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A Literature Review of Second Language (L2) Oral Fluency

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Abstract. This review aims to sort out and analyze the current research status of second language (L2) oral fluency. This paper defines the multidimensional concept of fluency, and summarizes the key factors affecting the development of fluency, such as the transfer effect of first language (L1) fluency, task repetition and time pressure, conceptualization difficulty, emotion and willingness, as well as vocabulary knowledge and teaching intervention. The study finds that although the academic circle has reached a consensus on the core dimensions of L2 fluency (such as speech rate, pauses, and repairs), there are still many controversies in different studies regarding the weight of specific indicators, the interaction among various factors, and the relationship between fluency and other language abilities. Finally, this paper points out the shortcomings of existing research and future research directions.

Keywords: Second language oral fluency, Fluency transfer, Task repetition, Conceptualization difficulty

1. Introduction

L2 oral fluency is a complex and multidimensional concept, and its definition and measurement methods have evolved from a single to a comprehensive perspective in academia. Fillmore defined fluency as "the ability to talk at length with few pauses; the ability to fill time with talk; the ability to produce coherent, semantically dense sentences; the ability to say appropriate things in a wide range of contexts; and the ability to be creative and imaginative in language use" [1]. Lennon was the first to systematically distinguish between broad and narrow senses of fluency — fluency in the broad sense is almost equivalent to overall oral proficiency, while fluency in the narrow sense specifically refers to speech smoothness, that is, measurable speech features such as speech rate, pauses, hesitations and repairs [2]. Lennon further defined fluency as "the listener's impression that the processes of speech planning and production are operating easily and efficiently" [2].

Tavakoli and Hunter further refined L2 oral fluency into four levels: very broad (equivalent to overall language ability), broad (oral ability), narrow (coherence and smoothness of speech) and very narrow (measured by specific indicators such as speech rate, pauses and repairs) [3].

The ternary model proposed by Segalowitz divides fluency into cognitive fluency, utterance fluency, and perceived fluency [4]. Cognitive Fluency refers to the operational efficiency of the cognitive processes behind speech production; it reflects the degree of proceduralization and automatization of learners' L2 knowledge, and is "the efficiency with which the underlying

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processes that support speech production operate" [4]. Utterance Fluency refers to objectively measurable speech features, including speech rate, pauses and repairs. Segalowitz defined it as "the features of utterances that reflect the speaker's cognitive fluency" [4]. Perceived Fluency refers to the listener's subjective judgment of the speaker's cognitive fluency based on the speech they hear. Segalowitz defined it as "the inference a listener makes about a speaker's cognitive fluency based on their perception of the speaker's utterance fluency" [4]. Multiple studies have shown that perceived fluency is highly correlated with objective indicators such as speech rate and pause frequency [5, 6].

Segalowitz's ternary framework is currently the most widely accepted theoretical framework [4].

2. Key factors affecting L2 oral fluency

2.1. The transfer effect of first language (L1) fluency

A large number of studies have shown that an individual's L1 speaking style and fluency characteristics will significantly affect their L2 fluency, which is regarded as a transfer of language habits or personality traits [7]. Multiple studies have confirmed that there is a significant positive correlation between L1 and L2 in temporal indicators such as speech rate, pause frequency, and average length of speech run [8-10]. De Jong et al. pointed out: "L2 fluency behavior can be largely predicted by L1 behavior alone" [8]. This correlation even goes beyond the influence of language distance. For example, although Finnish and English are typologically different, learners' L1 speech rate can still predict their L2 speech rate [9].

Faerch and Kasper divided the transfer from L1 to L2 into three types. The first is "strategic transfer", which means that learners will apply L1 speech conventions when their L2 knowledge is insufficient. The second is "auxiliary transfer", which means that performance factors such as speed hinder learners' use of L2 knowledge. The third is "automatic transfer", which means that when attention is shifted to other aspects such as conceptualization or pronunciation, highly automated L1 planning will take over [11]. This theoretical innovation has important significance for fluency assessment and teaching. It shows that the "disfluency" shown by learners in L2 may partly stem from their inherent L1 speaking style, not simply a problem of L2 proficiency. Therefore, when assessing L2 fluency, individual differences related to L1 should be carefully considered, so as to avoid misjudging learners' abilities [4].

However, this influence mechanism is not absolute. Riazantseva found that the influence of L1 Russian pause patterns on L2 English mainly exists in low-intermediate level learners, while high-level learners are closer to the target language pattern [12]. This indicates that with the improvement of L2 proficiency, the influence of L1 may be inhibited or adjusted, showing the dynamic nature of the relationship between L1 and L2 fluency [13]. In addition, for repair fluency (such as self-correction), the correlation between L1 and L2 is weak, which may be more affected by individual metacognitive monitoring styles [14].

2.2. The influence of task design and implementation conditions

Studies under the task-based teaching framework have extensively discussed how task design affects L2 utterance fluency. It is generally believed that reducing the cognitive load of tasks can promote fluency.

Task repetition and time pressure: The famous "4/3/2" technique (repeating the same task in decreasing time) can significantly improve fluency [15]. Nation pointed out that "with one exception, all subjects increased their speech rate from the first to the third telling... the number of

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false starts, hesitations... and repeated words decreased in every case" [16]. Lambert et al. found that the improvement of fluency from repeated tasks is phased: speech rate increases rapidly in the first three repetitions, the reduction of between-clause pauses occurs in the second repetition, while the reduction of within-clause pauses requires more repetitions (1st-3rd) [17].

Task structure: Tasks with clear structure and organized information can produce more fluent language than loose tasks [18]. Pawley and Syder pointed out that the characteristic of fluent daily speech is "a sequence of relatively independent clauses with low grammatical integration with preceding and following clauses" [19].

Planning time: Providing pre-task planning time usually improves fluency, because it allows learners to pre-process content, vocabulary and grammar, thereby reducing the pressure of online planning [20].

Multimodal input in forms such as combination of pictures and texts and videos with subtitles can effectively increase learners' oral production, but there is no unified conclusion on the optimization effect of oral fluency [21, 22]. Empirical data shows that different input modalities can significantly interfere with the chunk reproduction effect of learners in retelling practice, but cannot significantly change their oral fluency level. Moreover, the stronger learners' chunk reproduction ability is, the weaker their repair fluency performance tends to be, showing a significant negative correlation between the two [23].

Xu Jinfen and Feng Xiaoli found that increasing the difficulty of resource-oriented learning tasks helps to improve the accuracy of learners' oral expression, but has an inhibitory effect on fluency [24]. This result confirms the core theory of the limited attention model: high-complexity tasks will occupy a large amount of learners' cognitive resources, prompting learners to focus on linguistic form encoding, thus sacrificing the speed of oral output. Although both task-based language teaching and the production-oriented approach can effectively improve learners' oral fluency based on structured task design [25], the effect of task difficulty on various dimensions of oral ability is not unidirectional, but has the characteristics of dynamic game and balance [26].

The above research results have important guiding value for oral English teaching in second language classrooms. For example, task repetition training clearly reveals the cognitive mechanism of oral fluency improvement: repeated practice can continuously optimize learners' language conceptual processing efficiency and reduce pauses between sentences; at the same time, it promotes the automation of language encoding process, effectively reduces within-clause pauses and repairs, thus improving the coherence of oral output [17].

2.3. The influence of conceptualization difficulty

Felker et al. first isolated and independently verified the influence of conceptualization difficulty on native and second language oral fluency [27]. The experimental results showed that when subjects abandoned the established speech plan and reconstructed the expression plan, the fluency level of oral output would decrease significantly. On the whole, most fluency indicators have similar effects on native language and second language, but there is a significant interactive difference between the two in the core indicator of color naming duration: in the process of second language expression, the overthrow and reconstruction of speech plans will greatly prolong the time for individuals to process conceptual difficulty, which is significantly higher than the processing time of native language [27].

This research result provides strong empirical support for the "cognitive bottleneck" hypothesis [28]. The hypothesis holds that stages such as conceptualization, linguistic encoding and articulation all depend on the individual's limited cognitive resources. When the conceptualization processing load of second language learners increases, it will further occupy the already limited cognitive

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resources and delay the subsequent linguistic encoding process. This conclusion also provides important enlightenment for language assessment: compared with native speakers, increasing task cognitive complexity will have a more obvious negative impact on the oral fluency of second language learners [27].

2.4. Emotion, willingness and individual differences

Emotional and motivational factors play a key role in fluency performance. Studies have found that task anxiety has a negative impact on L2 oral fluency, while task enjoyment has a promoting effect [29, 30]. This effect is particularly significant when learners perceive their oral proficiency as low [29].

Willingness to Communicate (WTC) has a complex dynamic interactive relationship with language fluency. A case study by Nematizadeh and Wood found that among 103 groups of interactive cases, 59 groups showed positive correlation, that is, high willingness to communicate corresponds to higher language fluency; 29 groups showed negative correlation, which means that learners formed coherent speech flow based on formulaic chunks, but their subjective willingness to communicate was low. Cognitive factors such as lexical retrieval efficiency and topic familiarity can effectively improve learners' willingness to communicate, and then optimize language expression fluency; conversely, a temporary decline in language fluency will also inhibit willingness to communicate. There is a two-way causal relationship between the two, showing nonlinear dynamic changes as a whole [31, 32].

From the perspective of dynamic systems theory, language fluency is not simply a cognitive issue, but also involves affective and social dimensions. The dynamic fluctuation of willingness to communicate interacts with the fluctuation of cognitive processing efficiency, which jointly affects learners' actual language production effect.

2.5. Vocabulary knowledge and teaching intervention

Vocabulary knowledge is the basis of fluent oral production, and there are differences between learners and raters in vocabulary cognition. Guo and East confirmed this difference: learners pay more attention to the diversity and complexity of word use, while raters focus more on the appropriateness, accuracy and retrieval fluency of vocabulary when scoring [33]. In terms of vocabulary types, oral vocabulary tests such as the oral version of Lex30 can predict learners' second language oral proficiency more accurately than written vocabulary tests, especially in terms of pronunciation accuracy [34].

Formulaic sequences are another key element to improve oral fluency. Coulmas believed that formulaic sequences "provide linguistic means for specific types of conventional behavior, and their meaning is constrained by the behavior pattern they belong to" [35]. Wray and Perkins defined it as "a sequence of continuous or discontinuous words or other meaning elements, which is generally stored in memory as a whole and retrieved as a whole during communication, rather than being generated or analyzed by grammatical rules" [36]. Francois and Albakry found through empirical research that the frequency of using formulaic sequences by adolescent English learners can predict their oral fluency [37]. The reason is that these fixed expressions can act as "scaffolds", share the pressure of instant sentence making in the brain, and buy valuable online processing time for learners. Wood's longitudinal study also proved that as learners use more and more complex formulaic sequences, their length of speech run increases [38].

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Studies have shown that specialized explicit teaching of fluency is effective. Through a longitudinal controlled experiment, Yenkimaleki and Van Heuven found that training such as chunk memorization, retelling and shadowing can effectively improve the oral fluency of foreign language learners. One month after the training, the improvement effect can still be maintained [39]. In terms of pronunciation training, Kennedy et al. took French learners as subjects and carried out a 15-week special listening and speaking course on liaison and intonation. The results showed that these trainings can effectively improve learners' pronunciation accuracy and fluency [40]. Interestingly, whether students can perceive their own progress in fluency depends on whether they regard pronunciation as a tool for communication and meaning expression (qualitative language cognition), rather than simply dwelling on the correctness of pronunciation and quantitative scores.

2.6. The role of generative artificial intelligence (GAI)

Generative artificial intelligence represented by ChatGPT can simulate real oral communication scenarios, and has a positive effect on the complexity, accuracy and fluency of learners' oral expression [41]. Intelligent technology can build an interactive context close to reality, and effectively alleviate learners' anxiety in oral communication. This enabling mechanism is consistent with the interaction hypothesis of second language acquisition, that is, the interactive feedback provided by artificial intelligence can guide learners to pay attention to linguistic form problems and adjust their output accordingly. At the same time, GAI has greatly improved the experience of oral practice, alleviated learners' fear of expression, and helped them improve their oral fluency [42]. However, some studies have drawn different conclusions. Relevant experiments by Wu Jianhao et al. show that the improvement effect of artificial intelligence tools on optimizing oral accuracy is not prominent. Their analysis points out that attention resources are allocated to complexity and fluency, so accuracy cannot be taken into account [43].

3. Controversies and deficiencies of the research

3.1. Controversies over measurement indicators

In the selection of quantitative indicators of oral fluency, the academic circle has not yet formed a unified conclusion. The research of Kormos and Dénes confirmed that speech rate and average length of speech run are core effective indicators for judging oral fluency, while pause frequency has no significant predictive effect [44]. Different from this view, Kahng's study regarded within-clause pause rate as a key indicator to distinguish fluent from non-fluent oral expression. His hierarchical regression experimental data showed that within-clause pause rate could independently explain 54% of the variance in fluency scores, and after adding the speech rate variable, it could only explain an additional 6.8% of the score difference [45]. Subsequent further verification showed that compared with between-clause pauses, within-clause pauses would significantly reduce listeners' subjective scores of oral fluency [46]. The differences in the above research conclusions mainly stem from the different definition standards of pause concept and the different oral experimental tasks selected: Kormos and Dénes focused on the overall pause frequency, while Kahng focused on the detailed analysis of the specific position of pauses.

The evaluation value of repair fluency is also controversial in research. Most studies show that repair fluency has a weak correlation with perceived fluency [5], but some scholars point out that oral repair behavior is closely related to learners' individual traits, language anxiety and metacognitive monitoring ability [14]. Lennon believed that oral repairs of low-level learners are

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mostly caused by insufficient language knowledge reserve, while self-correction behaviors of high-level learners are often to improve the accuracy and appropriateness of language expression [2].

3.2. Insufficient research on dialogic fluency

At present, most studies still focus on fluency in monologic tasks, while research on fluency in dialogic interaction is relatively scarce. Dialogic fluency involves not only individual speech production, but also interactive abilities such as turn-taking, overlap, and collaborative construction [47, 48]. The study by van Os et al. is a rare exception. They found that the duration of turn-transition gaps affects listeners' judgment of speakers' fluency — when answering quickly and with a fast speech rate, overlap (-600 ms) reduces fluency scores; when speech rate is slow, long gaps (+900 ms) reduce fluency scores [49]. This effect shows different patterns in L1 and L2. Future research needs to devote more efforts to developing measurement and analysis frameworks suitable for dialogic fluency [50].

3.3. Limitations of research methods

Sample and language limitations: Existing studies not only have limited sample sizes, but also are highly concentrated on a few languages, especially learners of English as a second language (L2). Wray pointed out that corpus analysis software has serious problems in identifying formulaic sequences — the corpus cannot capture the true distribution of some types of formulaic sequences, and the tools cannot help determine the boundaries of formulaic sequences [51]. Little is known about the fluency development patterns of learners with different L1 backgrounds, different learning stages and non-English languages [52].

Static assessment and dynamic development: Traditional studies mostly adopt cross-sectional static comparisons, and insufficient attention is paid to the dynamic process and trajectory tracking of fluency development. A few longitudinal studies, such as the seven-year follow-up by Derwing et al. and the one-year observation by Saito & Hanzawa, have revealed the nonlinear and long-term nature of fluency development [53, 54]. Wray also pointed out that the Native Speaker Judgment (NSJ) method has five weaknesses, namely, being limited to small data sets, inconsistent judgments over time, inter-rater differences, lack of clear search criteria, and reliance on intuition rather than explicit knowledge [51].

4. Conclusion and future prospects

This review shows that L2 oral fluency is affected by various factors such as cognition, language, emotion and society. Focusing on the fluency characteristics of second language learners, the transfer effect of first language fluency, the influence of task design, the automation of lexical retrieval, the fluctuation of willingness to communicate and the influence of teaching intervention, this paper clarifies the complex generation mechanism of second language fluency from multiple perspectives. Follow-up research can focus on four major directions:

Exploring interactive oral fluency: analyzing the action mechanism of interactive elements such as conversational turn-taking and collaborative discourse construction, and improving the supporting theoretical framework and evaluation methods.

Expanding diversified subject samples: breaking through the research limitations of single English and homogeneous subjects, including multilingual, multi-native language and cross-age learners, to verify the scope of application of existing theories.

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Deepening dynamic longitudinal research. Relying on dynamic systems theory, carry out refined longitudinal case studies to track the long-term, nonlinear interactive development process of factors such as fluency, accuracy and complexity.

Promoting the in-depth application in the teaching field. Integrate the achievements of task design and learning strategy training into curriculum design and teacher training, optimize the quality of second language teaching and assessment, and promote the development of learners' oral ability.

Exploring the learning-promoting value of generative artificial intelligence. Combined with automatic speech recognition and machine learning technology, develop high-precision and automatic multi-dimensional fluency assessment tools [55, 56] to serve large-scale language testing and empirical research.

Integrating affective and cognitive factors. Exploring the differentiated paths of fluency development for learners with different traits under specific tasks [57].

Supplementing the dynamic relationship between fluency and other language abilities (sentence pattern complexity, sentence length, inadequate grasp of word stress). Existing studies have found that sentence pattern complexity has a greater restrictive effect on fluency than sentence length; high-level learners can optimize speech flow through chunking, but their regulatory ability is still weaker than the dynamic compression mode of native speakers [58]. At present, research in this field is still relatively weak, and the interaction mechanism between the two needs to be further explored.

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