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Differences in the Effects of Task Repetition Techniques on the Fluency Development of ESL Learners

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Abstract

In an attempt to compare the effects of interleaved and blocked practice on L2 fluency development, 44 adolescent Indian English as L2 learners were given fluency training in English for three months. The participants in the blocked group engaged in task repetition practice of speaking English sentences in a predictable sequence of task repetition, i.e., aaaa, bbbb, cccc, and dddd, in the first 16 sessions. The sequence of the task repetition practice in the interleaved group was arranged using the technique of spacing and mixing, i.e., abcd, abbd, aacc, and bdcd, in the first 16 sessions. The mean values of the English fluency scores of the interleaved and blocked group in the two intermediate fluency tests in the middle of the training and one achievement test at the end showed no statistically significant difference in fluency development as the p-value of the comparison in a repeated measures ANOVA test was .29 representing low F value of 1.16 and effect size of .05. The participants in the blocked group, however, demonstrated a minor growth in fluency development from slow and hesitant speech behavior to occasional self-correction or repetition in a long speech in the later stages of the fluency training in English. The systematic manipulation of the sequence of the tasks to be practiced incorporating high similarity or stimuli retrieval in blocked practice might be more effective in fluency development in L2 than interleaving. As interleaving causes anxiety among beginners, it might not be an appropriate method of task repetition in the initial stage of fluency practice in L2.

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1. INTRODUCTION

Fluency in L2 refers to the objective features of speed, breakdown, and repetition activities in the oral speech of L2 learners (Skehan, 2003). It has become a significant subject of research in recent years (e.g., Freed et al., 2004; Lambert et al., 2017; Tavakoli et al., 2016) because the underlying cognitive processes or cognitive fluency of L2 speakers can be explored extensively by observing the various features of fluency (Tavakoli & Hunter, 2018). L2 fluency potentially exhibits the L2 speakers' cognitive fluency seen in the efficiency of executing, integrating, planning, and assembling linguistic input (Segalowitz, 2010). It is a window to the L2 learners' procedural knowledge exercised by the rapid and efficient encoding of declarative representations (DeKeyser, 2018; Kahng, 2014). A greater understanding of the functioning of procedural knowledge as it is closely related to speech fluency may be achieved through an analysis of different aspects of fluency in L2 speakers' oral interaction (Suzuki, 2021). Two of the more frequently explored foci of research on L2 fluency development have been short-term interventions either in classrooms or in study-abroad settings (e.g., Freed et al., 2004; Lambert et al., 2017). These studies have more or less elaborately described various speech dimensions of articulation rate, pause phenomena, turn-taking, collocation, or word sequences (e.g., Saito, 2020; Saito et al., 2018; van Os et al., 2020).

One of the many effective ways identified for enhancing L2 fluency in a classroom-based instruction setting is task repetition (Tavakoli & Hunter, 2018). It is the repetition of performing some tasks involving either the similarity of pragmatic purpose or textual content (Bygate, 2018). Several studies in the past have demonstrated the utility of task repetition in L2 fluency development (e.g., Ahmadian, 2011; de Jong & Perfetti, 2011; Thai & Boers, 2016). In doing so, various task repetition procedures like manipulation of task type repetition and variations in the repeated task have been studied to examine the influence of such repetition methods on L2 fluency development (e.g., de Jong & Perfetti, 2011; Kim & Tracy-Ventura, 2013). In a study by Suzuki (2021), the effects of task repetition on fluency development in English on three groups of Japanese university students were explored with some interesting results on the advantages of blocking in terms of articulation rate and mid-clause pause duration. Despite the elaborate linguistic information provided by Suzuki (2021), certain limitations related to the duration of the study and the fluency training sessions as well as the number of tests administered to measure the fluency status of the participants in the three-day training program were observed. Instead of one achievement test taken after the end of the treatment, several formative tests at different stages of the treatment given for a longer duration might yield a more comprehensive and accurate understanding. As a consequence, two groups of English as L2 learners were separately given fluency training in English for three months in the present study. Several English fluency tests at different stages of the fluency training were administered in addition to the pre-test and post-test. We believed that such a longitudinal design might enable us to understand the effect of blocking and interleaving in greater detail. Justifying such a design, some previous studies on task

repetition methods of interleaving and blocking have also observed differences between early-stage and later-stage effects of the treatment (e.g., Carpenter & Mueller, 2013; Pan et al., 2019; Schneider et al., 1998, 2002).

The principal objective of the study was to measure and compare the difference in the effects of the task repetition methods of interleaving and blocking on the fluency development of the learners after the end of the three-month-long fluency training in English. Since the participants of the study had English learning experience of 14-15 years, giving them discourse-level fluency training in extended periods of practice was considered an appropriate and valid approach to examine the differences in effect instead of short-duration fluency training (e.g., de Jong & Perfetti, 2011; Suzuki, 2021) involving word and sentence level task repetition exercises (e.g., Carpenter & Mueller, 2013; Schneider et al., 1998, 2002). Additionally, as specific differences in the effect of interleaving and blocking on L2 learning at various stages of training have been observed in previous studies on the subject (e.g., Carpenter & Mueller, 2013; Schneider et al., 1998, 2002), the study also aimed to measure and compare the effects of the two methods of task repetition practice on fluency development at the initial and the final stages of the fluency training separately. Following these objectives, three research questions were posed in the study:

1. Is there any significant difference in the effect of interleaving and blocking on the English fluency performance of the interleaving group (IL) and blocking group (BP) in the initial stage of the scheduled fluency practice sessions (SFPSs)?
2. Is there any significant difference in the effect of interleaving and blocking on the English fluency performance of IL and BP in the final stages of the SFPSs?
3. Is there any significant difference in the effect of interleaving and blocking on the progression of English fluency performance of IL and BP in the three rounds of the SFPSs?

2. LITERATURE REVIEW

2.1 Interleaving and Blocking

In traditional academic settings, the skills the learners require to practice are often arranged in the order of difficulty, known as blocked practice, and the learners practice one set of skills over a while and after mastering them, they move to the next set of skills in a predictable order (Kakoti & Doley, 2021; Suzuki, 2021; Suzuki & Sunada, 2020; Suzuki et al., 2022). Highlighting the efficacy of a mixed and less predictable sequencing of the skill sets to be learned, termed as interleaving, recent studies have, however, demonstrated that mixing of skill sets in an unpredictable sequence may prove to be more effective (e.g., Brown, 2014; Dunlosky et al., 2013; Kang, 2016; Pan et al., 2019; Soderstrom & Bjork, 2015; Yan et al., 2017). Specific advantages have been observed in the use of both methods of practice. Algebraic rules were learned more effectively through interleaving (Mayfield & Chase, 2002), whereas blocking was found to be effective in learning to identify variations in line segments (Goldstone, 1996).

It has been observed that learning and retention of similarities of patterns within and between low-similarity categories of exemplars are easier in blocked practice than in interleaving (Carvalho & Goldstone, 2014). On the other hand, Zulkiply and Burt

(2013) found that learning and retention of high-similarity categories of exemplars sharing a high level of similarity both within and between the categories were more effectively done in interleaving than in blocked practice. Specifying the advantages of the two methods, Kang (2016) observed that learning to identify the similarities within a single category might be easier in blocking but interleaving worked more effectively than blocking in learning to make a clear distinction between different categories.

2.2 Effect of Interleaving and Blocking on L2 Learning

Several studies in the past showed interleaving as a more effective method of practice than blocking in L2 learning (e.g., Miles, 2014; Nakata, 2015; Rogers, 2017). Finkbeiner and Nicol (2003) found interleaving more effective than blocking in a translation task involving the learning of L2 vocabulary. They reported that learners practicing to recall 32 pseudo-words using interleaving demonstrated a faster speed of response than the learners using the method of blocked practice. Miles (2014) and Nakata (2015) also observed that interleaving was more effective than blocking in the retention of L2 grammar and vocabulary. Explaining the factors leading to better retention in certain domains of L2 learning, Rogers (2017) concluded that greater opportunities for attentive practice and more varied distribution of practice sessions in interleaving, contrary to the continuous practice without intervals in blocking, provide the element of spacing leading to greater retention in interleaved practice.

Pan et al. (2019), however, did not observe the benefits of interleaving in the initial stage of their study on the learning of L2 grammar rules. In their study, two groups of English-speaking students divided into interleaving and blocking groups learned two Spanish grammar rules of preterit and imperfect past tenses. They did not observe any statistically significant difference in the retention of the L2 grammar rules in the first two tests of their study. The post-test scores of the students in the blocked practice group were higher than the post-test scores of the students in the interleaving group.

Both methods have been reported to be effective in their ways by some studies in the past (e.g., Taylor & Rohrer, 2010). These studies have identified interleaving as an effective method of practice for experienced L2 learners while beginners learned effectively using the method of blocked practice. Bjork (1999) and Porter and Magill (2010) stated the reason for these specific benefits of interleaving and blocking as the effect of a desirable difficulty framework. Since both methods facilitate long-term retention of learning done at the appropriate level of difficulty, both of them have pedagogical relevance in L2 learning. The method of interleaved practice might pose a challenge to beginners or inefficient learners but it offers the appropriate level of difficulty to experienced learners resulting in more effective learning. As both methods have their relevance, blocking has been suggested for L2 learners with a low proficiency level in the early stages of their learning while more proficient learners are advised to practice using interleaving. Proficient learners benefit more from interleaving than from blocking because interleaving paves the way for an appropriate level of difficulty during the L2 learning period that increases contextual interference requiring greater practice (Porter & Magill, 2010). Although interleaving creates stress in the initial period of L2 practice, it might facilitate long-term retention and transfer performance introducing the element of desirable difficulty to the experienced L2 learners (Bjork, 1994). The method of blocked practice, however, has not been

reported to be conducive to long-term retention of L2 learning despite more encouraging signs of effective learning than in interleaving in the initial stages (Soderstrom & Bjork, 2015).

2.3 Interleaving and L2 Fluency Performance

Several studies have identified the technique of task repetition as an effective method to enhance L2 fluency performance (e.g., Ahmadian, 2011; Ahmadian & Tavakoli, 2011; Lambert et al., 2017; Thai & Boers, 2016). Banking on Levelt's (1989) speech production model and Kormos' (2006) bilingual production model involving the components of conceptualizer, formulator, and articulator, it has been reported that task repetition benefits L2 fluency performance by freeing up the attentional resources of the L2 learners (e.g., Fukuta, 2016). Since the attentional resources of the L2 learners are allocated for conceptualization in the working memory when a task is presented to them for the first time, not many attentional resources can be used by the learners for formulation and articulation. When the L2 learners repeat the task, they can free up their attentional resources for linguistic formulation as the concerned task becomes familiar (Fukuta, 2016). In a study conducted by Lambert et al. (2017), Japanese university EFL learners engaged in a classroom-based task repetition practice involving instruction, narration, or opinion tasks in pairs. They observed a steady and significant increase in the fluency performance among the learners in terms of a decrease in mid-clause pauses and the number of self-repairs. The potential proceduralization or automatization of underlying linguistic knowledge propels the development of fluency performance to some extent in the speech production of L2 learners practicing task repetition (Lambert et al., 2017).

Adopting a variation in task repetition technique, de Jong and Perfetti (2011) studied the effects of content similarity and variability in task repetition on L2 fluency performance. Three groups of English L2 learners- one no-repetition group of nine, and two repetition groups of ten- of an American university engaged in nine monologues 4/3/2-minute speech tasks in the study. The post-test scores in the study showed that meaningful fluency development related to proceduralization occurred only in the speech behaviors of the repetition groups. Task repetition triggered the changes in cognitive fluency or proceduralization leading to better or improved L2 fluency (de Jong & Perfetti, 2011). The task repetition study conducted by de Jong and Perfetti (2011) demonstrated that an enhanced level of L2 proceduralization can be achieved by systematically manipulating the sequence of practice tasks. Their study was, however, criticized for the low sample size of 24 participants and the location of the experiment in a place where English was the primary mode of communication outside the classroom (Suzuki, 2021).

An important study by Suzuki (2021) examined the effects of task repetition on fluency development in English. It was carried out at a university in Japan involving 68 students. The students were divided into three groups–one no-repetition group of 18, one blocked practice group of 24, and one interleaved group of 26 participants. The task repetition groups engaged in three oral narrative tasks of six-frame cartoons for three consecutive days under either a blocked or interleaved task repetition schedule. The study observed that participants in the blocked practice group demonstrated greater fluency development in terms of faster articulation rate and shorter mid-clause pause duration than did the participants in the interleaved group

(Suzuki, 2021). It may, however, be stated that Suzuki's (2021) study, despite its elaborate description of the various linguistic dimensions of fluency behavior observed among the participants, had certain limitations. Firstly, the study was carried out only for three days involving a very limited number of tasks for repetition practice. Since the training and observation period in the study was short, the findings may also have been influenced by extraneous factors concerning health, emotional, and familial issues of the participants having an impact on their cognitive state during those three days. Secondly, the duration of each fluency training session in the study was only 30 minutes. As the number of participants in each repetition group was more than 20, it may be assumed that there must have been considerable difficulty in attending to the individual learning styles and explanation needs of the concerned participants. Additionally, the number of tests to measure the fluency development of the participants was only two- a pre-test and a post-test separating a three-day training program. Evaluation of the efficacy of repetition practice may be considered difficult only with the use of one achievement test at the end of the duration of the treatment. There are L2 studies (e.g., Carpenter & Mueller, 2013; Pan et al., 2019; Schneider et al., 1998, 2002) on such repetition tasks that observed a curve of variation in the effect of the methods of interleaving and blocking measured at the initial stage of training and later stages.

3. METHODS

3.1 Research Design

A true experimental research design was applied in the present study. The participants were divided into two groups- IL and BP. The groups were required to practice different fluency tasks separately using interleaving and blocking methods for three months. The participants were selected and distributed into two groups based on their fluency performance in a pre-test (FT 1). Three more tests– the first intermediate fluency test (IFT 1), the second intermediate fluency test (IFT 2), and the post-test in fluency (FT 2) – were administered at different stages of the three rounds of the SFPSs. The SFPSs for both groups were conducted in online mode at Tezpur University, India, as part of an English as L2 learning project in the autumn semester (July-December) of 2021.

3.2 Participants

There were 44 participants, belonging to the age group of 18-19 years studying in various undergraduate sciences programs at different departments of Tezpur University in the present study. There were 68 candidates in the FT 1 administered for the recruitment of the participants. The purposive sampling method was used in the selection of the participants. The outliers in FT 1 were equally distributed between the two groups (see Table 1). Since the majority of the participants scored low in fluency performance in FT 1, the group distribution was relatively seamless and it was possible to keep an equal number of participants (n=22) in both groups at the start of the first round of the SFPSs. There were 10 female participants in each group. Some

participants – two in IL and two in BP– opted out and re-joined at different rounds of the SFPSs.

Table 1. Fluency performance in FT 1.

Speaking skill	Test mode	Sex		Age (in years)	
		Male M (SD)	Female M (SD)	18 M (SD)	19 M (SD)
Fluency	Online Interaction (OI)	2.88 (1.18)	3.17 (.86)	3.30 (.94)	2.83 (1.07)

3.3 Fluency Tests in English

In the three fluency tests – IFT 1, IFT 2, and FT 2– conducted in the present study in addition to FT 1, the participants responded to the instructor's questions related to their personal academic life using the sentences already practiced during the concerned SFPSs. After transcribing and preparing the oral responses of the participants recorded during the tests, four assessors with a master's degree in English and some teaching experience in English evaluated the responses using the English fluency assessment criteria designed by the Central Board of Secondary Education (CBSE), India. Following the 5-point scale of assessment criteria, the responses of the participants were given scores in the range between points 1 and 5. The scale of assessment ("Guidelines for assessment," 2012) ranged from noticeably long pauses and frequent repetition or self-correction (1 point), through hesitation and slow speech (2 points), occasional self-correction or repetition in long speech (3 points), and speech without noticeable effort with occasional self-correction (4 points), to fluency in speech with minimal hesitation and without repetition (5 points).

3.4 Materials, Activities, and Their Sequences

Based on a needs analysis of the views expressed by the participants in FT 1, 12 topics for fluency tasks (TFTs) to be practiced in the three rounds of SFPSs were identified in the present study. The 12 TFTs selected for the SFPSs were introducing oneself (a), personal hobby (b), one's native place (c), speaking about strengths and weaknesses (d), speaking about a favorite subject (e), one's internship experience (f), skills of a leader (g), management skills (h), introducing the topic in a presentation (i), presenting the content (j), interpreting the analysis (k), and how to conclude a presentation (l).

Table 2. Samples of sentences used in the SFPSs.

TFTs	Sample sentences
a	"I like reading spiritual books that provide truth about God and creation."
	"I am a good writer, reader, speaker, listener, thinker, communicator, and a table tennis player."
	"I am hard-working by nature and I like to do things with perfection."
	"I am an honest and straightforward man."
	"I do not compromise with any dishonesty in life or work."

Table 2 continued ...

b	"I am quite active in my spare time."
	"I am developing personally and professionally."
	"I play soccer three times a week."
	"We won the state championship last year."

The participants were required to watch the video clips of the sentences and listen to the audio several times. There were presentation slides of each of the sentences, and they were presented to the participants for practice separately (see Table 2). Once the sentences were practiced several times, at least three times, the participants were required to perform writing and role-playing exercises.

The 12 TFTs were practiced in 48 sessions of the three rounds of SFPSs and the sequences of the TFTs were arranged differently for the two groups (see Table 3). The TFTs in BP were arranged for practice as per the difficulty and relatedness of the topics. The sequence of the TFTs in IL, contrarily, followed the spacing and mixing technique of practice.

Table 3. Sequence of the TFTs.

Weeks	**TFTs in SFPS 1**		**TFTs in SFPS 2**		**TFTs in SFPS 3**	
	IL	**BP**	**IL**	**BP**	**IL**	**BP**
Week 1	a	a	e	e	i	i
	c	a	g	e	k	i
	b	a	f	e	j	i
	d	a	h	e	l	i
Week 2	a	b	e	f	i	j
	b	b	f	f	j	j
	b	b	f	f	j	j
	d	b	h	f	l	j
Week 3	a	c	e	g	i	k
	a	c	e	g	i	k
	c	c	g	g	k	k
	c	c	g	g	k	k
Week 4	b	d	f	h	j	l
	d	d	h	h	l	l
	c	d	g	h	k	l
	d	d	h	h	l	l

3.5 Data Collection and Analysis

The data for the comparison of the methods of interleaving and blocking in their effect on fluency development in English in the present study were collected from the four fluency tests of FT 1, IFT 1, IFT 2, and FT 2 administered at various stages of the SFPSs. The fluency scores of the participants of both groups collected in these four tests were analyzed in SPSS 26.0 using descriptive and inferential statistics. One-way repeated measures ANOVA test was performed to compare the differences in the effects of interleaving and blocking on the rate of progress in English fluency development, both at various stages of the SFPSs and during the entire period.

4. RESULTS

4.1 Initial Stage of the SFPSs

Since one of the major objectives of the present study was to measure and compare the mean values of the English fluency scores of IL and BP in the initial stage of the SFPSs, the first research question of the study was: 'Is there any significant difference in the effect of interleaving and blocking on the English fluency performance of the IL and BP in the initial stage of the SFPSs?' The differences in the mean values of the English fluency scores obtained by BP and IL in the first two tests– IFT1 and IFT 2– administered after the end of the first two rounds of SFPSs were analyzed to measure the difference in performance between the two groups (see Table 4).

Table 4. Differences in fluency performance during the intermediate tests.

Speaking skill	Test mode	Group	IFT 1 M (SD)	IFT 2 M (SD)	df	F	p	Effect size[a]
Fluency	OI	IL	2.39 (1.13)	1.98 (1.04)	1	1.30	.26	.05
		BP	2.81 (1.64)	2.77 (1.67)				

[a]Partial Eta^2

In IFT 1, 2.39 and 2.81 were the mean values of the fluency performance scores secured by the IL and BP, respectively. Although the group distribution was done after an analysis of the fluency scores of the participants in the pre-test (FT 1) ensuring recruitment of participants with equal proficiency distribution on average, the BP group demonstrated a better performance in IFT 1 administered after the end of the first round. The participants in the BP group showed similar performance in IFT 2 conducted after the end of the second round. The mean values of the fluency scores secured by the IL and BP in IFT 2 were 1.98 and 2.77, respectively. It is noted here that a slight decline in performance, from 2.39 in IFT 1 to 1.98 in IFT 2 among IL participants and from 2.81 in IFT 1 to 2.77 in IFT 2 among BP participants, was recorded in the initial two rounds of the SFPSs. One of the reasons for this decline in the mean values of the fluency scores might be the influence of the minor variations in assessors' subjective assessment standards. It might also be because of the presence of an outlier in BP since the *SD*s of 1.64 and 1.67 recorded for BP in IFT 1 and IFT 2 respectively were higher than the *SD*s of 1.13 and 1.04 recorded for IL for the same two tests. Despite the minor differences recorded in the fluency performance of IL and BP, no statistically significant difference was observed between the two groups in IFT 1 and IFT 2. The *p*-value recorded in a repeated measures ANOVA test was .26. The relevant *F* value was a meagre of 1.30 reflecting a similar low effect size of .05.

4.2 Final Stage of the SFPSs

The second research question of the study was: 'Is there any significant difference in the effect of interleaving and blocking on the English fluency performance of IL and BP in the final stages of the SFPSs?' The objective of this

question was to measure the difference, if there was any, in the fluency performance of the two groups after the end of the last round of the SFPSs. The mean values of the fluency performance scores secured by the IL and BP in IFT 2 and FT 2 were used to analyze and answer the various aspects of this research question (see Table 5). Since four participants, two from each group, opted out of the SFPSs in the third round, the mean values of the fluency performance scores in the final stage were calculated after excluding their scores. As such, the mean values of the fluency performance by IL and BP in IFT 2 presented in the preceding section (see Table 4) are a little different from the mean values shown here (see Table 5). Considering the equal number of dropouts and the retention of outliers in both groups, it might be assumed that the minor changes in the mean values of the fluency performance scores presented here (see Table 5) did not fail to represent a similar trend observed in the initial stage of the SFPSs (see Table 4).

Table 5. Differences in fluency performance in the final stages.

Speaking skill	**Test mode**	**Group**	**IFT 2 M (SD)**	**FT 2 M (SD)**	**df**	**F**	**p**	**Effect size[a]**
Fluency	OI	IL	1.54 (1.24)	2.09 (1.60)	1	1.12	.30	.04
		BP	2.34 (1.88)	2.55 (2.03)				

[a]Partial Eta^2

The fluency performance of IL and BP in the final phase of the SFPSs was measured by comparing and analyzing the mean values of the fluency scores secured by the participants in IFT 2 and FT 2. After excluding the fluency performance scores of the dropouts in IFT 2, the mean values of the scores secured by IL and BP were 1.54 and 2.34 respectively. Both groups performed slightly better in FT 2 than in IFT 2 as the mean values of fluency performance grew to 2.09 for IL and 2.55 in the case of BP. Contrary to what was observed in the initial stage of the SFPSs, participants in both groups demonstrated an improvement in the mean values of their fluency performance scores in the final stage of the SFPSs. It may be noted here that minor variations in the subjective assessment standards adopted by the assessors might have influenced this small rise in fluency performance as the differences in the mean values calculated for both groups in IFT 2 and FT 2 were not significantly large. The effect of the outliers might be the factor of the higher mean values of the fluency performance scores in BP in both tests because the *SD*s of 1.88 and 2.03 in the case of BP in IFT 2 and FT 2 respectively were higher than the *SD*s of 1.24 and 1.60 calculated for IL for the same two tests. The *p*-value of .30 calculated after a repeated measures ANOVA test of the mean values of the fluency scores in IFT 2 and FT 2 was very low reflecting a statistically insignificant difference in fluency performance between IL and BP. The *F* value of 1.12 was also very low reflecting a similar low effect size of .04.

4.3 Difference in the progression of fluency performance

Another objective of the present study was to measure the difference between IL and BP in fluency performance throughout the three rounds of SFPSs. The third research question of the study was posed to examine this difference in performance

and it was: 'Is there any significant difference in the effect of interleaving and blocking on the progression of English fluency performance of IL and BP in the three rounds of the SFPSs?' Since four participants, two in each group, opted out of the SFPSs at different stages, the mean values of the fluency performance scores only of those participants in IL and BP who continuously attended the three rounds of SFPSs were considered for comparison and analysis to measure the difference in the progression of fluency performance (see Table 6). Even though two dropouts in IL after IFT 1 re-joined the SFPSs in the third round, their fluency performance scores were excluded from the final calculation of the mean values of all three tests. As a result, there are differences in the mean values of the fluency scores of IL and BP in IFT 1, IFT 2, and FT 2 presented here (see Table 6) from the mean values of the fluency scores presented in the preceding sections (see Table 4 & Table 5) for the same three tests. Considering the small number of dropouts, the minor difference between the mean values of fluency scores with dropouts and the mean values of fluency scores without the dropouts might not change the difference in the average progression rate observed during the three rounds of the SFPSs.

Table 6. Progression in fluency performance during the period of experimentation.

Speaking skill	Test mode	Group	IFT 1 M (SD)	IFT 2 M (SD)	FT 2 M (SD)	F	p	Effect size[a]
Fluency	OI	IL	2.39 (1.13)	1.98 (1.04)	2.69 (1.27)	1.16	.29	.05
		BP	2.85 (1.55)	2.85 (1.61)	3.17 (1.77)			

[a]Partial Eta^2

The recalculation of the fluency scores after excluding the scores secured by the dropouts measured the mean values of 2.39, 1.98, and 2.69 in IFT 1, IFT 2, and FT 2 respectively for the participants in the IL group. The recalculation of the fluency performance scores of BP after the exclusion of the dropouts measured the mean values of 2.85, 2.85, and 3.17 in IFT 1, IFT 2, and FT 2, respectively. Since the *SDs* of 1.55, 1.61, and 1.77 in the case of BP were higher than the *SD*s of 1.13, 1.04, and 1.27 recorded for IL in IFT 1, IFT 2, and FT 2 respectively, it may be assumed here that the presence of an outlier in BP might have caused a comparatively higher rise in the mean values of the fluency scores of BP in all the three tests. Moreover, the minor decline in the mean values of fluency performance scores– from 2.39 to 1.98– in IL in IFT 2 might be interpreted as caused by minor differences in the subjective assessment preferences of the four assessors. Otherwise, both groups demonstrated a rise in the mean values of fluency performance scores– from 2.39 to 2.69 in IL and from 2.85 to 3.17 in BP– in IFT 1 and FT 2. All the same, no statistically significant difference in fluency performance between IL and BP was recorded in the comparison of the mean values as the *p*-value after repeated measures ANOVA test was .29. The *F* value was considerably low (1.16) corresponding to a similar low effect size of .05.

5. DISCUSSION

In contrast to several studies confirming the advantages of using the method of interleaving in an L2 task repetition program (e.g., Brown, 2014; Dunlosky et al., 2013; Soderstrom & Bjork, 2015; Suzuki et al., 2022; Yan et al., 2017), no statistically significant difference in the effect of interleaving and blocking on English fluency performance was observed in the present study. Most of the findings in the present study were in agreement with some studies in the past (e.g., Brunmair & Richter, 2019; Carpenter & Mueller, 2013; Dunlosky et al., 2013; Pan et al., 2019; Schneider et al., 1998, 2002). Since blocking was observed to enhance a slightly higher fluency performance than interleaving in the present study, it also partially confirmed Suzuki's (2021) findings on the effect of blocking on the fluency development of L2 learners.

In the initial stages of the SFPSs, neither group recorded a statistically significant rise in English fluency performance. The effect of blocking and interleaving on the fluency development of the participants also did not demonstrate any statistically significant difference in the first two intermediate fluency tests administered after the end of the first two rounds of the SFPSs. Both groups recorded a minor downward curve in fluency performance in the second intermediate test. Since the decline in fluency performance was not exponential and it was within the same range for both groups, it might have been influenced more by minor differences in the subjective assessment preferences of the assessors than a realistic decline in the fluency performance of the participants. In partial agreement with Suzuki's (2021) findings about the positive effect of blocking on fluency development, the participants under the blocked condition in the present study performed slightly better, even though not statistically significant, than the participants under the interleaved condition in the initial stages of the SFPSs.

Similar trends were observed in the final stages of the SFPSs. Neither the interleaved nor the blocked group performed significantly differently in the English fluency test administered after the end of the third round of SFPSs. A small hike in fluency performance from the second intermediate test recorded in the final test in English fluency for both groups was not statistically significant. Better fluency performance was recorded for the participants under the blocked condition in the first two intermediate tests, repeated in the third test of the present study. As observed by Schneider et al., (1998, 2002) about the advantages of blocking in the initial stages of L2 learning, the findings of the present study demonstrated that the advantages of blocking in fluency development (Suzuki, 2021) might extend even till later stages of fluency training. The participants in BP exhibited hesitation in utterance and slow speech speed after the end of the two rounds of fluency training. They, however, started to produce long speeches in English with occasional self-correction and repetition by the end of the third round of training. The participants in IL, on the other hand, remained slightly hesitant, and the speed of their speech in English continued to be on the slower side even after the end of the three rounds of fluency training. But, this difference in fluency performance might not be considered very significant as the participants in both groups continued to demonstrate, more or less, similar speech behavior.

During the three rounds of SFPSs, no statistically significant difference between interleaving and blocking was observed in the rate of fluency development in the present study. Although the advantages recorded for blocking in L2 fluency

development in all three tests administered during the study were not statistically significant, they might indicate that task repetitions involving high similarity or stimuli retrieval (Brunmair & Richter, 2019; Carpenter & Mueller, 2013; Carvalho & Goldstone, 2014; Zulkiply & Burt, 2013) might be benefitted more by the use of blocking than the use of interleaving. The components of conceptualizer, formulator, and articulator presented in the speech production model (Levelt, 1989) and bilingual production model (Kormos, 2006) might also explain this minor advantage for blocking recorded in the present study. Since fluency development tasks require the distribution of attentional resources in the working memory of the L2 learners (Fukuta, 2016) for conceptualization, formulation, and articulation acts, the repetition of similar language tasks or closely related language tasks for a certain number of times, before moving to another language task, performed in blocking might free up the attentional resources for all the components identified in speech production or bilingual production models. As the repetition of the same task several times might make the task familiar to the L2 learner, the attentional resources freed up using the method of blocking make it available for linguistic formulation (Fukuta, 2016). Such task repetitions also propel potential proceduralization or automatization of underlying linguistic knowledge of the L2 learners resulting in a steady and significant increase in L2 fluency in terms of a decrease in mid-clause pauses and the number of clause repairs (de Jong & Perfetti, 2011; Lambert et al., 2017).

Since the use of blocked practice results in a faster articulation rate and shorter mid-clause pause duration than in interleaving practice (Suzuki, 2021), such task repetitions lead to greater fluency development in L2. Additionally, ineffective teaching might have contributed to the absence of significant fluency development observed among the participants of both groups even after three months of L2 fluency practice. A lack of serious pedagogical engagement on the part of both teacher and participants, as the fluency training sessions were conducted on a distant learning mode of online teaching, might have slackened the effect of the whole fluency training exercise. It leaves us with an expectation that the minor increase in fluency performance observed in the blocked group might have grown higher demonstrating a more significant difference in their effect on fluency development if the fluency training sessions were more involved and motivating than they were during the study.

6. CONCLUSION

The present study examined the difference in the pedagogical effect of interleaving and blocked practice on the fluency development of English as L2 learners. The study demonstrated that there was no statistically significant difference between interleaving and blocking in their effect on L2 fluency development. Neither the participants in the interleaved group nor the ones in the blocked practice group showed an exceptionally high rate of fluency development in the initial stage of the fluency training program. One of the most significant conclusions of the present study was the observation that the minor spikes in fluency performance both in the initial and in the later stages of the training program in favor of blocking might have been enhanced had there been more urgency and involvement in the sessions of the training program.

As the method of blocked practice encourages stimuli retrieval in task repetition and propels potential proceduralization or automatization of underlying linguistic knowledge, it provides greater opportunity than interleaving for a steady increase in L2 fluency. So, task repetitions arranged in order of difficulty and relatedness adopted in blocking might be considered more effective than the spacing and mixing technique of task repetition followed in interleaving practice in L2 fluency development training. One caveat might be appropriate in this context. The continuous presence of the participants and the performance of class work with sincerity could not be effectively monitored by the teacher during the online training sessions. It resulted in the breaking of continuity in task repetitions rendering the tasks ineffective and monotonous in this study. We might state here that more comprehensive and convincing observations on the subject may be acquired in an experimental study of similar duration involving a face-to-face mode of fluency training in the future.

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