Analysis of IELTS and TOEFL reading and listening tests in terms of Revised Bloom’s Taxonomy

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Abstract: The main purpose of this quantitative-qualitative content analysis study was to compare IELTS and TOEFL listening and reading tests based on the representation of the learning objectives of Revised Bloom’s taxonomy. To this end, 12 Academic IELTS listening and reading tests and 12 TOEFL iBT listening and reading tests were analyzed qualitatively and quantitatively. The contents of these tests were codified using a coding scheme developed by the researcher. To ensure the reliability of the coding, the test items were coded twice by the main researcher with a two-week time interval. Three coders (the researchers in this study) also independently codified the test items. The inter-coder and intra-coder reliability of the coding turned out to be .68 and .83, respectively. The Fisher-Freeman-Halton and Monte Carlo tests were used to analyze the data. Our results revealed that IELTS listening test items mainly revolved around Understanding and Remembering Factual Knowledge, respectively, while TOEFL listening test items drew on Understanding, Analyzing, and Remembering Factual Knowledge, respectively. Furthermore, the results demonstrated that lower-order thinking skills featured more prominently in IELTS listening tests than TOEFL listening tests. A significant difference was also found between IELTS and TOEFL reading tests in terms of learning objectives. That is, IELTS and TOEFL reading tests covered three and seven learning levels, respectively with the former overwhelmingly assessing lower-order
thinking skills and the latter drawing on both lower-order and higher-order thinking skills. The implications of the findings are also delineated.

**Subjects:** Language & Linguistics; Language Teaching & Learning; Literature

**Keywords:** IELTS; TOEFL; listening; reading; Revised Bloom's Taxonomy

### 1. Introduction

In recent years, there has been mounting interest in the content analysis of test items in terms of their cognitive difficulty. The identification of the cognitive domains of the IELTS and TOEFL productive and receptive skills is of great value to IELTS and TOEFL trainers.

Receptive skills, i.e. listening and reading are problematic for most IELTS and TOEFL test takers (Aryadoust, 2012). They seem to lack the ability to answer questions demanding the skills involving different cognitive levels. To promote test-takers’ receptive skills, IELTS and TOEFL trainers need to devote close attention in terms of sustaining the proper balance between lower and higher-order cognitive questions. That is, they should practice questions spanning the full range of cognitive categories. Blooms’ Revised Taxonomy of the cognitive domain (2001) is a prevailing mental construct of thinking which analyzes the instructional objectives and questions in terms of levels of the cognitive domain. Based on this framework, cognitive levels are arranged in order ranging from simple to complex with Remembering and Creating being the first and the last, respectively. Lower-level questions entail the recall of specific and general information. On the contrary, higher-level questions, require learners to involve in deeper thinking processes. A carefully thought-out learning objective obtained from the analysis of the IELTS and TOEFL questions will provide IELTS and TOEFL trainers with a strong indication of the cognitive level of learning tasks and skills.

Much of the burgeoning research base has addressed different sections of IELTS and TOEFL e.g. the cognitive processing of test-takers’ completing the IELTS and TOEFL tests (e.g. Aryadoust, 2013; Aryadoust & Goh, 2009; Field, 2009; Jung Lim, 2014). In fact, all the previous studies regarding the cognitive processing involved in the IELTS and TOEFL have centered on test-takers’ mental processing and their use of language to undertake a test task. Test-takers’ performance is influenced by different factors such as “inaccurate performance appraisals” which might result in poor use of cognitive strategies (Phakiti, 2016, p. 26). Therefore, to explore the key cognitive processes represented in the IELTS and TOEFL, empirical research should also look into the cognitive processes underlying these tests beyond the mere test-takers’ performance to validate the cognitive processes of the test tasks.

There is a wealth of research (Ebadi & Shahbazian, 2015; Razmjoo & Kazempourfard, 2012; Razmjoo & Madani, 2013; Sahragard & Zahed Alavi, 2016) elaborating on the learning objectives pursued within textbooks or exam questions in the context of language teaching in view of the Revised Bloom’s Taxonomy. Evidently, the cognitive processes and learning objectives presented by the items of these tests regardless of test-takers’ performance have largely been neglected in research terms. Along the same lines, the cognitive processes involved in IELTS reading and listening tests have largely been unresearched (Taylor & Weir, 2012). This is an important gap in the research base that we intend to fill. Therefore, the current study aims to compare the cognitive processes and learning objectives in the reading and listening modules of the IELTS and TOEFL with respect to the Revised Bloom’s Taxonomy as the framework of the study. To achieve the objectives of the study, the following research questions were formulated:

(1) How do listening tests of IELTS and TOEFL differ in terms of the representation of learning objectives presented in Revised Bloom’s taxonomy?

(2) How do reading tests of IELTS and TOEFL differ in terms of the representation of learning objectives presented in Revised Bloom’s taxonomy?
1.1. Significance of the study

The study could be significant and productive in several ways. First, the results can be a great contribution to IELTS and TOEFL trainers. Being aware of the learning objectives the IELTS and TOEFL tests, IELTS and TOEFL trainers can effectively boost their strategies and practices relating to the language skills in question. Further, the findings of the present study redound to IELTS and TOEFL test preparation programs and training courses. In fact, the analysis of the IELTS and TOEFL tests can contribute to the IELTS and TOEFL trainers to gain useful insights into the nature of questions. Taken together, the results of the study are significant in that they can provide insights into the effective instruction of the reading and listening of the IELTS and TOEFL tests.

2. Theoretical framework

The present study draws on the revised version of Bloom’s taxonomy (Anderson & Krathwohl, 2001) as its theoretical framework developed and emerged from Bloom’s original taxonomy (1956) with a fundamental model of cognitive domains and learning objectives at its heart.

As a two-dimensional domain, Revised Bloom’s Taxonomy embraces two domains, i.e. cognitive and knowledge dimensions. The six cognitive levels of increasing complexity entail Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating. Remembering, as the first cognitive dimension refers to retrieving related knowledge from long-term memory. The next dimension, Understanding, “involves determining the meaning of instructional messages, including oral, written, and graphic communication” (Krathwohl, 2002, p. 215). Applying concerns the use of a procedure or learned material in a given situation. Analyzing is to do with breaking more complex information into its constituent parts, detecting the relationship between them and recognizing the organizational principles involved. Evaluating points to making judgments based on definite criteria and standards. Creating as the last and the highest dimension involves putting parts together so as to form a novel and integrated whole or develop an original product.

Figure 1 depicts the hierarchy of the cognitive process categories presented in the Revised Bloom’s Taxonomy.

The four knowledge dimensions as defined by Anderson and Krathwohl (2001) include factual, conceptual, procedural, and metacognitive. The first knowledge dimension is factual knowledge which refers to the underlying elements students need to know to be familiar with a discipline to address associated problems. Conceptual knowledge centers on the interconnections among the underlying elements within a larger structure allowing them to work in tandem. Procedural knowledge is concerned with the way things are done and with criteria to determine the appropriate time to use skills, algorithms, and procedures. Metacognitive knowledge viewed as the highest level of the knowledge dimension in Revised Bloom’s Taxonomy refers to awareness and knowledge of one’s own thinking (Anderson & Krathwohl, 2001). Table 1 shows the structure of Revised Bloom’s Taxonomy.

3. Literature review

A review of the literature indicates that a few studies have investigated the cognitive processes underlying the listening section of the IELTS and TOEFL (Aryadoust, 2013; Aryadoust & Goh, 2009; Field, 2009). In fact, these studies addressed the cognitive processes adopted by candidates taking listening tests of IELTS and TOEFL. For example, in a study examining the cognitive validity of the lecture-listening component of the IELTS listening, Field (2009) concluded that the IELTS listening test format limited test-takers’ cognitive processing. Moreover, the evidence of candidates’ test-specific behavior was observed which implies that the candidates’ responses were reliant on the characteristics of the test. He reported that in gap-filling items, test takers mainly focused on the word level, while in multiple-choice questions, test takers’ attention switched between the listening and reading in which high levels of attention are demanded. Aryadoust and Goh (2009) also examined Rasch-based differential item functioning of the IELTS listening test. The results of their research were in accord with those of Field’s (2009) study.
Along the same lines, Aryadoust (2013) found that the listening construct in the IELTS test was underrepresented. He noted that gap-filling and multiple-choice items as short-answer questions placed the cognitive limitations on listeners. He also found that test wiseness can affect the performance of the candidates. That is, test-wise low-ability candidates appeared to be taking advantage of the cognitive limitation of test items.

Further, a few studies have examined the cognitive processes underlying the IELTS and TOEFL reading sections. For instance, Weir, Hawkey, Green, and Devi (2009) employed retrospective questionnaires to explore the cognitive processes underlying the IELTS academic reading construct on the basis of Khalifa and Weir (2009) cognitive hierarchy model of reading. Based on their results, expeditious reading was instrumental in the way candidates sought to answer the questions. They compared the cognitive processes underlying the IELTS and TOEFL reading tests based on the test-takers’ performance. The present study, however, sought to compare these two tests regardless of test-takers’ performance.

Focusing on local reading, Bax (2013) used eye-tracking to explore test-takers’ cognitive processing while completing on-screen IELTS reading test items. The results revealed that successful candidates mostly used conscious metacognitive strategies with a view to reading expeditiously. Unsuccessful candidates, on the other hand, did not capitalize on conscious strategies.

Jung Lim (2014) conducted an eye-tracking study to explore the extent to which the TOEFL iBT reading test activated the cognitive processes being measured. She found that expeditious reading skills (i.e., the skills of reading a text quickly) were rarely activated while, at a sentential level, careful reading including reading to learn or reading to memorize seemed to be dominant. The researcher concluded that for vocabulary questions measuring candidates’ abilities to make inferences, test takers relied on their stored knowledge. Additionally, successful and unsuccessful
| Knowledge Dimension       | Cognitive Process Dimension |
|---------------------------|----------------------------|
|                           | Remember       | Understand  | Apply | Analyze | Evaluate | Create |
| Factual Knowledge         |               |             |      |         |          |        |
| Conceptual Knowledge      |               |             |      |         |          |        |
| Procedural Knowledge      |               |             |      |         |          |        |
| Metacognitive Knowledge   |               |             |      |         |          |        |
readers differed in terms of their eye-movements while answering the item types associated with vocabulary and factual questions requiring locating and matching of words.

Adopting Khalifa and Weir (2009) cognitive hierarchy model of reading to analyze test-takers’ verbalizations, Owen (2016) examined the cognitive processes activated by IELTS and TOEFL iBT reading tests. He concluded that some of the higher-level cognitive processes in Khalifa’s and Weir’s model were not adequately represented in the IELTS and TOEFL, including inferential reasoning and forming a text-level representation. Focusing on test-takers’ verbalizations, Owen (2016) interpreted the observable test-taking strategies as the cognitive processes activated by IELTS and TOEFL iBT reading tests. Nonetheless, the present study adopted a different view, i.e., analyzing the test items, to identify the cognitive processes represented in IELTS and TOEFL iBT.

A review of the literature indicates that the majority of previous studies employed eye-tracking to investigate the cognitive processes involved in the IELTS and TOEFL tests. However, Bax and Chan (2019) demonstrated that the eye-tracking data separately cannot positively identify readers’ cognitive processes quickly. Clearly, the cognitive processes included in IELTS and TOEFL items regardless of test-takers’ performance have not thus far been touched upon. Additionally, the previous studies were descriptive rather than evaluative. Moreover, most studies (e.g., Bax, 2013; Jung Lim, 2014) also explored the cognitive skills underlying just one section of the IELTS and TOEFL such as reading or listening.

Bloom’s Taxonomy (1956) has been viewed as “an acceptable guideline in constructing appropriate exam questions associated with various cognitive levels” (Omara et al., 2012, p. 297). Bloom’s Taxonomy and its revised version i.e. Revised Bloom’s Taxonomy have been widely in place in constructing questions (Lister & Leaney, 2003), evaluating student cognitive mastery (Oliver, Dobele, Greber, & Roberts, 2004), textbook evaluation (Parsaei, Alemokhtar, & Rahimi, 2017; Razmjoo & Kazempourfard, 2012; Sahragard & Zahed Alavi, 2016) and determining the cognitive level of examination questions (Chang & Chung, 2009; Ebadi & Shahbazian, 2015; Karamustafaoglu, Sevim, Karamustafaoglu, & Cepni, 2003; Razmjoo & Madani, 2013; Momsen et al., 2013; Veeravagu, Muthusamy, Marimuthu, & Subrayan, 2010; Zheng, Lawhorn, Lumley, & Freeman, 2008).

For instance, Khorsand (2009) probed the questions used by Iranian EFL teachers in advanced reading comprehension tests based on the cognitive dimensions of Bloom’s taxonomy. She found that although the reading comprehension questions included all cognitive levels presented in Bloom’s taxonomy, the first two cognitive levels (Knowledge and Comprehension) were more frequent than the other cognitive levels in the reading tests. Accordingly, the researcher reported that reading comprehension tests overwhelmingly assessed lower-order cognitive domains.

Comparing the thinking levels represented in reading comprehension questions and the performance of learners, Veeravagu et al. (2010) analyzed the reading test items based on Bloom’s taxonomy. They found that the level of questions designed with regard to the learning objectives in Bloom’s taxonomy affected learners’ performance in answering reading comprehension questions. Accordingly, there existed a relationship between thinking levels required and the learners’ ability in answering these questions.

Razmjoo and Madani (2013) also investigated the university entrance exam items in three majors of Mathematics, Natural Sciences, and Humanities, and in two state and Islamic Azad universities, using Revised Bloom’s Taxonomy. They found that lower-order thinking skills were dominant in the items. Creating was absent among the used levels. Their results also revealed that higher levels of thinking are more frequent in Azad university exams than those of state universities. Concerning the majors, Mathematics ranked first regarding the levels of thinking. Moreover, they concluded that Iran’s university entrance exams do not help learners be critical thinkers.
Rezaee and Golshan (2016) adopted the Bloom’s Taxonomy to analyze English final exams of Iranian high schools. Based on their results, the test questions covered three cognitive levels (Knowledge, Comprehension, and Application) in which Comprehension was reported to be the most dominant level.

Tangsakul, Kijpoonphol, Linh, and Kimura (2017) also used the revised version of Bloom’s taxonomy to analyze 416 reading comprehension questions in the Grade 9 English Ordinary National Education Test (O-NET) academic in the years 2013–2016. They found that from 2013 to 2015, Remembering was the most frequent cognitive level in the reading comprehension tests, while in 2016, Understanding was the most dominant cognitive level.

Adopting the revised version of Bloom’s taxonomy as the framework, NamazianDoost and HayaviMehr (2017) compared the reading comprehension questions of Iranian high-school English textbooks and IELTS tests in terms of the representation of cognitive levels. They found that in both high school textbooks and IELTS reading comprehension questions, there was a tendency towards the lower-order cognitive levels.

In a recent study by Mizbani, Salehi, and Tabatabaei (2020), they investigated the content of the four skills of listening, speaking, reading, and writing Vision 1, the textbook of senior high school, grade 1 based on Bloom’s Revised Taxonomy. The findings of their study did not reveal any evidence of higher levels of the cognition and thinking process concerning the four skills in the textbook.

4. Methodology

4.1. Research design

The present study is designed on a quantitative-qualitative content analysis basis. Content analysis brings about replicable and sound inferences from texts to the contexts in which they are used (Krippendorff, 2004). In quantitative content analysis, features of a text are thoroughly classified and analyzed (Coe & Scacco, 2017). In fact, the main goal of quantitative content analysis is to explore the meanings and themes of messages so as to identify how they are organized and presented. By contrast, qualitative content analysis is the most widespread approach to the qualitative analysis of texts in which key themes are unearthed, categorized, and analyzed (Bryman, 2004).

4.2. Materials

4.2.1. IELTS

As the IELTS does not grant researchers access to live test versions, the test materials were taken from 12 sample tests presented in the book, Crack IELTS: Practice Tests (Bagheri, Akbari, & Riasati, 2016). The materials used in this book include the retired IELTS tests collected by the authors who are certified IELTS examiners. The IELTS tests included in this book conform to the IELTS specifications and are therefore representative of genuine IELTS test materials.

4.2.1.1. Academic IELTS reading test. Each reading test included three reading passages and 40 questions covering a number of task types. A wide range of reading skills is assessed in the IELTS reading test. These skills include reading for gist/main idea/detail, skimming, understanding the logical argument, inferences and implied meaning, and recognizing writers’ opinions, attitudes and purpose. The length of the IELTS Academic reading test is between 2,150 to 2,750 words.

The IELTS reading test includes various question types (e.g., multiple choices, identification of information or the writer’s views/claims, matching information, headings, features, and sentence endings, summary, note completion, sentence completion, table completion, flow-chart/diagram
label completion, and short-answer questions). It should also be noted that the number of different question types is variable.

4.2.1. Academic IELTS listening test. Each listening test also included four sections including a conversation between two people, a monologue on everyday social context, a conversation up to four people and a monologue including a lecture on academic subjects. Each section contained 10 questions. A variety of question types are used in the IELTS listening test, ranging from multiple-choice, matching, form/note completion, table/flow-chart/summary completion, sentence completion, plan/map/diagram labeling and short-answer questions. Here again, the number of different question types is variable.

4.2.2. TOEFL

Twelve real TOEFL iBT tests were randomly selected from TOEFL Practice Online (TPO) tests. TPO tests are official, full-length TOEFL iBT practice tests available through the official ETS TOEFL Practice Online website.

4.2.2.1. TOEFL iBT reading test. Reading is the first section on the TOEFL iBT. The TOEFL iBT reading section includes three passages with 41 or 42 questions that measure test takers’ ability to understand university-level academic texts and passages. All passages are classified into three basic categories: Exposition (materials that provide an explanation of a topic), Argumentation (materials that present a point of view about a topic and some evidence to support it), and Historical (materials that provide an explanation of a historical event or present history of a subject such as art or science) (ETS, 2018).

There are three question formats in the reading section of TOEFL iBT: 1) multiple-choice questions with four alternatives and one correct answer in a traditional format, 2) questions that ask test takers to select one of the four choices and insert it where it fits best in a passage, and 3) questions with more than four alternatives and more than one possible correct answer.

4.2.2.2. TOEFL iBT listening test. The listening section of the TOEFL test encompasses academic lectures and long conversations. The TOEFL iBT listening section is composed of two separately timed parts and each part encompassed one conversation and two lectures. Each TOEFL iBT listening test includes 30, 31 or 32 questions.

Four types of questions are presented in the listening section: 1) multiple-choice questions with four alternatives and one correct answer, 2) multiple-choice questions with more than one correct answer, 3) questions that require the test takers to order events or steps in a process, and 4) questions that ask the candidates to match objects or text to categories in a chart.

4.3. Coding scheme

A coding scheme based on the Revised Bloom’s Taxonomy was employed to codify, classify, and analyze the test questions. The coding scheme included six levels ranging from Remembering which implies the simple recall or recognition of facts, to creating as the most complex and abstract mental level. In the present study, the first three levels in Revised Bloom’s Taxonomy (Remember, Understand, and Apply) were considered as the lower-order thinking skills and the second three levels (Analyze, Evaluate, and Create) were considered as the higher-order thinking skills. Table 2 demonstrates the results of the coding scheme.

As the borderlines among the six cognitive levels presented in the Revised Bloom’s Taxonomy are fuzzy and sometimes tend to overlap, many researchers have found the classification of items into one of these levels a difficult process (Rawadieh, 1998). To resolve the problem, inter-coder and intra-coder reliabilities were calculated. Accordingly, the data were coded twice by the main researcher with a two-week time interval and the degree of consistency between the two coding
Table 2. Coding scheme based on Revised Bloom’s Taxonomy

| Knowledge Dimension          | Cognitive Process Dimension |
|-----------------------------|-----------------------------|
|                             | 1. Remember | 2. Understand | 3. Apply | 4. Analyze | 5. Evaluate | 6. Create |
| A. Factual Knowledge        | A1          | A2            | A3        | A4          | A5          | A6        |
| B. Conceptual Knowledge     | B1          | B2            | B3        | B4          | B5          | B6        |
| C. Procedural Knowledge     | C1          | C2            | C3        | C4          | C5          | C6        |
| D. Metacognitive Knowledge  | D1          | D2            | D3        | D4          | D5          | D6        |
attempts was estimated. Following the guidelines from Altman (1999), the results of Cohen's Kappa ($\kappa = .83$) represented an almost absolute agreement between the two coding attempts.

In addition, two other researchers in the study independently codified the data. The coders finally resolved the areas of disagreement and unanimously decided on the codes. To determine if there was an agreement among the three codings, Fleiss kappa was performed, the results of which indicated a substantial agreement ($\kappa = .68$) among the three codings.

4.4. Data collection and data analysis procedures

To evaluate the learning objectives of the test items, 12 Academic IELTS listening and reading and 12 TOEFL iBT listening and reading tests were selected. Then, three coders codified the test items based on Revised Bloom’s Taxonomy separately.

To ensure the intra-coder reliability, the test items were coded twice by the researcher in a two-week time span and the degree of consistency in the two coding attempts was estimated. To estimate the intra-rater reliability, the Fleiss Kappa reliability was run in Minitab software. Additionally, Cohen’s Kappa reliability was run using Statistical Package for Social Sciences (SPSS) to estimate the inter-rater reliability.

In the process of data analysis, SPSS software (version 21) was used. To compare IELTS and TOEFL listening tests in terms of the representation of learning objectives, the Fisher-Freeman-Halton Test was run. The Chi-square test was also performed to investigate if there was any significant difference between the frequency of lower and higher-order thinking skills in the IELTS and TOEFL listening tests.

Furthermore, to assess whether there was any significant difference between IELTS and TOEFL reading tests in terms of the representation of learning objectives, the Monte Carlo test was run. A Chi-square test was also performed in order to compare the IELTS and TOEFL reading tests in terms of the frequency of lower and higher-order thinking skills.

5. Results

5.1. Comparing the IELTS and TOEFL listening tests

The first objective of the study was to determine if listening tests of IELTS and TOEFL were different in terms of the learning objectives presented in Revised Bloom’s taxonomy. As the assumption of the chi-square test regarding the expected values was violated, the Fisher-Freeman-Halton Test was performed to compare the IELTS and TOEFL listening tests in terms of the representation of learning objectives. Tables 3 and 4 depict the results of frequency and Fisher-Freeman-Halton Test for the listening tests of IELTS and TOEFL, respectively.

According to Table 3, A1 (Remembering Factual Knowledge) and A2 (Understanding Factual Knowledge) learning levels were included in the listening section of both tests. The results of the

| Category | A1 | A2 | A4 | B4 | C2 | Total |
|----------|----|----|----|----|----|-------|
| Test     | IELTS | 76  | 388 | 0  | 16 | 0     | 480   |
| TOEFL    | 47  | 249 | 105 | 0  | 7  | 408   |
| Total    | 123 | 637 | 105 | 16 | 7  | 888   |

*Skill = Listening
frequency also showed that IELTS listening tests taped three learning levels (A1, A2, and B4), while TOEFL listening tests covered four learning levels (A1, A2, A4, and C2). The representation of cognitive domains in the IELTS and TOEFL listening tests is depicted in Figure 2.

The significance level presented in Table 4 demonstrated that there was a significant difference between the IELTS and TOEFL listening tests in terms of the representation of learning levels (sig. = .000, p < .05). It implies that the distribution of learning levels is not equal in the IELTS and TOEFL listening tests.

Based on the results, although A2 (Understanding Factual Knowledge) was the dominant learning level in both tests, it was more frequent in the IELTS listening tests (F = 388) than the TOEFL listening tests (F = 249). A1 (Remembering Factual Knowledge) also had a higher frequency in the IELTS listening tests than TOEFL listening tests. Besides, the results of the frequency demonstrated that in 105 cases of the TOEFL listening task, A4 (Analyzing Factual Knowledge) was represented, while this learning level was absent in the IELTS listening tests. The TOEFL listening tests also included C2 (Understanding Procedural Knowledge), whereas the IELTS listening tests did not benefit from this learning level. The IELTS listening tests encompassed 16 cases of B4 (Analyzing Conceptual Knowledge), while this learning level was absent in the TOEFL listening tests.

Furthermore, Cramer’s V as a test of the strength of association showed that there was a high degree of association between the variables, i.e. tests and representation of learning levels. Figure 3 visually depicts the frequency of counts in the listening section of both tests.
To examine if the differences between the frequencies of the occurrence of higher and lower-order skills in IELTS and TOEFL listening tests were significant, the Chi-square test was conducted. The results of the frequency and Chi-square test are provided in Tables 5 and 6, respectively.

According to Table 5, the frequency of lower-order thinking skills was more than that of higher ones in the IELTS and TOEFL listening tests.

The results of the Chi-square test indicated that there was a significant difference between IELTS and TOEFL listening tests in terms of the representation of lower and higher-order thinking skills (sig. = .000, p < .05). The results demonstrated that the TOEFL listening tests significantly entailed more higher-order thinking skills (F = 105) and less lower-order thinking skills (F = 303) than did the IELTS listening tests. Figure 4 depicts the bar chart of the frequency of lower and higher-order thinking skills.

| Count | Thinking Skills | Total |
|-------|-----------------|-------|
|       | Lower-order     | Higher-order |     |
| Test  | IELTS           | 464   | 16   | 480 |
| TOEFL | 303             | 105   |       | 408 |
| Total | 767             | 121   |       | 888 |

*Table 5. Frequency of lower and higher-order thinking skills in IELTS and TOEFL listening tests*
5.2. Comparing the IELTS and TOEFL reading tests

To investigate if there was any significant difference between the IELTS and TOEFL reading tests in terms of the representation of learning levels, the Monte Carlo test was conducted. Tables 7 and 8 depict the results of the frequency and Monte Carlo test, respectively.

As shown in Table 7, the IELTS reading tests included two learning levels with the highest frequency for B2 (Understanding Conceptual Knowledge) (F = 400), while TOEFL reading tests covered seven learning levels with the highest frequency for A2 (Understanding Factual...
Figure 5 shows the representation of cognitive domains in the IELTS and TOEFL reading tests.

Based on the results of the Monte Carlo test, the reading and listening tests of IELTS and TOEFL were significantly different in terms of the learning objectives presented in Revised Bloom’s taxonomy (sig. = .00, p < .05). In the IELTS reading tests, B2 (Understanding Conceptual Knowledge) was the most frequent learning level (F = 400), while the TOEFL reading tests were lacking in this level. The IELTS reading tests also covered A2 (Understanding Factual Knowledge) in 51 cases and A1 (Remembering Factual Knowledge) in 29 cases.

A2 (Understanding Factual Knowledge) was the dominant learning level in the TOEFL reading tests (F = 342). The TOEFL reading tests also covered six other learning levels (B4 (Analyzing Conceptual Knowledge), A4 (Analyzing Factual Knowledge), B6 (Creating Conceptual Knowledge), A1 (Remembering Factual Knowledge), B5 (Evaluating Conceptual Knowledge), and C2 (Understanding Procedural Knowledge) which were absent in the IELTS reading tests. The results of the test of the strength of association (Cramer’s V) revealed that there was a very strong association between the tests and the representation of learning objectives. The clustered bar chart in Figure 6 shows the frequency of learning levels in the IELTS and TOEFL reading tests.

To explore if there was any significant difference between the frequency of the occurrence of higher and lower-order skills in the IELTS and TOEFL reading tests, another Chi-square test was run. Tables 9 and 10 present the results of the frequency and Chi-square test, respectively.

According to Table 9, the lower-order thinking skills were dominant in both the IELTS reading tests (F = 480) and the TOEFL reading tests (F = 353).

As demonstrated in Table 10, there was a significant difference between the IELTS and TOEFL reading tests in terms of the frequency of occurrence of lower and higher-order thinking skills (sig. = .00, p < .05). According to the results, the IELTS reading tests included just lower-order thinking skills. Further, they did not embrace any higher-order thinking skills. The results of the frequency also revealed that the TOEFL reading tests covered both lower-order (F = 353) and higher-order (F = 146) thinking skills. The results also showed that lower-order thinking skills were more frequent in the IELTS reading tests than TOEFL reading tests. The bar chart in Figure 7 shows the results of the frequency of lower and higher-order thinking skills in the IELTS and TOEFL reading tests.

### 6. Discussion

The purpose of this study was to compare the listening tests of IELTS and TOEFL in terms of the representation of learning objectives presented in the Revised Bloom’s taxonomy. The study also investigated if the reading tests of IELTS and TOEFL were different in terms of the representation of learning objectives presented in the Revised Bloom’s taxonomy.

| Count | Category | Total |
|-------|----------|-------|
|       | A1 | A2 | A4 | B2 | B4 | B5 | B6 | C2 |
| Test  | IELTS | 29 | 51 | 0  | 400| 0  | 0  | 0  | 480 |
|       | TOEFL | 7  | 342| 55 | 0  | 52 | 3  | 36 | 499 |
| Total | 36 | 393| 55 | 400| 52 | 3  | 36 | 4  | 979 |

*Skill = Reading Knowledge (F = 342).
Table 8. Monte Carlo test to compare frequency of learning levels in IELTS and TOEFL reading tests

| Test Type                  | Value     |.df | Asymp. Sig. (2-sided) | Monte Carlo Sig. (2-sided) | 99% Confidence Interval | Cramer's V |
|----------------------------|-----------|----|-----------------------|---------------------------|--------------------------|------------|
|                            |           |    |                       |                           |                          |            |
| Pearson Chi-Square         | 778.842$^a$ | 7  | .000                  | .000$^b$                  | .000                     | .000       |
| Likelihood Ratio           | 1017.988  | 7  | .000                  | .000$^b$                  | .000                     | .000       |
| Fisher's Exact Test        | 994.029   |    | .000$^c$              | .000$^c$                  | .000                     | .000       |
| Linear-by-Linear Association | 197.432$^d$ | 1  | .000                  | .000$^e$                  | .000                     | .000       |
| N of Valid Cases           | 979       |    |                       |                           |                          |            |
6.1. Comparing the IELTS and TOEFL listening tests

Regarding the comparison of the IELTS and TOEFL listening tests, the results revealed that there was a significant difference between these two tests in terms of the representation of learning objectives. Based on the results, the IELTS listening tests represented three learning levels (A1, A2, and B4), while the TOEFL listening tests entailed four learning levels (A1, A2, A4, and C2). A2 (Understanding Factual Knowledge) was the most dominant learning level included in the listening section of both tests. Nonetheless, the IELTS listening tests ($F = 388$) represented the higher frequency of A2 than the TOEFL listening tests ($F = 249$). The results confirmed Geranpayeh and
Table 9. Frequency of lower and higher-order thinking skills in IELTS and TOEFL reading tests

| Test  | Thinking Skill | Total |
|-------|----------------|-------|
|       | Lower-order    | Higher-order |
| IELTS | 480            | 0      | 480   |
| TOEFL | 353            | 146    | 499   |
| Total | 833            | 146    | 979   |

*aSkill = Reading*

Table 10. Chi-square test to compare lower and higher-order thinking skills in IELTS and TOEFL reading tests

| Value               | df  | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) | Cramer’s V |
|---------------------|-----|-----------------------|----------------------|----------------------|------------|
| Pearson Chi-Square  | 165.056 | 1.000                 | 0.000                | 0.000                | 0.411      |
| Continuity Correction | 162.758 | 1.000                 | 0.000                | 0.000                |            |
| Likelihood Ratio    | 221.468 | 1.000                 | 0.000                | 0.000                | 0.000      |
| Fisher’s Exact Test |      |                       |                      |                      | 0.000      |
| Linear-by-Linear Association | 164.887 | 1.000                 | 0.000                | 0.000                |            |
| N of Valid Cases    | 979 |                       |                      |                      |            |

Figure 7. Clustered bar chart of the frequency of lower and higher-order thinking skills in IELTS and TOEFL reading tests.
Taylor (2008) opinions that the IELTS listening test focuses on understanding explicitly stated information.

A1 (Remembering Factual Knowledge) was also more frequent in the IELTS listening tests ($F = 76$) than the TOEFL listening tests ($F = 47$). In addition, 16 IELTS listening test items represented B4 (Analyzing Conceptual Knowledge), whereas the TOEFL listening tests were devoid of this learning objective.

By contrast, a considerable number of the TOEFL listening test items ($F = 105$) represented A4 (Analyzing Factual Knowledge), while A4 was absent in the IELTS listening tests. C1 (Remembering Procedural Knowledge) represented in seven cases in the TOEFL listening tests. It was however absent in the IELTS listening tests.

Concerning the representation of thinking skills, although lower-order thinking skills were more frequent than the higher-order thinking skills in both tests, the results revealed that the IELTS listening tests considered a higher frequency of the lower-order thinking skills than the TOEFL listening tests. In the case of higher-order thinking skills, the TOEFL listening tests included more higher-order thinking skills than did the IELTS listening tests. Along the same lines, Rea-Dickins, Keily, and Yu (2007) who investigated the IELTS candidates’ scores and their academic performance confirmed that IELTS candidates’ academic performance showed that they were not assessed based on high-level thinking skills. They added that even when test-takers’ IELTS scores met the admission requirements of universities, test takers were found to “lack critical thinking and evaluative skills” (p. 117). It implies that just the use of lower-order thinking skills can lead to an acceptable performance in the IELTS.

One possible line of explanation for this is that the context of the TOEFL listening section is fully academic (Bejar, Douglas, Jamieson, Nissan, & Turner, 2000) whereas the IELTS listening section encompasses both social and academic context (Nakatsuhera, Inoue, & Taylor, 2017; Phakiti, 2016). As the language used in academic contexts is more cognitively demanding than that of social contexts (Cummins, 1984), high-stakes tests such as TOEFL just representing academic context encompass items that assess cognitive levels higher than just understanding of the information orally presented in the listening test.

6.2. Comparing the IELTS and TOEFL reading tests
The results of the comparison between the IELTS and TOEFL reading tests revealed that these tests were significantly different in terms of the representation of learning objectives. The most remarkable difference deals with the number of learning objectives included in these tests. The TOEFL reading tests covered seven learning levels A1 (Remembering Factual Knowledge), A2 (Understanding Factual Knowledge), A4 (Analyzing Factual Knowledge), B4 (Analyzing Conceptual Knowledge), B5 (Evaluating Conceptual Knowledge), B6 (Creating Conceptual Knowledge), and C2 (Understanding Procedural Knowledge). Nonetheless, the IELTS reading tests covered three ones (A1 (Remembering Factual Knowledge), A2 (Understanding Factual Knowledge) and B2 (Understanding Conceptual Knowledge). Considering the cognitive dimensions, one can easily see that all the levels except “Applying” are more or less attended to in the TOEFL reading tests.

The findings also demonstrated that B2 as the most frequent learning objective in the IELTS reading tests was absent in the TOEFL reading tests. In addition, A2 was the most frequent learning objective in TOEFL reading tests. The frequency of A2 was higher in the TOEFL reading tests than the IELTS reading tests.

The results also revealed that the IELTS reading tests overwhelmingly assessed lower-order thinking skills. In fact, all the IELTS reading test items represented the lower-order thinking skills. One reason might be that the IELTS is basically designed to assess test-takers’ English language...
readiness to enter the university-level study. In fact, it does not assume test takers have already mastered the high-level academic skills they require for their future studies (Taylor & Weir, 2012).

On the contrary, the TOEFL reading tests covered both higher and lower-order thinking skills. It is notable that the lower-order thinking skills were more frequent in the IELTS reading tests than the TOEFL reading tests. One explanation could lie in the fact that the IELTS and TOEFL are different in terms of item type and item design. The TOEFL is dominated by multiple-choice items that elicit a variety of cognitive processes (Owen, 2016). Multiple-choice items also load heavily on the reading skill because of their complexity (Field, 2009).

The IELTS includes multiple item types, some of which are limited in eliciting higher-level processing. For instance, as Owen (2016) reported IELTS gap-fill items were less likely to elicit higher-level processes. Concerning the item design in the IELTS, a group of item types is presented together. In fact, the item design restricts the number of item types presented for each text and the number of cognitive processes in the reading section. However, in the TOEFL, items are not classified into sections and are presented separately.

The results of the study accord with those of the research conducted by Ebadi, Zamani, and Sharifi (2014). They concluded that in the IELTS Academic reading module, few items required higher levels of cognitive processing. They also reported that the focus of the IELTS Academic reading test was mainly on comprehension. Similarly, Moore, Morton, and Price (2007) reported that most IELTS reading items did not require critical engagement with material or interaction with multiple sources. NamazianDoost and HayaviMehr (2017) also found that IELTS reading tests covered the lower-order cognitive processes more than the higher-order ones.

Our findings are also resonant with Owen (2016) who adopted Khalifa and Weir (2009) model of reading to compare IELTS and TOEFL reading tests based on the test takers’ verbalization of strategies used in completing the tests. Owen (2016) concluded that the majority of cognitive processes were lower-level processes for both tests. “The TOEFL test recorded a greater number of instances of each level of processing than the IELTS test” (p. 365).

Momsen et al. (2013) presented a logical reason for the more frequent inclusion of lower-order level items in the tests. They indicated that the mere inclusion of higher-level items in tests does not guarantee test-takers’ engagement in the desired deep-learning approach.

Additionally, some scholars believed that questions demanding complex cognitive skills may result in perpetuating misconceptions, and ultimately end in failure for test-takers (Doyle, 1986; Frederiksen, 1984). Therefore, the higher frequency of lower-order learning objectives may serve as a solution to this problem.

Many scholars (e.g., Kim, Patel, Uchizono, & Beck, 2012; Nevid & McClelland, 2013; Veeravagu et al., 2010) who investigated the relationship between item difficulty and the cognitive levels in Bloom’s taxonomy suggested that more cognitively demanding items equate to increased difficulty. Therefore, although the IELTS and TOEFL listening and reading tests focused on items that primarily test candidates’ understanding with respect to the representation of learning objectives and thinking skills, it can be inferred that the TOEFL listening and reading tests are more difficult than the IELTS listening and reading tests.

7. Conclusion
The main purpose of the present study was to compare IELTS and TOEFL listening and reading tests based on the representation of the learning objectives of Revised Bloom’s taxonomy. The results demonstrated that the focus of the IELTS listening tests was more directed toward lower-order thinking skills, i.e. understanding and remembering factual knowledge, respectively. It
implies that IELTS test items send a clear message to test takers regarding the learning expectations, thereby helping test takers align better with assessment practices. Taking this finding into consideration, IELTS trainers can raise their students’ awareness of the IELTS listening test expectations and their learning objectives. Further, IELTS trainers can employ supplementary materials to compensate for the insufficiency of higher-order thinking skills. The incorporation of higher-order thinking skills into the IELTS receptive skills can assist IELTS candidates to achieve the intended levels of the cognitive domain.

The results also revealed that higher-order thinking skills are more frequent in TOEFL listening tests than IELTS listening test items. In view of this, TOEFL test takers should strive to learn how to go beyond an understanding of the oral information presented in the listening tests by practicing to analyze the information. In fact, test takers lacking sufficient higher-order thinking skills might not appropriately use a surface approach, i.e. lower-order thinking skills when higher-order skills are required, and vice versa.

Furthermore, based on the findings, IELTS and TOEFL reading tests differed in terms of the representation of learning objectives. The IELTS reading tests clustered around three lower-order learning objectives, whereas the TOEFL reading tests covered both lower-order and higher-order thinking skills. This finding lends weight to the inclusion of different cognitive tasks in IELTS and TOEFL classes to address the mismatch between the nature of knowledge and learning in IELTS and TOEFL, and to increase test-takers’ awareness of cognitive processes e.g., memorizing, understanding or analyzing the information that is appropriate for the task at hand.

The findings of the current study hold some significant pedagogical implications for IELTS and TOEFL teachers and test-item writers. Given the difference between the IELTS and TOEFL listening and reading tests in terms of the representation of learning objectives, IELTS and TOEFL teachers can take such differences into account and align their instructional approaches accordingly. The results of the present study can also be of value to IELTS and TOEFL candidates. That is, the results can provide a frame of reference to IELTS and TOEFL candidates to compare the IELTS and TOEFL listening and reading tests in terms of test difficulty.

Understanding the cognitive domains and learning objectives assessed in IELTS and TOEFL listening and reading tests informs assessment practitioners to identify potential pathways to modify high-stakes tests. Additionally, the present study has consolidated the evidence base for using the Revised Bloom’s Taxonomy as a framework for elucidating cognitive processes included in the high-stakes tests. Test-item writers can also draw on the findings of the present study. For example, they can construct different kinds of high-quality items that tap different cognitive domains.

Although this study may yield some significant insights, it has some limitations which could be addressed in future research. The major limitation of this study has to do with the accessibility to the live test versions. As the researchers in the study did not have access to the live test versions, the materials of the study were selected from the retired tests. Thus, it is highly recommended that future studies utilize live versions of the IELTS and TOEFL tests. Additionally, as the number of the tests under investigation was limited, the generalizability of the findings should be dealt with caution. Therefore, it is highly recommended that the findings be further explored in more representative samples. As the main focus of the study was the listening and reading sections of two high-stakes tests, similar studies can be conducted on writing and speaking sections.

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