexical complexity, fluency, and accuracy of their linguistic performance although language proficiency and working memory had the same effect only on accuracy of simple and complex tasks; their effects on fluency and lexical complexity of simple and complex tasks were different.

Révész et al (2017) researched the role of task complexity in L2 learners' online writing behaviors and linguistic complexity. They removed content support that was available to simple task performers to make tasks complex. Their study results indicated the significant role of removing content support in raising pausing and making revisions and lowering lexical complexity.

Xu and Fan's study (2021) shed light on the relationship between learners' English proficiency, task complexity and the degree to which they use their mother tongue to interact with their peers to complete tasks. Completing the simple task required participants and their peers to narrate a story in the present tense while the pictures are available to them (+here-and-now) whereas the complex task included narrating a story collaboratively in the past tense without looking at the pictures(-here-and-now). The results of their study confirmed that task complexity associates significantly with using mother tongue and this association is under the influence of L2 proficiency.

Methodology

The Design of the Study

This study has two designs, experimental – the repeated-measures design – and correlational. It is experimental since it investigates the influence of various degrees of cognitive task complexity, the independent variable, on listening comprehension, the dependent variable. Another independent variable of this study is language proficiency; the way learners' language proficiency mediates the influence of various degrees of task complexity, simple, complex and more complex tasks, on their listening comprehension is also investigated. It is also correlational since it seeks how the theoretical expression of task complexity correlates with students' perceived task difficulty.

Participants

The initial participants of this experiment consisted of 66 undergraduate university students of two classes studying at a non-profit university in Tehran. In the course of this study, they were in their sophomore, junior and senior year doing a general English course. They were all females and aged 19 to 25 with the average age of 21 years. Classes were held for 16 sessions each lasted 135 minutes during the fall semester. They were at different levels of proficiency: high and low as measured by the Oxford Placement Test. Participants were made aware that their final course mark would remain untouched by the influence of the quality of their performance on the proficiency test.

Instruments

Proficiency Test

The Oxford Placement Test which was utilized in numerous erstwhile studies (Ahmadian, 2011, 2012, and Murphy and Roca de Larios, 2010) was administered to participants to determine their language proficiency levels. This standardized bipartite proficiency test consists of grammar and listening tests. In total, it incorporates two hundred items, one hundred items in each section. Grammar section employs multiple-choice items and each item of the listening section involves two choices, out of which the word heard is ticked.

The whole two classes containing 66 students were asked to do this test, out of which 44 students were chosen as the participants of this experiment based on the result of their performance on the test, but the scores of 9 of them that neither completed all tasks during regular class time nor participated in classes which were held at a time other than normal class time for absent participants were excluded from data analysis.

As to their performance on the Oxford Placement Test, the participants of the present study were grouped into two levels of proficiency; that is, low and high. Participants who obtained a placement test score below 119 represented the low proficiency group, and those who obtained above 122 represented the high proficiency group. The existence of the statistically significant difference between means of these two groups was revealed by the result of a t-test ($p = 0.05$).

Tasks of Various Degrees of Complexity Used in This Study

Tasks of the current study consisted of six listening comprehension tasks with different levels of complexity, each including two listening comprehension tasks. They were all taken from the 'Improve Your IELTS Listening and Speaking Skills' book. The first group of tasks were simple tasks containing two variables of -intentional reasoning and +few steps from two different dimensions of task complexity, namely resource-directing and dispersing dimensions respectively. Non-intentional reasoning was operationalized in the present study by using a listening task which just provides some information and participants do not need to comprehend others' thoughts and beliefs to answer its questions. As Robinson states, a task manipulated along + few steps is performed in one or few steps, its counterpart, namely many-step tasks are performed in more than two steps. Following his definition, a listening task followed by two

steps was chosen to operationalize + few steps variable. Step 1 included a question about the gist of what participants heard. Step 2 included questions about specific information of the listening task.

The second group of tasks received by participants were complex tasks. The simple tasks were made complex by adding many steps to few-step tasks, but the -intentional reasoning task was not changed based on Robinson's (2010) SSARC model. Within this model of task complexity, the higher degree of complexity is initially presented on resource-dispersing dimensions prior to resource-directing dimensions. To operationalize many steps, a listening task followed by 4 steps was presented to participants. Step 1 was operationalized using questions about specific information of the listening task, step 2 through questions about making inferences, step 3 through questions about further thoughts, and step 4 through questions about logical conclusions based on the listening task. The third group of tasks received by participants were very complex tasks. The complex tasks were made very complex by using a many-step task and a + intentional task as well. + intentional task involved cognitive state terms such as think, believe, and sure based on Robinson's (2008) idea that cognitive state terms such as "think", "believe", "sure", and "wonder" feature in intentional reasoning tasks. Therefore, it was followed by questions on others' thoughts, beliefs, and what a person is not sure about. To examine the validity of the listening tasks of the current study, three experts were asked to check them in terms of their length, content, and language using a checklist including these three criteria. Table of the specification of the present study instruments has been presented (Table 1).

Table 1

Tasks, Items, Dimensions, and Different Degrees of Complexity

Dimensions	Different degrees of task complexity	Tasks	Items
-Intentional reasoning/+ Few steps	Simple tasks After listening to the non-intentional reasoning task, participants answered its following questions/ after listening to the few-step task, participants answered its following questions	Task 1	13
-Intentional reasoning/ + Many steps	Complex tasks After listening to the non-intentional reasoning task, participants answered its following questions/ after listening to the many-step task, participants answered its following questions	Task 2	16
+Intentional reasoning/+ Many steps	Very complex tasks After listening to the intentional reasoning task, participants answered its following question/ after listening to the many-step task, participants answered its following questions	Task 3	16

Task Difficulty Questionnaire

Another instrument employed in this study was a questionnaire of task difficulty to answer the third research question. It was used to investigate whether participants perceive task difficulty as the task complexity has been hypothesized. This questionnaire consisted of the statement of "Please express your perception of the difficulty level of the listening task you just completed", and the question of "How did you find the task?" Participants were asked to choose one of the response categories of a five-point Likert scale (very difficult,

difficult, average, pretty easy and easy) to indicate their perception of task difficulty. They completed two questionnaires each session, since as mentioned above each task of a specific degree of complexity of the current study included two different tasks.

Procedure

Examining whether tasks of different degrees of complexity affect the listening comprehension of Iranian undergraduate students was initiated by determining participants' proficiency levels by dint of the Oxford Placement Test and the participants of this study were chosen based on their performance on this placement test. To answer the first question, high proficiency participants who obtained higher than 122 were singled out. In addition, a classification was made between high proficiency and low proficiency participants to investigate the mediating role of proficiency in the effect of various degrees of complexity on listening comprehension, the high proficiency group achieved higher than 122 and the low proficiency group achieved less than 119.

The process of collecting required data occurred in the fall semester in two university classes during normal class time. An appointment was made with participants who were absent from class and could not participate in data collection during normal class time to complete listening tasks at a time other than normal class time. All students took part in data collection, but just the performances of those students who represented an appropriate level of proficiency were analyzed. Three sessions were allotted to the data collection process. A Participant completed two listening tasks each session, with a total number of 6 listening tasks during 3 sessions.

To investigate synergetic effects of resource-directing and dispersing dimensions, the ±intentional reasoning variable from resource-directing dimensions and the ± few steps variable from resource-dispersing dimensions were chosen. Various degrees of complexity were investigated using three tasks with three various degrees of complexity – simple, complex, and very complex tasks. Based on Robinson's suggestion in his SSARC model, tasks were presented in increasing order. In other words, first of all participants completed the simple tasks – the non-intentional reasoning and few-step tasks. Next session they completed the complex tasks – the non-intentional reasoning and many-step tasks. Ultimately, they completed very complex tasks – the intentional reasoning and many-step tasks.

With the aim of investigating the existence of the relationship between participants' subjective rating of task difficulty and hypothetical task complexity, participants were asked to express their perception of task difficulty of each task separately and then of both tasks together. They revealed their idea of task difficulty by one of the Likert scale options which best described their idea.

Data Analysis

Analyzing collected data was initiated with rating participants' performance on six listening tasks accumulated during three sessions and allotting a score to them. A score was allotted to each listening task performed by a participant, two scores to simple tasks, two scores to complex tasks, and two scores to more complex tasks. The mean of two scores of each group of tasks was calculated and the mean score of each group of tasks was analyzed. Furthermore, one of the five codes (1-5) was allotted to a participant's subjective rating of task difficulty based on their idea of task difficulty with a total of three codes for three groups of tasks of various degrees of complexity. Thorough saving of unprocessed accumulated data paved the way to conducting descriptive and inferential analysis afterwards.

The results of conducting descriptive analyses using SPSS software, version 27, were providing the means and standard deviations of participants' performance on three groups of tasks and conducting inferential analyses including the repeated measures ANOVA, independent t-test, one sample t-test and Spearman's rho correlations paved the way to answering three research questions of the present study.

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Results

The Influence of Cognitive Complexity on Students' Listening Comprehension

The process of manipulating different degrees of complexity took place through making modifications to the degree of complexity of two variables of cognitive complexity – the ± intentional reasoning variable from resource-directing dimensions along with the ± few steps variable from resource-dispersing dimensions – and the influence of such modifications on participants' mean scores of listening comprehension tasks was investigated. Each participant performed six listening comprehension tasks, two simple (the first group of tasks), two complex (the second group of tasks) and two more complex tasks (the third group of tasks), thus six scores were allotted to each. The mean of two scores of each group of tasks was calculated and the mean score of each group of tasks was analyzed. The repeated measures ANOVA test was employed to investigate whether there is a statistically significant difference among means of simple, complex and more complex tasks. Table 2 includes descriptive statistics for the first research question.

Table 2

Means and Standard Deviations

	Mean	Std. Deviation	N
simple task	4.3333	1.39326	18
complex task	3.2194	.87761	18
more complex task	2.8850	.69584	18

Based on what is indicated in Table 2, participants' listening comprehension performance on the simple task was better in comparison with their performance on the complex and more complex tasks (*M* for the simple task = 4.33) and their performances on complex and more complex tasks were slightly different (*M* for the complex task = 3.21 and *M* for the more complex task = 2.88) ; running the repeated measures ANOVA ,represented in Table 3, manifested these differences were statistically significant since p was smaller than .05 (F (2 , 34) = 21.96, $P < .05$). A moderate effect size (η^2) of .56 was observed.

Table 3

Repeated Measures ANOVA for the Influence of Three Different Degrees of Cognitive Task Complexity

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Complexity	Sphericity Assumed	20.702	2	10.351	21.966	.000	.564
	Greenhouse-Geisser	20.702	1.750	11.830	21.966	.000	.564
	Huynh-Feldt	20.702	1.934	10.702	21.966	.000	.564
	Lower-bound	20.702	1.000	20.702	21.966	.000	.564
Error(complexity)	Sphericity Assumed	16.021	34	.471	21.966		
	Greenhouse-Geisser	16.021	29.749	.539			
	Huynh-Feldt	16.021	32.884	.487			
	Lower-bound	16.021	17.000	.942			

Therefore, listening comprehension performances vary significantly with varying the degree of cognitive complexity of tasks. To put it another way, the quality of listening comprehension tasks which required participants to follow many steps and comprehend other people's thoughts and beliefs was worse compared to both the quality of those which required participants to follow few steps and comprehend simply

transformed information without being have to comprehend other people's thoughts and beliefs and the quality of many step tasks as well as those tasks which did not require participants to comprehend others' thoughts and beliefs.

It was needed to employ a post hoc Bonferroni test to investigate the statistical significance of differences between each pair of task means. Results in Table 4 manifested that the differences between simple and complex and simple and more complex tasks were statistically significant since p was smaller than .05 ($p < .001$), only the difference between complex and more complex tasks was not statistically significant since p was larger than .05 ($p = .29$).

Table 4

Pairwise Comparisons of 3 Pairs of Tasks

Measure: LC

(I) complexity	(J) complexity	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
1	2	1.114*	.225	.000	.517	1.711
	3	1.448*	.265	.000	.744	2.152
2	1	-1.114*	.225	.000	-1.711	-.517
	3	.334	.190	.290	-.171	.840
3	1	-1.448*	.265	.000	-2.152	-.744
	2	-.334	.190	.290	-.840	.171

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

Comparing High Proficiency Participants with Low Proficiency Participants

Based on what is indicated in Table 5 which includes descriptive statistics for research question 2, high proficiency participants' listening comprehension mean score of the simple task was higher than that of the complex and more complex tasks (*M* for the simple task = 4.33, *M* for the complex task = 3.21 and *M* for the more complex task = 2.88). Increasing cognitive complexity was associated with decreasing participants' listening comprehension performance. Low proficiency participants' listening comprehension mean score of the complex task was lower than that of the simple and more complex tasks (*M* for the simple task = 2.11, *M* for the more complex task = 1.44 and *M* for the complex task = 0.81). Increasing cognitive complexity had a negative effect on participants' listening comprehension performance on the complex tasks, but increasing the cognitive complexity of the complex task was associated with increasing their performance on the more complex task (*M* for the more complex task = 1.44).

Table 5

Descriptive Statistics for High and Low Proficiency Participant' Performance on Simple, Complex, and More Complex Tasks

	proficiency levels	N	Mean	Std. Deviation	Std. Error Mean
simple task	high proficiency group	18	4.3333	1.39326	.32839
	low proficiency group	17	2.1176	1.28123	.31074
complex task	high proficiency group	18	3.2194	.87761	.20686
	low proficiency group	17	.8194	.62424	.15140
more complex task	high proficiency group	18	2.8850	.69584	.16401
	low proficiency group	17	1.4476	.84830	.20574

In addition, a comparison was drawn between the results of low proficiency participants' performances with the repeated measures ANOVA test which aimed to investigate whether these differences are statistically significant. The differences between low proficiency participants' performance on simple and complex tasks ($p < .001$), simple and more complex tasks ($p = .02$), and complex and more complex tasks ($p = .001$) were statistically significant (Table 6).

Table 6

Repeated Measures ANOVA for Low Proficiency Participants' Listening Comprehension Performance

Measure: Listening Comprehension

					95% Confidence Interval for Difference[b]	
(I) complexity	(J) complexity	Mean Difference (I-J)	Std. Error	Sig.[b]	Lower Bound	Upper Bound
1	2	1.298*	.266	.000	.588	2.008
	3	.670*	.223	.026	.073	1.267
2	1	-1.298*	.266	.000	-2.008	-.588
	3	-.628*	.140	.001	-1.002	-.255
3	1	-.670*	.223	.026	-1.267	-.073
	2	.628*	.140	.001	.255	1.002

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

As mentioned above, there was a statistically significant difference between high proficiency participants' performance on simple and complex tasks ($p < .001$), simple and more complex tasks ($p < .001$), but the difference between their performance on complex and more complex tasks was no statistically significant ($p = .29$).

Unlike increasing the cognitive complexity of the simple task that had the same effect on groups at different proficiency levels, increasing the cognitive complexity of the complex task exercised a different effect. It had a significantly positive effect on low proficiency participants' performance on the more complex task but a statistically insignificant negative effect on high proficiency participants' performance on the more complex task.

The independent t-test which aimed to check whether there is a statistically significant difference between mean scores of high proficiency and low proficiency participants was run. Results of this statistical test reported in table 7 demonstrated that the difference between high proficiency participants' listening comprehension performance and low proficiency participants' listening comprehension performance on simple (t (33) = 4.88, $p < .001$) complex (t (33) = 9.27, $p < .001$) and more complex tasks (t (33) = 5.49, $p < .001$) was statistically significant.

Table 7

Independent T-test for Comparing the Effect of Task Complexity on High and Low Proficiency Participants' Performance

		Leven's Test for Equality of Variances		t test for Equality of Means					
								95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Differences	Std. Error Difference	Lower	Upper
simple task	Equal variances assumed	.125	.726	4.889	33	<.001	2.21569	.45323	1.29359	3.13778
	Equal variances not assumed			4.901	32.980	<.001	2.21569	.45211	1.29584	3.13554
complex task	Equal variances assumed	1.613	.213	9.273	33	<.001	2.40003	.25883	1.87344	2.92304
	Equal variances not assumed			9.363	30.724	<.001	2.40003	.25634	1.87703	2.92304
more complex task	Equal variances assumed	.347	.560	5.494	33	<.001	1.43735	.2616	.90512	1.96959
	Equal variances not assumed			5.463	31.010	<.001	1.43735	.26311	.90073	1.97397

Cohen's d test result indicated a large effect size of 1.34 for the simple task and medium effect sizes of 0.76 and 0.77 for complex and more complex tasks respectively (Table 8).

Table 8

Independent Samples Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
simple task	Cohen's d	1.34011	1.653	.871	2.417
	Hedges' correction	1.37156	1.615	.851	2.361
	Glass's delta	1.28123	1.729	.824	2.604
complex task	Cohen's d	.76532	3.136	2.122	4.129
	Hedges' correction	.78328	3.064	2.073	4.034
	Glass's delta	.62424	3.845	2.356	5.309
more complex task	Cohen's d	.77352	1.858	1.049	2.648
	Hedges' correction	.79167	1.816	1.025	2.587
	Glass's delta	.84830	1.694	.797	2.562

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control group.

Relationship Between Perceived Task Difficulty and the Theoretical Expression of Task Complexity

The answer to this question shed light on the relationship between high proficiency participants' perceived task difficulty and the hypothetical formulation of task complexity. In other words, it was an investigation of whether participants rate hypothetically more complex tasks which were two manipulated variables from cognitive complexity dimensions, ±intentional reasoning and ± few steps, more difficult. To indicate their perception of task difficulty, high proficiency participants chose one of the response categories of a five-point Likert scale (very difficult, difficult, average, pretty easy and easy) and wrote it on their answer sheet. To be able to analyze collected data, one was assigned to very difficult and 5 to easy. Table 9 includes the descriptive statistics of participants' perceived task difficulty. Based on the analysis results, indicated by Table 9, the mean of 18 high proficiency participants' perception of task difficulty of the complex task was smaller – closer to very difficult (one) – compared to that of their perception of task difficulty of simple and more complex tasks; and the largest mean score was assigned to the more complex task. In other words, participants did not rate the more complex task as very difficult.

Table 9

Descriptive Statistics for Perceived Task Difficulty

	N	Minimum	Maximum	Mean	Std. Deviation
simple task	18	2.00	4.50	3.3056	.69956
complex task	18	1.00	4.50	3.1389	.84984
more complex task	18	2.50	4.50	3.4861	.76443
Valid N (listwise)	18				

The statistical test run to investigate whether participants' subjective rating was in line with the level of complexity of the task was the one sample t-test; that is to say, it tested whether the task rated as more difficult was more complex (Table 10). Results of the statistical test (one sample t-test) confirmed the existence of a statistically significant difference between participants' perception of task difficulty and the hypothetical formulation of task complexity (t (17) =13.79, $p < .05$).

Table 10

One Sample T-test for Perceived Task Difficulty

	Test Value = 1					
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
more complex task	13.798	17	.000	2.48611	2.1060	2.8663

Furthermore, Spearman's rho correlations, which are appropriate statistical tests for ranked data, allowed investigating the relationship between participants' perceived task difficulty and the hypothetical formulation of task complexity. Participants' subjective rating of task difficulty and the complexity degree of the task correlated significantly (r_s (18) = .66, $p < .05$), but the nature of Spearman's correlation coefficient was positive and increasing the complexity of the task was not accompanied by decreasing scores participants assigned to the task to indicate their perceived task difficulty (Table 11).

Table 11
Spearman's Rho Correlations for Perceived Task Difficulty

			simple task	complex task	more complex task
Spearman's rho	simple task	Correlation coefficient	1.000	.686**	.667**
		Sig. (2-tailed)		.002	.003
		N	18	18	18
	complex task	Correlation coefficient	.686**	1.000	.483*
		Sig. (2-tailed)	.002		.042
		N	18	18	18
	more complex task	Correlation coefficient	.667**	.483*	1.000
		Sig. (2-tailed)	.003	.042	
		N	18	18	18

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Discussion

The starting point of this study was Robinson's SSARC model (2010) which allowed moving toward the primary aim of investigating the influence of three various degrees of task complexity, simple, complex, more complex over undergraduate participants' listening comprehension performance. Dimensions which were under investigation involved ± intentional reasoning demand dimension as one of the resource-directing dimensions of cognitive complexity and ± few steps dimension as one of the resource-dispersing dimensions of cognitive complexity; simple tasks were non-intentional reasoning and few-step ones; complex tasks were non-intentional reasoning and many-step ones and more complex tasks were intentional reasoning and many-step ones. Another aim of this study included investigating the mediating role of participants' proficiency level in performing tasks with three different levels of cognitive complexity presented in sequence, simple, complex, more complex which was achieved by grouping participants into high and low proficiency groups. The final aim was to determine how equivalent participants' subjective rating of task difficulty and theoretically expressed task complexity are. Based on Robinson's cognition hypothesis (2003), contrary to raising the cognitive complexity of tasks on resource-dispersing dimensions, raising cognitive complexity of tasks on resource-directing dimensions is conducive to learners' better linguistic performance, whereas it is not stated what the influence of raising cognitive complexity on learners' linguistic performance based on the principles of SSARC model is.

Analyzing participants' listening comprehension performance on simple, complex, and more complex tasks confirmed the negative influence of the complex task as well as the more complex task. Raising cognitive complexity only on resource-dispersing dimensions, non-intentional reasoning and many-step tasks, and concurrently on both resource-directing and dispersing dimensions, intentional reasoning and many-step tasks, can be conducive to worse listening comprehension performance. Since the influence of raising cognitive complexity just on resource-dispersing dimensions, non-intentional reasoning and many -step tasks, and concurrently on both resource-directing and dispersing dimensions, intentional reasoning and many-step tasks, was statistically significant it can be said that high proficiency participants' listening comprehension performance changes with changing the degree of the cognitive complexity of the simple task. But because of the absence of a statistically significant difference between complex and more complex tasks it can be said that participants' listening comprehension performance does not change by raising the cognitive complexity of the complex task. Therefore, the first hypothesis of this study that

participants' performances on simple, complex and more complex tasks do not differ significantly is rejected. This result is in harmony with the results of Awwad et al's (2017), Malicka's (2014), Malicka and Levkina's (2012), Révész et al's (2017), and Zare-ee's (2013) study which indicated participants' linguistic performance was influenced by raising the cognitive complexity of tasks. Some other studies have been conducted which their results and the result of this study are not in harmony with each other completely: Farrokhi and Sattarpour's(2017), Ishikawa's(2008), Kim and Ventura's (2011), and Robinson's (2007 a) study which confirmed the tendency of just some areas of language production of participants to be affected by raising cognitive complexity. The difference between this study result and previous studies results may be due to the way of operationalizing cognitive complexity in this study which is different. Previous studies except Farrokhi and Sattarpour's(2017) study focused on increasing task complexity just on resource-directing dimensions that may be the reason for the difference between the results of those studies and the result of this study which focused on increasing task complexity along both resource-directing and dispersing dimensions.

The results of the present study that high proficiency participants' performance changes significantly by raising cognitive complexity of tasks indicates that performing simple and complex tasks ahead of the more complex task fails to reduce the degree of the cognitive demands of the more complex task through reinforcing what formerly has been learned. It seems that the degree of cognitive complexity plays a more important role in participants' listening comprehension performance compared to the role of performing simpler tasks prior to the more complex task. In addition, simple and complex tasks performed ahead of the more complex task failed to play the scaffolding role which is advantageous to participants' performance. Cognitively more demanding tasks dispersed participants' attention so that they could not attend to controlling how to perform tasks (Malicka, 2014). Although, the lack of the statistically significant difference between complex and more complex tasks indicates that raising the cognitive complexity of tasks does not always lead to worse results rather it depends on the tasks which are made complex and dimensions on which complexity is raised.

Comparing high proficiency and low proficiency participants' listening comprehension performance on simple, complex, and more complex tasks, this study manifested that listeners' proficiency levels mediate their linguistic performances. Raising the cognitive complexity of simple and complex tasks had approximately a different effect on high and low proficiency listeners; while raised task complexity had a negative effect on high proficiency listeners' performance, it affected one of low proficiency listeners' performances positively but another negatively. Raising complexity of the simple task had a significant negative effect on both low and high proficiency participants' performance as concluded from comparing their performance on the simple task with their performance on complex and more complex tasks, but raising complexity of the complex task had a significant positive effect on low proficiency listeners' performance and an insignificant negative effect on high proficiency listeners' performance that indicated by comparing their performance on complex and more complex tasks. In addition, high and low proficiency participants' responses to different levels of tasks were different. High proficiency listeners' performance on simple, complex, more complex tasks was better than low proficiency listeners' performance on the same tasks. Therefore, the second hypothesis of this study that there is no statistically significant difference between the influence of task complexity on low and high proficiency participants' listening comprehension performance is not confirmed. The results of the role of proficiency that refer to the effectiveness of proficiency levels in mediating the effect of raised complexity on participants' performance bear a resemblance to Awwad and Tavakoli's (2022), Malicka's (2014), and Malicka and Levkina's (2012) study results that demonstrated the difference between high and low proficiency participants' performance on complex tasks. These results also bear a resemblance to Xu and Fan's (2021) study results that demonstrated the relationship between task complexity and using mother tongue is under the influence of L2 proficiency.

Ultimately, the third finding of this study indicated that the more complex task was not more difficult in participants' estimation. Participants failed to assess intentional reasoning and many-step listening tasks as ones which are also more difficult. As a consequence of this finding, the third hypothesis

of this study that there is no significant relationship between task complexity and task difficulty is confirmed. The absence of a relationship between task difficulty in participants' estimation and task complexity is opposite the theoretical expression of task complexity within the SSARC model which considers tasks with intentional reasoning and many steps as more complex. This finding of the present study is not in harmony with the finding of Awwad et al's (2017) study which demonstrated that learners' perceived task difficulty significantly depends on intentional reasoning and with Robinson's (2007 a) study that found learners' perception of task difficulty is influenced by task complexity. Zare-ee's (2013) study found that except for one dimension there is no relationship between task complexity and task difficulty and this is relatively in harmony with the finding of the present study. As stated above participants did not rate the more complex task more difficult than its simpler versions, and therefore it was not so difficult in participants' estimation to be rated as more difficult. Such a mismatch between perceived task difficulty and the theoretical expression of task complexity occurred since complexity increased gradually; to put it another way, if participants were given only the more complex task, they might have rated it more difficult. It seems that the burden of the cognitive load of the more complex task has been spread on simple, complex, and more complex tasks in participants' estimation.

Conclusions, Implications and Limitations

The present study included three investigations: the tendency of high proficiency listeners' performance to be altered by altering the degree of the cognitive load of tasks, the way learners' proficiency level mediates their linguistic performance, the resemblance between learners' assessment of task difficulty and task complexity introduced within SSARC model.

The first finding of this study was the dependence of high proficiency learners' listening performance on the degree of the cognitive loads of tasks. Raised cognitive load was disadvantageous to participants' performance. The absence of a significant negative effect of raising the cognitive load of the complex task is probably related to taking advantage of performing the complex task before the more complex one as well as the dimension on which complexity has been raised. Ineffectiveness of raised complexity in having a significant positive effect is presumably down to the insufficiency of the degree of complexity of the complex resource-directing task.

The second finding indicated the difference between the effect of increasing cognitive loads of tasks on listening comprehension performance of high proficiency and low proficiency participants. Therefore, performing cognitively complex tasks can be mediated by proficiency levels of task performers. Increasing cognitive complexity should occur with considering proficiency levels of learners.

The third finding was related to participants' rating of the more complex task. It was not so that the more complex task was necessarily rated as the more difficult one. Different factors such as the proficiency level of task performers, being preceded by simpler tasks, the linguistic mode of the task, the time interval between performing tasks of different complexity levels, and dimensions along which cognitive complexity has been raised may have mediated their rating.

Some implications of this study for second language teachers and task designers are as follows:

L2 teachers should use tasks of lower degree of complexity before presenting more complex tasks to high proficiency learners since more complex tasks disperse participants' attention and result in worse performance. Participants' performance on the more complex task indicates that they dominate simpler tasks prior to the more complex task as the more complex task is more demanding and needs more attentional resources compared to simpler tasks. Therefore, task complexity should be raised gradually.

Task designers and L2 teachers can use the cognitive complexity of tasks as a criterion for presenting order of tasks.

Teachers could focus on variables investigated in this study to increase participants' ability to reason about others' intentions based on the fact that there is a direct relationship between comprehending language and producing it.

Using the results of investigation on the mediating effect of proficiency on the influence of raised complexity on listening comprehension, teachers should decide on the degree of the cognitive complexity of tasks based on learners' language proficiency levels.

As increasing the degree of complexity of the complex task affected low proficiency listeners' listening comprehension performance positively, this should be considered by teachers and task designers that performing the complex task before the more complex one is able to help low proficiency learners to perform better on the more complex task that is more demanding since it scaffolds participants' comprehension of the more complex task. Therefore, low proficiency learners' successful performance on the more complex task may be mediated this way.

To improve low proficiency participants' performance on the complex task, it may be required to lengthen the time interval between presenting simple and complex tasks and it should be longer than the time interval between complex and more complex tasks.

The present study also suffers from some limitations: The dimensions ± intentional and ± few steps investigated have not been checked simultaneously to date. In addition, neither of them has been selected to investigate the influence of raising task complexity along these dimensions on listening comprehension performance. Therefore, tasks designed for this study lack support of the previous studies. It is noteworthy that the present study attempted to investigate unresearched dimensions to trigger further research on unresearched variables within task-based language teaching.

High proficiency listeners' subjective assessment of task difficulty was investigated to match it with the theoretical expression of task complexity. To check the role of proficiency in this regard, low and high proficiency participants' perception of task difficulty could have been compared. To put it another way, the present study did not investigate the role of proficiency in the degree of match between task performers' perception of task difficulty and the theoretical expression of task complexity.

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