

言語産出に関する認知モデルを使った考察：  
強制アウトプットを促進させる  
アウトプット活動使用の効用性

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Usefulness of Output Activities that Promote Pushed Output:  
Some Perspectives from Cognitive Models of Production

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**Abstract**

大学における外国語教育の目的は学生のニーズや興味、また大学の方針によってそれぞれ異なるが、概して日本人の学生は話す能力の育成を一番に望んでいると言える。本論文では、二つの言語産出に関わる認知モデルを取り上げ、アウトプット活動は少なくとも流暢さと文法的正確さを高めることに効用性があることを指摘した。また、アウトプット活動であればどのような活動でも有効であるというわけではなく、強制アウトプット (pushed output) という概念を据えることの大切さも挙げた。最後にアウトプット活動における強制アウトプットの促進を確実なものにするために、Robinson (2001a, 2001b, 2003, 2005) が提唱する、タスクの複雑さ (task complexity) という要素をアウトプット活動に取り入れことの必要性を提案した。

## **Introduction**

Why are Japanese students not good at speaking English regardless of their long-term exposure to English in Japanese schools? Why do they continue making persistent grammatical errors regardless of form-focused instruction containing a lot of grammatical exercises? One plausible reason for these problems seems to be due to the lack of the incorporation of output activities into Japanese English classrooms. However, it is not to say that any type of an output activity is always beneficial to improve speaking ability and grammatical accuracy. In this paper, by introducing two cognitive models of production, it is suggested that Japanese English teachers should provide students with output activities in which they are pushed to stretch their interlanguage system. This study maintains that the construct of pushed output as opposed to mere output is crucial in devising and conducting output-based activities. It is also proposed that output tasks which incorporate a feature such as task complexity would be useful to enhance L2 learners' pushed output during output activities.

## **Cognitive Models of Output Production**

There are several cognitive models of production; widely-known models are Swain's Comprehensible Output Hypothesis and Levelt's Production Model. The former model had been developed in the field of second language acquisition (SLA) research. The latter model explains how native speakers (L1 speakers) generally produce language. In this section, each model will be illustrated in details.

### *Swain's Comprehensible Output Hypothesis*

The Comprehensible Output Hypothesis states that L2 learning may take place through producing the spoken or written language (Swain, 1985, 1991, 1993, 1995, 1998, 2000; Swain & Lapkin, 1995). The first impetus for Swain to stress the significance of output activities in L2 acquisition comes from the finding that the comprehension skills of L2 learners involved in immersion programs have developed comparable to those of native speakers. However, their production skills have remained poor, containing the persistent incorrect use of basic grammatical features (Harley & Swain, 1984; Swain, 1985, 1991, 1993, 1995, 1998; Swain & Lapkin, 1995). This is so even after 7 years of exposure to *comprehensible input* (Krashen, 1985), which has been claimed to be sufficient for L2 acquisition to come about. Swain found that what was missing in the immersion classrooms were opportunities for output from her classroom observations. It is argued that once the ability to understand a target language is accomplished, learners' desire to go beyond their current developmental stage seems to be diminished. Moreover, there appears to be little social and cognitive pressure to produce more accurate and appropriate language in the immersion classrooms.

One way to help immersion learners to move to more accurate and target-like production of a target language is to provide more opportunities to produce an L2 in meaningful contexts. Producing language, through spoken or written, promotes language acquisition in a way that is different from comprehension. Learners can pretend to understand a language in comprehension; however, they cannot do so in production. In producing a language, learners have to generate forms and meaning on their own. In so doing, they are often pushed to stretch their interlanguage to complete their communicative intention. This stretching or pushed

output is suggested to stimulate L2 learners to move from semantic processing to grammatical processing, which leads to accurate and fluent production. Thus, being independent of input, output may play its unique role in L2 acquisition.

According to this hypothesis, producing L2 speech may promote language acquisition in four ways: (a) to provide opportunities for the meaningful use of learners' linguistic resources, which further promotes the development of automaticity of their use and fluency; (b) to provide opportunities to formulate hypotheses and test them out; (c) to serve a metalinguistic role; (d) to promote noticing. This paper focuses on the fourth role. In producing a target language, L2 learners may encounter a language problem in their production. This may lead to noticing the hole. That is, learners consciously recognize that they cannot express precisely what they want to say with their available linguistic resources (noticing deficiencies). Swain (1998) speculates that this noticing the hole may further stimulate noticing the gap. Noticing the gap indicates that learners might notice the gap between their interlanguage and the target language. That is to say, they may notice that what they produced is different from what native speakers or more competent L2 learners produced. When this happens, learners may search for relevant linguistic information by means of consolidating existing knowledge or generating new knowledge (i.e., hypothesis formation and testing) in order to fill out the gap or hole in their interlanguage, thereby leading to modified output and restructuring<sup>1</sup> (Doughty & Williams, 1998; Loschky & Bley-Vroman, 1990). Or, learners identify their linguistic problems and pay focused attention to relevant knowledge in future input. It is argued that this kind of syntactic processing, an internal analysis of incoming data, is crucial if L2 learners are to overcome their linguistic limitations.

### *Levelt's Production Model*

Acknowledging a crucial role of output in SLA, several researchers have attempted to identify and elucidate specific psycholinguistic mechanisms through which output promotes SLA by adopting the Levelt's Production Model (Bygate, 2001; de Bot, 1996; Izumi, 2003; Kormos, 2006). It is not the whole process of output that facilitates learners' noticing and learning; rather the subcomponents of the production process are involved in promoting L2 acquisition.

Levelt (1989) proposes that various processing components are involved into the generation of fluent speech: conceptualizer, formulator, articulator, audition, and speech-comprehension system. According to the model, the generation of messages takes place in the conceptualizer by accessing two kinds of knowledge: procedural knowledge and declarative knowledge (e.g., encyclopedic knowledge, situational knowledge, and discourse knowledge). In generating the message, the speaker has to attend to his/her own production and monitor what he/she is saying. The output of the conceptualizer is called a preverbal message, which in turn becomes the input to the formulator. Within the formulator, the preverbal message, which is a conceptual unit, is converted into a linguistic structure in two steps. First, grammatical encoding, consisting of procedures for accessing lemmas and of syntactic building procedures, operates on the preverbal message. Lemmas are a kind of declarative knowledge and contain information about a lexical item's meaning or sense as well as the syntax of each word. A specific lemma will be activated "when its meaning matches part of the preverbal message" (p. 11). At the same moment, the syntax of the lemma is also triggered for availability, which further activates the syntactic building procedures stored in the grammatical encoding. The product of the grammatical encoding is called a surface structure, which is

“an ordered string of lemmas grouped in phrases and subphrases of various kinds” (p. 11).

Second, phonological encoding operates on this surface structure to build a phonetic or articulatory plan (internal speech) by accessing lexical form, containing information about a lexicon item’s morphology and phonology. The phonetic plan generated by the phonological encoding is then translated into overt speech by the articulator. Both overt speech and internal speech eventually enter the speech-comprehension system to recognize words and retrieve their meanings by accessing the form information and the lemma information in the lexicon. The output of the speech-comprehension system is parsed speech. The parsed speech is attended by monitoring located in the conceptualizer. The monitoring is responsible for comparing what was said or internally prepared to what was intended to say and for detecting form errors. It is posited that each processing component is autonomous and a specialist given that the other components are neither necessary nor effective to be activated.

### **Relevance of Level’s Production Model to Swain’s Output Hypothesis**

Swain’s Output Hypothesis has psycholinguistic reality with reference to Levelt’s Production Model. Discrete propositions are put forward by de Bot (1996) and Izumi (2002). Taking an information-processing approach as a starting point, de Bot (1996) ventures to clarify the role of output in L2 acquisition as follows: “the locus of the effect of output must be in the transition of declarative to procedural knowledge” (p. 549). In Levelt’s production model, it is postulated that matching of preverbal message with lemmas in lexicon activates certain syntactic building procedures; the connection between the activation of certain lemmas and that of certain procedures is gradually strengthened and will be automatized in the end if

it is repeatedly made. However, if what is produced and what is intended to say do not match, the connection will be hampered. Within the framework of the information-processing approach, learning insinuates that declarative knowledge is changed into procedural knowledge as controlled information-processing becomes automatic information-processing through frequent use. In this respect, the connection between certain lemmas and certain procedures and further strengthening of this connection (transition of declarative to procedural knowledge) can be considered learning; therefore, broadly speaking, from a psycholinguistic point of view, output has a role in enhancing fluency. Therefore, there is psycholinguistic reality with respect to the claims that the incorporation of output activities in EFL classrooms is beneficial for improving L2 learners' speaking ability.

Expanding this argument and closely examining the subcomponents of the production model, Izumi (2002) proposes that the processes of grammatical encoding and monitoring, in particular, are closely tied to some of the functions of output proposed by Swain. The grammatical encoding in the formulator receives a preverbal message from the conceptualizer and translates it into a surface structure. The generation of the surface structure entails two steps: first, it gets access to lemmas to search for a specific lemma to match the meaning of the preverbal message; second, the activation of the semantic specification triggers the syntactic information that corresponds to it, which further activates syntactic building procedures. This syntactic building procedure specified by the selected lemma produces the surface structure. Since the activation of the grammatical encoding is an essential part of the production process and the speakers cannot avoid exploiting syntactic operations in the course of production, Izumi argues that it is in this light that Swain suggests that output activities force the learner to move from semantic processing to

syntactic processing. Izumi maintains that “it is possible that the very process of grammatical encoding in production sensitizes the learners to the possibilities and limitations of what they can or cannot express in the TL” (p. 183).

Izumi also states that L2 learners’ sensitization to their limitations is further strengthened through monitoring in the conceptualizer. As Levelt’s model indicates, both overt speech and internal speech are fed into the speech-comprehension system and are led to the conceptualizer to monitor whether the preverbal message matches the output and whether the output is grammatically and contextually appropriate. By comparing their intended meaning and actual output through the monitoring process, L2 learners may notice the gap or the hole in their interlanguage. This noticing accordingly might prompt learners to interact actively with external resources (feedback or input) or internal resources (interlanguage) to fill in the gap or the hole. In this way, both grammatical encoding and monitoring can be considered to “serve as an ‘internal priming device’ for grammatical consciousness raising for the language learners” (Izumi, 2002, p. 184).

In sum, it is proposed that Swain’s Comprehensible Output Hypothesis has psycholinguistic reality; it has the function of transforming declarative knowledge into procedural knowledge, which is likely to result in fluency of L2 speech and the improvement of speaking ability in general (de Bot, 1996). Also, the processes of grammatical encoding and monitoring, which are inherent parts of the production system, are closely related to functions of output (Izumi, 2002). That the engagement of grammatical encoding is unavoidable in the course of production appears to support the claim that L2 learners are pushed to process language syntactically. The monitoring process may confirm the proposal that output promotes



learners' noticing the gap and the hole. These arguments seem to indicate that grammatical accuracy will be facilitated through involvement in output activities.

### **Mere Output or Pushed Output?**

Even though output in general is useful to promote speaking ability and grammatical accuracy of L2 learners, it is not likely that all output activities always facilitate fluency and accuracy in the same manner. That is to say, it cannot be presumed that involvement in output activities always leads to the automatic development of these two abilities. Swain (1985) suggests that the normal idea of "getting one's message across" (p. 248) has to be extended if the goal is to develop native-like proficiency of a target language. Learners can get their meaning across in spite of ill grammatical forms and sociolinguistically inappropriate expressions. What is important is the notion of 'pushed output' that denotes learners need to be "pushed toward the delivery of a message that is not only conveyed, but that is conveyed precisely, coherently, and appropriately" (Swain, 1985, p. 248). Therefore, "just speaking and writing are not enough" (Swain, 1993, p. 160). Learners need to be put in a situation where their interlanguage is stretched to their fullest, thereby, with more mental effort, reflecting on the source of their output and thinking of some ways to enhance comprehensibility, appropriateness, and accuracy (Swain, 1993, 2000).

There appear to be some reasons why pushed output, not mere output, is necessary for the acquisition of some linguistic forms. It is well known that L2 learners often produce an L2 by using only linguistic knowledge and structures that are familiar to them (Schachter, 1974). Færch and Kasper (1983) propose that strategies to avoid using difficult linguistic features seem to be very powerful. They classifies "reduction

strategy” as one useful communicative strategy that is commonly used “in order to avoid producing non-fluent or incorrect utterances by using insufficiently automatized or hypothetical rules/items” (p. 38). In encountering a linguistic problem, L2 learners get their intended meaning across by changing the communicative goal or by using a reduced system where only rules and linguistic items that are relatively automatized are used. Færch and Kasper suggest that this reduction strategy is less likely to affect L2 acquisition since an avoidance behavior does not result in hypothesis formation or automatization which are assumed to be important cognitive processes for L2 acquisition. This claim in turn indicates that if the learners keep employing the reduction strategy, the acquisition of some difficult linguistic structures might not take place.

In addition, Skehan (1998) also maintains that communicative strategies, which are applied when learners encounter interactional breakdown, can be harmful to language development by referring to the case study of *Wes* (Schmidt, 1983) whose discourse and strategic competence have developed over time, but whose linguistic ability has remained unchanged. Communicative strategies are helpful to sustain a flow of conversation between interlocutors, but are detrimental to trigger restructuring in the interlanguage system. Therefore, it is necessary to carefully think about the types of tasks that are more likely to stimulate pushed output.

### **Output Task Variables that Promote Pushed Output**

Swain and Lapkin (1995) argue that one way to accomplish pushed output is by “pushing learners beyond their current performance level” (p. 374). It has been argued that for L2 learning to take place learners need to be exposed to a linguistic situation where comprehension or

production is beyond their current ability to process. When learners encounter a language context which they cannot handle with their existing interlanguage, learners may be more pushed to resolve the language problem at hand. Swain (1998) suggests that the study by Tarone and Liu (1995) demonstrate a piece of useful evidence in this regard. It was found that Bob, a Chinese boy who is learning English through natural interactions in Australia, displayed a faster acquisition rate of English interrogative forms in interaction between Bob and a researcher, compared with other interactional contexts such as between Bob and his peers or his teachers.

Tarone and Liu (1995) argue that the Bob-researcher interaction especially provided important opportunities where Bob was pushed to produce output beyond his current interlanguage level and received relevant input from a researcher in a subsequent turn. That is, there were many communicative contexts where Bob's interlanguage was beyond its limitation. Bob was pushed to produce his output in many contexts. By doing so, Bob might have become aware of the gap in his interlanguage and have noticed problematic structures for him. Tarone and Liu (1995) posit that "it is precisely in those contexts where Bob has to produce output which his IL cannot handle that the IL develops fastest" (p. 120).

In sum, the findings of the study by Tarone and Liu seem to imply that output tasks that push the limits of learner's current interlanguage system would facilitate pushed output. Therefore, it can be argued that the provision of output activities which incorporate the concept of pushed output can be useful to promote fluency and grammatical accuracy, which are weaknesses of L2 learners in general, particularly of Japanese students.

## Cognitive Complexity to Promote Pushed Output

The main suggestion of this paper is that Japanese teachers should incorporate more output activities that trigger learners' pushed output into regular classrooms to promote their speaking ability and grammatical accuracy. Now, the argument should be directed toward discussing *how to*. On this account, the last section will be devoted to the introduction of the concept of task complexity proposed by Robinson (2001a, 2001b, 2003, 2005). Theoretical suggestions proposed by Robinson will provide teachers at any students' level with the promising framework they can follow in devising output activities that may promote pushed output.

Robinson (2001a, 2001b, 2003, 2005) proposes that that tasks with cognitive complexity are more likely to trigger learners' pushed performances than tasks with less cognitive complexity<sup>2</sup>. This claim appears to be consistent with the argument that pushed output might be facilitated in tasks that push the limits of learner's current interlanguage system. According to Robinson, task complexity is "a series of options which can be manipulated to progressively increase the cognitive demands of pedagogic tasks" (Robinson, 2001b, p. 292) and should become a basis for decisions about sequencing tasks in syllabus design. A gradual increase in cognitive demand will approach the full complexity of a target task in the real world.

### *Dimensions of Task Complexity*

Within the framework proposed by Robinson, task complexity can be increased along two dimensions: one is resource-directing dimension, which increases conceptual and linguistic demands of a task and is related to development, and the other is resource-dispersing dimension, which increases demands on learners' attention and working memory and is related to performance.

The resource-directing dimension consists of three subcategories: [+/-Here-and-Now], [+/-No Reasoning Demands] and [+/-Few Elements]. All three dimensions make a task cognitively and conceptually more or less complex. Increasing task complexity along the resource-directing dimension is suggested to direct learners' attentional resources to some aspects of linguistic codes that are necessary to complete an assigned task and to increase demands on language use. The resource-directing dimension also implies an increase in conceptual demands because a cognitively complex task requires using linguistic codes that reflect high demands on conceptualization. To restate, increasing task complexity along the resource-dimension "has the potential to direct learners' attentional and memory resources to the way the L2 structures and code concepts, so leading to interlanguage development" (Robinson, 2005, p. 4).

The dimension of [+/-Here-and-Now] can be operationalized as whether the task requires the use of the present tense ([+Here-and-Now]) or the past tense ([-Here-and-Now]) (Robinson, 1995c); the latter indicates more complex task demands than the former. This distinction was generated based on the findings in L1 acquisition studies that found "there-and-then reference to emerge later than present tense, context supported reference" (Robinson, 2001a, p. 37). A task with [-No Reasoning Demands] involves information transmission along with justification to support beliefs, thereby requiring the use of logical connectors (e.g., so, because, therefore) while one with [+No Reasoning Demands] does not include such a requirement. The former is more cognitively complex than the latter since the former demands the use of complex syntactic structures to complete a task. Robinson (2005) maintains that "this sequence of conceptual and linguistic development too, has been observed in L1 acquisition" (p.5). Furthermore, a task containing a few clearly

distinguishable elements ([+Few Elements]) is cognitively simpler than a task containing many similar elements ([-Few Elements]) that are difficult to be discriminated. This sequence also reflects the findings of L1 acquisition that children gradually develop perspectives on location<sup>3</sup>. Overall, the Cognition Hypothesis predicts that the dimensions of [-Here-and-Now], [-No Reasoning Demands] and [-Few Elements] might lead to the use of a wide range of language, including “greater use of logical connectors, subordination, complex noun phrases, and a variety of attributive adjectives” (Robinson, 2001a, p. 38), relative to those of [+Here-and-Now], [+No Reasoning Demands] and [+Few Elements].

The other dimension of task complexity is the resource-dispersing dimensions which contain three factors: [+/-Planning], [+/-Single Task], and [+/-Prior knowledge]. It is claimed that increasing the task along this dimension makes enormous resource demands on learners’ attention and working memory, which results in “depleting the attentional available to perform the task, and dispersing it over many, non-specific linguistic aspects of production and comprehension” (Robinson, 2003, p. 647). This can be achieved when learners have to complete an additional task along with a primary task. Increasing complexity along the resource-dispersing dimension can help improve the ability to access and utilize knowledge effectively during real performance of a complex skill (Robinson, 2005).

Robinson’s primary claim is that increasing task complexity along the resource-directing dimension (e.g., by requiring reasoning demands) and decreasing the complexity along the resource-dispersing dimension (e.g., by giving planning time) may be likely to lead to “optimum resource allocation to satisfy the linguistic demands of the task” (Robinson, 2001a, p. 31). It is hypothesized that a task that imposes high cognitive demands would require greater cognitive resources such as attention,

memory, noticing, cognitive comparison, hypothesis formation and testing, all of which might trigger more attention to and incorporation of input by means of rehearsal in working memory. Such cognitive operations can be further promoted when the time to plan learners' output is provided. The results of more attention to and incorporation of input are claimed to facilitate pushed output, which eventually promote fluency, accuracy and complexity of L2 performance.

In sum, this section illustrates in detail the framework of cognitive complexity suggested by Robinson and the ways in which output tasks that demand cognitive complexity promote pushed output. This framework is relatively new and much has not been known yet if cognitive complexity actually promotes pushed output of L2 learners. Nonetheless, this claim is theoretically-grounded and practically-valid; therefore, it can be said that it is the most promising framework existing to date that language teachers can follow in devising output activities to be incorporated in regular classrooms.

## Conclusion

The purposes of foreign language education in Japanese universities may vary according to students' needs and interests as well as policies and academic requirements of each university. However, it may be generally presumed that speaking fluently, accurately, and appropriately is the very ability that Japanese college students want to achieve most in foreign language classrooms. Even though this paper mainly argues the importance of the incorporation of output activities into English classrooms, such a claim can be applied to any foreign language classes. The paper presented two well-known cognitive models of output to show that there is psycholinguistic reality with respect to the promotion of fluency and

accuracy by means of output activities. Furthermore, the concept of pushed output as opposed to mere output was introduced to indicate that not all the output activities are equally beneficial for L2 learners. Finally, it was suggested that the creation and the implementation of output activities that incorporate the concept of task complexity would be one promising way to ensure learners' pushed performance. It is without saying that more research examining the roles of output in the facilitation of SLA processes is necessary. Meanwhile, at least what we, foreign language teachers, can do seems to provide theoretically-grounded output activities that promote pushed output.

#### Notes

1. Restructuring is a large SLA process that drives acquisition (Doughty & Williams, 1998). Since such subprocesses as hypothesis testing and noticing the gap/the hole may be triggered by output, output can be considered to play a crucial role in SLA processes.
2. It is further argued that task complexity can be distinguished from task difficulty and task conditions, all of which are assumed to interactively influence task performance and L2 development (Robinson, 2005). However, both cannot serve as a useful basis for sequencing decision.
3. Robinson (2005) claims that the framework he suggests captures "a sequence of conceptual development in childhood" (p. 6) and that "increases in cognitive complexity along these dimensions should therefore represent a natural order for sequencing the conceptual and linguistic demands of L2 tasks" (p. 6).

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