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A Bottleneck Hypothesis Test: L1 American English Learners' Comprehension of Morphology and Syntax in L2 Urdu

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ABSTRACT

The paper investigates L1 (English) learners' knowledge of syntax and morphology in L2 (Urdu) to test the bottleneck hypothesis. The bottleneck hypothesis examines what is difficult and easy to learn in L2. According to this hypothesis, acquiring a second language's functional morphology is more challenging than syntax. The present study tested whether subject-verb-agreement is more complicated than word ordering in the second language L2 (Urdu). The study differs in several respects (methodology and languages L1& L2) from other previous studies Slabakova & Gajdos, (2008), Slabakova, (2013), Slabakova, (2014), Slabakova, (2018), Dhoaj, (2017),I. N. Jensen et al., (2020); Rajabi, (2022). Content analysis and quantitative methods have been used in this study to get the answers to the research questions and prove the research hypothesis. The result indicates that the learners struggle more in acquiring subject-verb-agreement than word order. The study concludes that the findings impart conditional support to the bottleneck hypothesis.

Keywords: *Bottleneck hypothesis; Content analysis; Functional morphology; Second language; Syntax.*

INTRODUCTION

If we talk about second language learning, we must know that it is not about learning specific linguistic properties but all linguistic properties like sounds, word formation, grammar, and vocabulary. While learning a second language, we found some linguistic properties are apparent, and some are difficult to learn. So, the bottleneck hypothesis claims that the most challenging part of a language is functional morphology (Subject-Verb agreement) rather than core syntax (Word order). The bottleneck hypothesis was proposed and further updated by Slabakova, (2018). Before this hypothesis, researchers raised a few fundamental questions: What is easy and challenging in second language learning/acquisition? Why do we learn some linguistic properties quickly, and some take a long time to learn? The Bottleneck Hypothesis proposes the answer to the following questions. This formulation is based on the Borer–Chomsky Conjecture (BCC) Slabakova, (2018). This conjecture relies on a division of labour between the formal grammatical features hosted by the FCs and their semantic and syntactic reflexes or consequences, such as calculating a certain grammatical meaning or executing some movement operation I. N. Jensen et al., (2020).

Knowing which property of L2 is easy and which is difficult is essential, since language teachers/instructors can pay more attention to those properties that L2 learners find challenging. Language teachers can pay more attention to the difficult properties in the language classrooms and not waste time teaching the easy material that will come to the learners for free Slabakova, (2018). Several pieces of research have been done in the area of second language learning. Learning a certain linguistic property means creating a mental representation of the property in the mind/brain. A significant concern was why some linguistic features are easy to learn and some are difficult. Throughout the fifties and until the late sixties, pedagogical contrastive analysis was used extensively in the field of second language acquisition as a method of explaining why some features are more difficult to acquire than others Keshavarz, (2012). Well, we got the answer to this question a long year ago, tested by CAH that the item that is similar to L1 is easy and those different difficult to acquire Khansir, (2012); Rana Abid Thyab, (2016); Al-khresheh, (2016). The CA hypothesis has been used earlier in many studies. However, despite differences between L1 and L2, there are a few items of L2 which learners learn in less time, and some take longer; Word order takes less, and subject-verb-agreement takes longer time to acquire have been tested by BH in many studies like Slabakova,(2013); I. N. Jensen et al., (2020).

The presented study aims to test the bottleneck hypothesis in the L2 acquisition of Urdu by American English learners. Regarding the bottleneck hypothesis, two linguistic properties of L2 Urdu have been included in this study, i.e., subject-verb-agreement and word order. Subject-verb-agreement concerns proficiency in functional morphology and word order in L2 syntax. Subject-verb-agreement includes some features of the Urdu language which we cannot ignore. As non-living things recognition as masculine and feminine, which play the role of subject and object, subject-auxiliary verb-agreement, somewhere auxiliary verb agrees in the same way as the main verb and in few cases, it does not (see 1.1.1 (1) example). Hence, this part is also introduced and tested in this study. Moreover, the result of the study may facilitate L2 instructors/teachers to overcome learners' problems they face in learning the difficult area of L2 (Urdu).

Concerning subject-verb-agreement, the agreement system of Urdu and English is quite different in inflection. Urdu is a head-final SOV language where the verb is in agreement with the subject in person, gender, and number when there is a subject to perform the action. In a few cases, it agrees with the object Ilyas & Al-Shibani, (2019). English is a head initial SVO language, showing distinctive agreement only in the third-person singular, present tense form of verbs, which are marked by adding "-s" (walks) or "-es" Lashari, (2023).

Before testing this hypothesis, it is necessary to ensure that learners get appropriate and required input for their learning or not. If yes, so, it can be tested by applying BH. If learners did not get appropriate input for L2 learning, it would not be worth testing this hypothesis.

Linguistic Features to be tested

1. Subject-Verb-Agreement (Functional Morphology) of English and Urdu

Urdu is a head-final language (SOV) where a verb agrees with the nominative subject in gender, number, and person; it also agrees with the object only if the subject is non-nominative and the object is nominative (Butt, 1993). For Example:

Nominative Subject

(1) iqra ba:zar jat**ɪ** haı

iqra-3rdP.S.F market-OBJ goes-MVPF AUX.V

'Iqra goes to market.'

Non-nominative Subject

(2) iqra ne khana nʌhı khay**a** haı

iqra-3rd P.S.F. ERG food- OBJ.M not-NEG eat-MVPF AUX.V

'Iqra has not eaten food.'

In the above-given examples, *"-ɪ and -a"* suffixes are gender markers *"-ɪ"* added for feminine and *"-a"* for masculine at the end of the main verb.

Urdu has more variations in subject-verb-agreement in comparison to English. Moreover, Urdu is an ergative language. In the ergative case, the verb does not agree with the subject of the sentence rather, it agrees with the object in person and number. Ilyas & AlShibani state that Urdu also has OV agreement without alternating with the SV structure Ilyas & Al-Shibani, (2019). Additionally, things like a *"kɪta:b" (book), "ghʌr" (home), "dʌwa" (medicine), "rupye" (money),* etc., are objectified as masculine and feminine; hence verbs must agree with the subject accordingly see; Schmidt, (2005).

The complexity of Urdu is the main verb and auxiliary verb both agree with the subject and object (if an object is non-nominative). The main verb occurs at the medial and the auxiliary verb at the final position. Verb and auxiliary verbs do not agree in the same manner with the subject; there are variations. With a singular or plural subject, the auxiliary verb agrees the same way as the main verb agrees, but when it comes to gender, only the main verb shows inflection in the gender auxiliary verb remains the same. Furthermore, the 2nd person singular *"you"* have three forms *"tum"* (non-honorific use for friends or equals), *"tu"* (non-honorific use for extremely close relations), and *"a:p"* (honorific term use for elders). These variations of 2nd person *"you"* agree with the main and auxiliary verbs differently. For further detail, see table 1.

Table 1: Urdu verb inflectional system using base form tʌhlna 'walk'

Singular	**Personal Pronoun**	**Verb Agreement**	
		Masculine	**Feminine**
1st Person	maĩ	tʌhlta hũ	tʌhltı hũ
2nd Person	tum/tu/a:p	tʌhlte ho/ tʌhlta haı/ tʌhlte haĩ	tʌhltı ho/ tʌhltı haı/ tʌhltı haĩ
3rd Person	vo/ye	tʌhlta haı	tʌhltı haı
Plural			
1st Person	hum	tʌhlte haĩ	-
2nd Person	tumlog/a:plog	tʌhlte ho/ tʌhlte haĩ	tʌhltı ho/ tʌhltı haĩ
3rd Person	volog/yelog	tʌhlte haĩ	tʌhltı haĩ

English is a head initial SVO language, where the verb agrees with the subject in number and person. There are three person (first, second, and third person), two

numbers (singular and plural), and two genders (masculine and feminine) exist in English. The person and number are inflected in the verb, but gender does not inflect in the verb. English verbal agreement is commonly described as 'easy,' 'simple,' 'transparent,' and 'straightforward' Krashen, (1982), Ellis, (1996), Camacho, (1999), (Jiang et al., 2009); (O'Grady, 2006). English verb is inflected for tense only in the present tense and with the 3rd person singular by using suffixes -(e)s; for details, (see table 2). English marks present tense verbs with the suffix -s when the subject is 3rd person singular I. N. Jensen et al., (2020).

Table 2: English verb inflectional system using the base form 'walk'

Singular	**Personal Pronouns**	**Verb Agreement**
1st Person	I	Walk
2nd person	You	Walk
3rd person	He/She/It	Walks
Plural		
1st Person	We	Walk
2nd person	You	Walk
3rd person	They	Walk

When we use third-person singular subjects like he/she/it verb carries "-s" or "-es" and for other subjects, verbs do not go under change, for example:

(1) He/she walks daily.
(2) They walk daily.
(3) I walk daily.

2. Word Order (Syntax) of English and Urdu

Urdu is a SOV language where a verb occurs at the end of the sentence, while English is a SVO language. The word order in English is rigid and inflexible, while Urdu sometimes shows flexibility in word order which is acceptable, especially in spoken form (see; Ehsan & Hussain, (2019); Ali & al., (2017); Jawaid & Zeman, (2011). Urdu is highly inflectional and has free word order Ehsan & Hussain, (2019). In Urdu, the sentence always starts with the subject followed by objects (direct or indirect objects, time or place adverbs, etc.).

Regarding the learning of word order, Odlin, (2012) explains that "word order is one of the most intensively studied syntactic properties in linguistics" Shi & Pongpairoj, (2020). However, if a sentence includes both lexical/main and auxiliary verbs, then the lexical verb always precedes the auxiliary verb, following the word order pattern of SOV aux.

Some examples from both (English and Urdu) languages show the basic word ordering.

English

(1) aira lives in a hostel
SUB V X X OBJ

Urdu

(1) aːɪra hostʌl me rʌhtɪ haɪ
aira-SUB hostel-OBJ X live-MVPFF X
'Aira lives in a hostel.'

Previous Studies

The bottleneck hypothesis proposed in Salbakova, R.'s book "*meaning in second language*" 2008; she claimed that second language (L2) learners' difficulties lie in the acquisition of functional morphology. Some studies carried out by scholars like Lardiere (2005), (2008); Slabakova (2006), (2008); White, (2003) give birth to BH. Slabakova, (2013), building on White's and Lardiere's insights and viewing the issue from the point of modular critical periods in SLA, argues that there is no critical period for the acquisition of semantics; that is, meaning comes for free if the functional morpho-syntactic competence is already in place Slabakova, (2013).

The study carried out by Slabakova & Gajdos, (2008) is an experimental study that shows that the acquisition of functional morphology is difficult. The study investigated the L2 acquisition of different German copula *sein ('be')* forms in the present tense. The study was conducted on German university students with L1 English, including twenty-four beginners and eighteen intermediate learners. The participants were tested based on the written material, which contained simple sentences with missing subjects. Slabakova & Gajdos, (2008) M. G. Jensen, (2017) investigated functional morphology against narrow syntax. She tested Norwegian L1 speakers' acquisition of English as L2 by carrying out an acceptability judgment task (AJT). M. G. Jensen, (2017) found a significant difference between tense and agreement difficulties and different syntactic conditions. (I. N. Jensen et al., 2020a) tested BH where Norwegian L1 speakers' knowledge of syntax and morphology in English L2 whether functional morphology is more difficult than narrow syntax. Their study supported the bottleneck hypothesis that functional morphology was found to be more difficult despite several factors working in its favour, such as being learnable from positive evidence, being more frequent, and being explicitly taught.

Several studies have been conducted in L2 acquisition, focusing on subject-verb agreement and word order in different languages. Further, in some studies (see, Slabakova, (2006); Jensen, (2020), agreement and word order acquisition is compared to investigate the more complex grammatical phenomena to acquire in L2 acquisition. In this regard, the present study also focuses on the acquisition of agreement and word order. The study is developed based on the experiment of I. N. Jensen et al., (2020), and it aims to test further the BH of L1 American learners' knowledge of morphology and syntax in L2 Urdu.

Previous studies I. N. Jensen et al., (2020) have been done where L1 is distinct, but L2 is the one and only English. No other studies carried out earlier using English L1 speakers compared the complexities of agreement and word order in the L2 acquisition of Urdu. The different use of agreement and word order in Urdu makes the present study different from the other studies carried out in the past.

Present Study

Research Questions

The study mainly aims to test the bottleneck hypothesis to determine whether functional morphology is more complex than syntax for Urdu language learners. The work focuses on the following research questions:

1. Due to differences in subject-verb-agreement between English and Urdu, do learners face difficulty acquiring the Urdu language?
2. Does the difference in the word order of English and Urdu cause difficulties in acquisition?
3. Does subject-verb-agreement (functional morphology) more complicated than word order (syntax) in L2 acquisition?

Predictions

1. Subject-verb-agreement difference between English and Urdu exhibits difficulty in the acquisition.
2. The word order differences between English and Urdu do not pose difficulties in the acquisition.
3. Subject-verb-agreement (functional morphology) is more complicated than word order (syntax).

METHOD

Procedure and Participants

The study comprises text data (learners' answer scripts) collected from 30 American English learners of Urdu, including males and females aged 18 to 45 with different educational and professional backgrounds. All subjects are adults, some are undergraduate and postgraduate students, some are researchers, and very few are professionals. The study is based on the institute (AIIS Lucknow, India) offering an Urdu language learning course for two and half months. However, learners are native speakers of American English and are already in the language learning (Urdu as a second language) process. So, data was collected from answer scripts without any modification or interference from the researcher to test BH (see figure 1).

The data is available in written form, representing learners' comprehension of Urdu, including all linguistic properties (phonology, morphology, and syntax). But for the present study, we focused on errors in subject-verb-agreement and word order.

In this study, the quantitative research method has been followed. "A quantitative study is best typified by an experiment designed to test a hypothesis through the use of objective instruments and appropriate statistical analysis" Larsen-Freeman & Long, (2014). "Quantitative research is mostly associated with the positivist or post-positivist paradigm. It involves collecting and converting data into numerical form. We can do statistical calculations and draw a conclusion" Madaan, (2019). This study also follows a content analysis method. "Content analysis is the analysis of what is being said, written, or recorded" Parveen & Showkat, (2017). (Hsieh & Shannon, 2005) define content analysis as a "research method for the subjective interpretation of the content of text data," Parveen & Showkat, (2017). Furthermore, "Content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" Krippendorff, (2004).

Learners are provided a syllabus and booklets to complete Urdu language learning that includes all areas of that language. The written materials include substitution drills of pronouns, translation exercises of sentences and phrases, converting sentences from present to past and past to future, describing learners' daily routine, describing the meaning, and making complete sentences with given lexical items.

As the researchers are native speakers of Urdu, they confirmed the appropriateness of data without any interference from other Urdu speakers. Since participants were already in the language learning process, it was easy for the researcher to collect items and test BH.

Test Items

Learners were offered two and half months Urdu learning programs, we chose 40 sentences from the 1st two weeks and 40 from the last two weeks of their learning to see the changes in their comprehension to test BH. Most of the sentences are in the present tense; only a few are in the present perfect tense to show the OV agreement. A single sentence represents both subject-verb-agreement and word order of L2. Here are examples of a few sentences we selected from learners' answer scripts. The following sentences represent the learners' proficiency in Urdu's subject-verb-agreement (functional morphology) and word order (syntax).

(1) *Sentence with 1st person singular masculine subject.*

*maĩ urdu nʌhı bolte haĩ
i-SUB urdu not-NEG speak-V AUX.V
maĩ urdu nʌhı bolta hũ̃
I do not speak Urdu.

(2) *Sentence with 3rd person plural feminine subject.*

*tı:n xwa:tı:n khʌde haĩ
three ladies-SUB standing- MV are-AUX.V
tı:n xwa:tı:n khʌdı haĩ.
Three ladies are standing.

(3) *Sentence with 3rd person singular feminine subject.*

*roz sara xa:brı pʌrta haı
everyday-ADJ sara-SUB news read-MV AUX.V
sara roz xʌbrẽ̃ pʌrtı haı
Sara reads the news every day.

(4) *Sentence with object-verb-agreement (feminine object).*

*pehlı ba:r maĩ ne subʌh puja dekha
first time-ADJ i-SUB ERG morning-P worship-OBJ saw-MV
pehlı ba:r maĩ ne subʌh puja dekhı.
First time I saw worship in the morning.

(5) *Sentence with 3rd person (dummy subject)*

*aesa nʌhɪ ho sʌktɪ haɪ
It-DSUB not-NEG happen-MV can-MO.V AUX.V
aesa nʌhɪ ho sʌkta haɪ.
It cannot happen.

(6) *Sentence with 2nd person (honorific) singular masculine.*

*a:p ye kurta cha:hta haɪ
you-SUB this-DP shirt-OBJ want-MV AUX.V
a:p ye kurta cha:hte haĩ
Do you want this shirt?

(7) *Sentence with object-verb-agreement (masculine object)*

*ʌmmɪ ne bʌhut xa:s khana bʌnaɪ
mother-SUB ERG very special-ADJ food-OBJ cooked-MV
ʌmmɪ ne bʌhut xa:s khana bʌnaya:
Mother cooked a very special food.

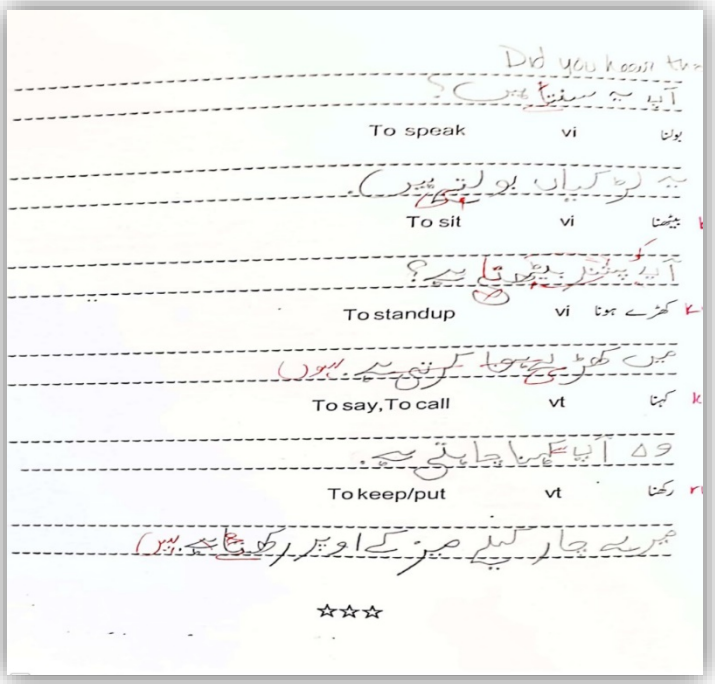


Figure 1 Example of the test items used for the study

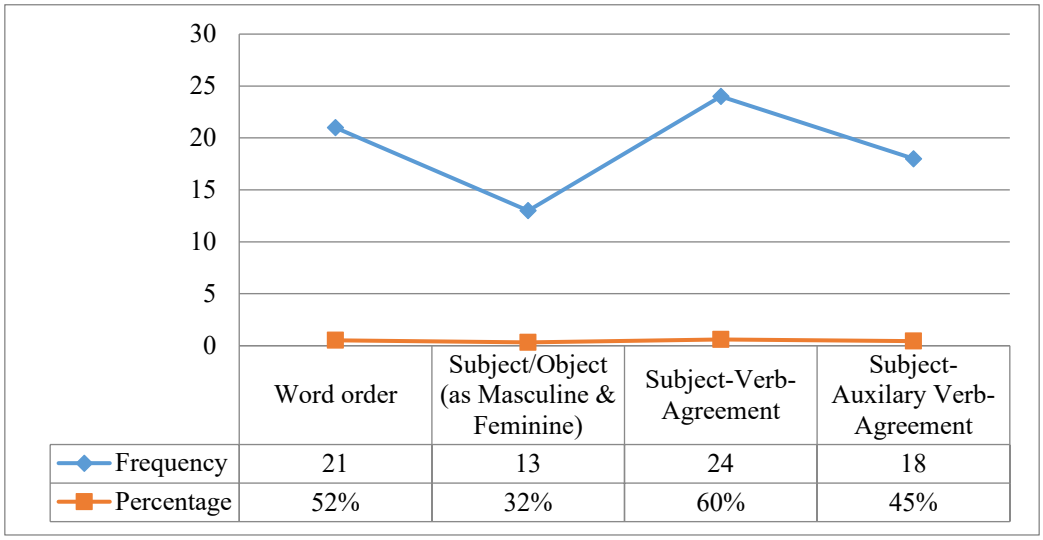
FINDINGS AND DISCUSSION

Result

A total of 80 sentences were selected from learners' answer scripts. As learners were learning the Urdu language and already under proficiency tests, researchers didn't follow the acceptability judgment task and proficiency test like other previous studies.

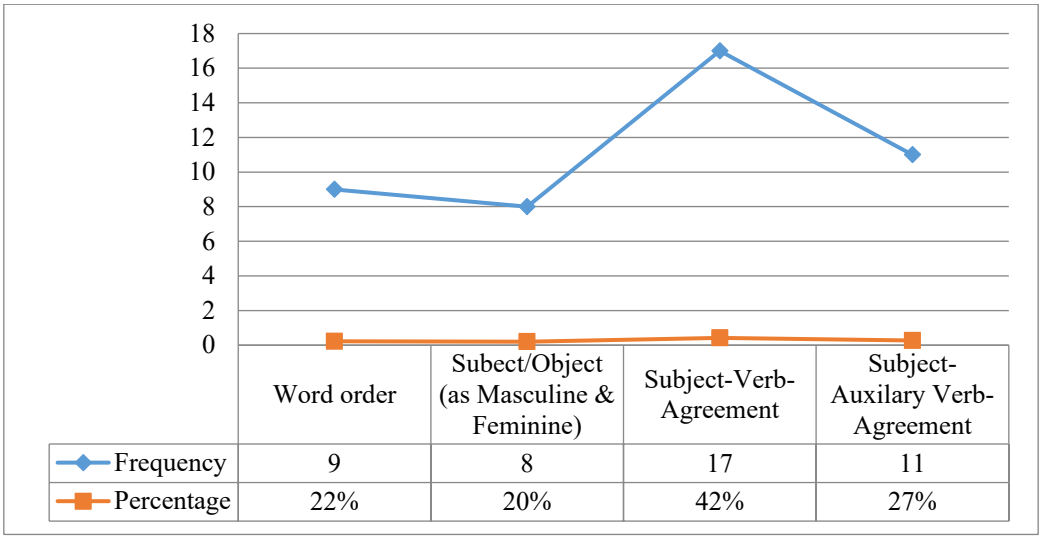
After analysing learners' performance in the first two weeks and last two weeks, the researchers demonstrated the percentage of their performance and scored them with the help of separate figures.

The figure demonstrates the frequency of how many times learners failed to put all the linguistic properties correctly. Four features of the Urdu language were examined, including word order, subject-verb-agreement, subject-auxiliary verb-agreement and recognition of subject/object as masculine and feminine. Subject-verb-agreement (functional morphology) and word order (syntax) are in focus; we include two other features of Urdu because they are interconnected with subject-verb-agreement. As we mentioned above, nouns are qualified as feminine and masculine, so verbs will agree accordingly. It might be one of the reasons for not following subject-verb-agreement properly. The second thing is subject-auxiliary verb-agreement, which agrees with the subject in the same way as the main verb agrees. The only difference is that the main verb shows inflection in gender, but the auxiliary verb does not. See example no. 10 **roz sara xaːbrɪ pʌrta haɪ (sara roz xʌbrẽ pʌrtɪ haɪ)* Sara is 3rd p.s.f. subject, so the main verb agreed accordingly by adding *"ɪ"* suffix in the main verb "pʌrna" (read), but the auxiliary verb remains the same. Hence, it may also hinder their acquisition. These features have been demonstrated with the percentage for further clarity of learners' acquisition process.



	Word order	Subject/Object (as Masculine & Feminine)	Subject-Verb-Agreement	Subject-Auxilary Verb-Agreement
Frequency	21	13	24	18
Percentage	52%	32%	60%	45%

Figure 2. Learners' performance percentage in the first two weeks of learning



	Word order	Subect/Object (as Masculine & Feminine)	Subject-Verb-Agreement	Subject-Auxilary Verb-Agreement
Frequency	9	8	17	11
Percentage	22%	20%	42%	27%

Figure 3. Learners' performance percentage in the last two weeks of learning

In the first two weeks of the learning, learners' performance shows that they failed to conjugate verbs with subjects (functional morphology) which constituted 60% and word order (syntax) showed 52% failure of not following correctly.

The last two weeks of their learning show a drastic change in learners' performance. The subject-verb-agreement (functional morphology) shows 42% and word order (syntax) 22%. Moreover, we can see fluctuation in the percentage of subject/object (as masculine & feminine) and subject-auxiliary verb-agreement. The result revealed that the subject/object recognized as feminine and masculine in Urdu is one of the causes that make subject-verb-agreement more complicated for the learners than in English. Subject-auxiliary verb-agreement does not create any hindrance; rather, its accuracy depends on main verb agreement.

Discussion

1. Due to differences in subject-verb-agreement between English and Urdu, do learners face difficulty acquiring the Urdu language?

Regarding research question 1, it has been predicted that the difference between subject-verb-agreement of both languages exhibits difficulties. The result supports the prediction since Urdu integrates not only subject-verb-agreement but subject-auxiliary verb-agreement; for example *"a:p kɪtne bʌje ja:gte haĩ"* in this sentence, the main verb is *"ja:gna,"* and the auxiliary verb is *"haĩ"* both the verb agrees with the subject of the sentence while in English only m ain verb agrees with the subject of the sentence for example *"at what time do you wake up?"*. Additionally, one more difference exists: non-living things are objectified as masculine and feminine and play the role of subject and object in the sentence; the verb must agree accordingly. In contrast, English does not have these features, so learners find it challenging to recognize things as masculine and feminine due to these differences, learners find subject-verb-agreement more complicated.

2. Does the difference in the word order of English and Urdu cause difficulties in acquisition?

For the basic structure of the sentence, English follows Subject+Verb+Object this structure is relatively inflexible whether in spoken or written form. Urdu follows a Subject+Object+Verb structure which may be flexible, especially in spoken form. The result shows that learners find it difficult in the beginning, but once they understand the Urdu language's basic structure, they commit very few errors in organizing words in order. This indicates that learners do not face longer difficulties in forming sentences despite having different word orders in both languages.

3. Does subject-verb-agreement (functional morphology) more complicated than word order (syntax) in L2 acquisition?

Based on other studies Salbakova, (2008), (2013), (2014), (2018); Basnet, (2017); Jensen, (2017); Jensen et al., (2020); Rajabi, (2022), it has been predicted that the acquisition of subject-verb-agreement is more difficult than the acquisition of word order of L2 (Urdu). However, the study's findings strongly indicate that the study supports the 3rd prediction. The subject-verb-agreement acquisition is quite difficult in Urdu since Urdu has many variations with exceptions, whether subject-verb-agreement or non-living thing objectified as masculine or feminine or subject-auxiliary verb-agreement. The test items are based on the live class performance, so we have observed that learners have learned one or two or more rules and apply them, but in the next step, they are again in front of some other new items which have different rules, and the learners couldn't remember all the rules at a time.

CONCLUSION

The presented study aims to contribute to the contemporary knowledge of the cognitive process of acquisition of L2 Urdu by examining the predictions offered by BH. We experimented on the L2 acquisition of Urdu, focusing on learners' knowledge of functional morphology and syntax. However, the result of the analysis supports the bottleneck Hypothesis.

Comparing L1 (English) functional morphology to L2 (Urdu) provides a subtle understanding of linguistic complexity in L2. Some studies also focus on the contrast; for example, Basnet et al., (2017) investigated L1 Nepali learners of L2 English and found, For instance, present simple verbs in English are marked with the suffix –e(s) if the subject is 3rd person singular whereas in Nepali it is marked with various suffixes (e.g., $ts^h\partial$, -ts^he, -ts^hin, - $ts^h\partial$n, etc.) for further details Basnet et al., (2017). Moreover, I. N. Jensen et al., (2020) study has also investigated L1 Norwegian learners of L2 English and found a clear difference in difficulties between different types of morphological exponents and different types of syntactic structures.

However, these are preliminary findings of the presented study, many more questions remain. To further test the hypothesis, it is necessary to examine functional morphology compared to other domains beyond core syntax, such as phonology, semantics, or the syntax–discourse interface, as suggested by I. N. Jensen et al., (2020).

The general results provide implications for language teaching, as learners struggle with subject-verb-agreement even at advanced proficiency levels. It seems that more practice is needed beyond two and a half months to make learners proficient.

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