In this paper, I will review the literature on what the second language (L2) speaker actually does during L2 speech production in order to overcome difficulties in achieving communicative goals. L2 speech production differs from the L1 counterpart in three important terms: incomplete L2 knowledge, under-developed automaticity, and the presence of L1 influences. Mainly, but not solely, due to these characteristics, the L2 learner faces often processing difficulties and the learner exhibits various types of L2 behaviors to solve problems (e.g., Faerch & Kasper, 1983; Poulisse, 1990, 1993). These learner behaviors have been categorized under four labels: communication strategies, meaning negotiation, pauses and stalling phenomena, and repair phenomena (Dörnyei & Kormos, 1998). Consistently with the review of L1 and L2 speech production models, attempts have also been made to capture the L2 learner’s coping behaviors from psycholinguistic perspectives, especially within the framework of Levelt’s speech production model notably by Dörnyei and Kormos (1998). This article describes Dörnyei and Kormos’ framework on L2 learner’s problem-solving mechanisms during L2 communication.
Types of problems in L2 use

As described above, the L2 learner faces various processing problems during L2 communication. Therefore, the first step is to map the terrain before dealing with the learner's coping behaviors. Dörnyei and Kormos (1998) classify problems in L2 use into four types: resource deficit; processing time pressure; perceived deficiency in one's own language output; and perceived deficiency in the interlocutor's performance.

The first problem area the L2 learner faces (i.e., resource deficit) is attributable to the learner's incomplete L2 knowledge. In terms of the speech production stage, resource deficit problems are located within the planning and encoding of preverbal message. In order to solve resource deficit problems, three problem-solving mechanisms are assumed to be involved: (1) lexical problem-solving mechanisms, which "handle the frequent inability to retrieve the appropriate lemma that corresponds to the concepts specified in the preverbal plan"; (2) grammatical problem-solving mechanisms, which "deal with the insufficient knowledge of the grammatical form and the argument structure of the lemma, as well as the word-ordering rules of the L2"; (3) phonological and articulatory problem-solving mechanisms, which "help overcome difficulties in the phonological encoding and articulatory phases caused by the lack of phonological knowledge of a word or connected speech" (Dörnyei & Kormos, 1998, p. 357).

The second problem area, processing time pressure, is related to the L2 learner's lack of automaticity; consequently, the L2 learner's speech production is assumed to be more attention demanding or effortful and slow. In order to overcome problems related to processing time pressure, the learner is assumed to employ stalling mechanisms. According to Dörnyei and Kormos (1998), these stalling mechanisms have functions (1) to gain time and (2) to
devote attention for L2 speech processing. In terms of the speech production stage, this problem area is associated with the planning and encoding of the preverbal plan.

The third problem area, deficiencies in one’s own language output, is associated with post-message encoding stages. In order to deal with this type of processing problems, the learner exhibits various types of self-repair behaviors. According to Dörnyei and Kormos (1998), self-repairs are brought about by three types of phenomena: (1) encoding lapses; (2) inappropriate/incomplete message generation; (3) incomplete L2 knowledge. They also mention that as an alternative to immediate self-repair, when the interlocutor is present, the learner may ask “check questions” whether a repair is necessary. In terms of the speech processing stage, this problem area is associated with the monitoring of the phonetic plan (i.e., covert speech) and the articulated speech.

Finally, the fourth problem area, other-performance-related problems, is related to the interlocutor’s speech performance as opposed to the learner’s own speech output. Accordingly, this problem area is associated with the speech comprehension system or the parse. In order to overcome these problems, the L2 learner employs meaning-negotiation mechanisms such as clarification request and comprehension checks. In what follows, I elaborate on each problem-solving mechanism.

Problem-solving devices related to resource deficit problems

In this section I sketch problem-solving mechanisms that are recruited by L2 learners when they face resource deficit problems during L2 use. Figure 1 shows the taxonomy of such problem-solving devices. These devices will be outlined in the following sections.
Figure 1. Taxonomy of problem-solving mechanisms related to resource deficit problems (based on Dörnyei & Kormos, 1998).

Lexical problem-solving mechanisms


Poulisse (1993) discusses lexical problem-solving mechanisms within Levelt’s framework. According to her, because the learner’s L2 lexical knowledge is deficit, the formulator cannot retrieve the intended lemma from the lexicon; thereby an alarm signal is sent to the monitor and the conceptualizer receives the information. When that happens, according to Poulisse, the learner has some options to resort to: (1) the original speech
plan is abandoned or changed and (2) the macro-plan is retained, but the semantic elements or chunks of the preverbal message are modified.

When the original speech plan is abandoned or changed in order to avoid processing problems (Faerch & Kasper, 1983), the speaker has three options: (1) the whole message is abandoned (i.e., message abandonment); (2) part of the message content is deleted (message reduction); (3) message parts are replaced with other parts (message replacement). Dörnyei and Kormos (1998) comment that these options meet the criteria of “problem-solving” minimally because “their application does not actually solve the original problem but rather helps the speaker get over the problem situation and thus avoid a complete communication breakdown” (p. 362). These three problem-solving options are classified into the category of “content reduction.”

Dörnyei and Kormos (1998), who modify Poulisse’s (1993) original classification system, claim that when the macro-plan is unchanged but only the preverbal plan is modified, the speaker can resort to the following six options. First, conceptual specifications in the preverbal message are changed or deleted in search for a new lemma (i.e., substitution strategy). The substitution strategy comprises four sub-categories: code-switching (e.g., use of L1 words with L1 pronunciation in L2 speech); approximation (i.e., use of a single lexical item that share semantic features with the intended word such as a super-ordinate term); use of all-purpose words (e.g., use of “thing” or “stuff”); complete omission (i.e., leaving a gap and carrying on as if the intended word were supplied). Second, subsequent encoding operations (e.g., morphological and phonological) can be applied “in addition to” the substitution strategy (hence, substitution plus strategy). This class of lexical problem-solving strategies has three sub-types: foreignizing (i.e., the use of L1/L3 word by adjusting it to L2 phonology or morphology); grammatical word coinage (i.e., creating a non-existing L2 word with the application of
supposed L2 rules to an existing L2 word); literal translation (i.e., translating for example an L1 idiom into L2). Third, only one lexical chunk in preverbal message is modified as a result of conceptual manipulations (i.e., micro reconceptualization). The micro reconceptualization includes circumlocution (e.g., exemplifying the properties of the target object) and semantic word coinage (i.e., creating a new non-existing L2 word by combining L2 words). Fourth, more than one lexical chunk in the preverbal message is altered after conceptual manipulations (i.e., macro reconceptualization). This macro reconceptualization includes restructuring. Restructuring here means that a preverbal plan is abandoned, the utterance is finished incomplete, and a new alternative preverbal plan is executed. Sixth and finally, in an attempt to retrieve the intended lemma, the speaker utilizes the interlocutor’s speech production system by providing verbal stimuli (i.e., appeals for help). As such, both macro and micro re-conceptualization are characterized by conceptual analysis and decomposition, followed by combination of lexical items (e.g., “snowman” can analyzed, decomposed, and combined to produce “snow doll”). Appeals for help include both direct and indirect appeals for help (e.g., “I don’t know the meaning of the word XXX”).

*Grammatical problem-solving mechanisms*

The second major problem area concerns knowledge deficit problems in grammatical encoding, which is “the process by which a message is mapped onto a surface structure” (Levelt, 1989, p. 235). As I reviewed elsewhere, the lemma has its diacritic parameters (e.g., case, gender, person, aspect, number) to be set by hierarchies of syntactic building procedures, some of which inspect the preverbal message for encoding language-specific conceptual information. Those grammatical encoding procedures are also in charge of building sentential, clausal and phrasal frames, which accompany the
ordering of the retrieved lemmas from left to right based on word-order rules. According to Dörnyei and Kormos (1998), the L2 learner’s problems in building surface structures arise: (1) “when the lemmas activated by the preverbal message are inspected for optional and obligatory complements, specifiers, and diacritic values”; (2) “when the complements, specifiers, and diacritic parameters are handled”; (3) “when the order of the processed materials is established” (Dörnyei and Kormos, 1998, p. 366).

In order to cope with grammatical encoding problems, Dörnyei and Kormos (1998) point out three possible problem-solving options. The first option is that the learner avoids activating the problematic lemma and resorts to the aforementioned lexical problem-solving mechanisms. The second problem-solving option is to resort to “grammatical substitution mechanisms,” which involves modifications of certain lemma features (i.e., grammatical form or argument structure). For instance, L1 syntactic procedures are applied to the L2 grammatical encoding or alternatively L2 overgeneralizations may occur as a result of the application of pre-existing L2 rules or argument structures of similar L2 lemmas. The third problem-solving option is “grammatical reduction,” which means that “the speaker uses intentionally simplified grammar hoping that the interlocutor will be able to reconstruct the grammatical meaning from the context” (p. 366). Included here are omissions of diacritic features of tense and/or gender.

**Phonological and articulatory problem-solving mechanisms**

After the utterance’ surface structure is generated by the grammatical encoder, the surface structure must be processed to be a pronounceable articulatory plan, which is the input to the articulator. This clarifies the point that knowledge deficit at this processing stage hampers the flow of information and the L2 learner needs to cope with such problems when he or
she does face such knowledge deficit problems. According to Dörnyei and Kormos (1998), phonological encoding problems can arise in the following three processing points: (1) when the speaker generates the metrical frames; (2) when the speaker adds the segmental information and inserts the phonological segments to the metrical frame; and (3) when the speaker retrieves the articulatory program.

Dörnyei and Kormos (1998) point out four phonological and articulatory problem-solving mechanisms. The first option is, similarly to the learner reaction to problems in the grammatical encoding, that the learner avoids using problematic words and resorts to a lexical problem-solving mechanism. The second coping device is called “phonological retrieval,” that is, the retrieval of incomplete lexeme, which leads to the “tip-of-the-tongue phenomenon.” The learner then “encodes or articulates several versions of the item so that by running the alternatives through the acoustic-phonetic and speech comprehension modules he or she can test them and select the best version” (p. 367). The third problem-solving option is “phonological or articulatory substitution,” which means that the learner encodes and articulates the problematic lexical item by substituting certain phonological features with recourse to the speaker’s pre-existing knowledge, which is characterized as inter- and/or intra-lingual transfer. Its compensatory nature with recourse to the pre-existing knowledge is similar to the grammatical substitution problem-solving mechanisms. “Use of similar-sounding words” belongs to this category, that is, use of the word that is metrically similar and one or more phonological segments are replaced. The forth and final problem-solving mechanism is termed “phonological reduction,” which is a more extreme version of the use of similar-sounding words. Dörnyei and Scott’s (1997) “mumbling” belongs to this category. Mumbling here means that “a deliberately non-understandable word is uttered in the slot of the
problematic lexical item within the utterance” (Dörnyei and Kormos, 1998, p. 368). Both “similar-sounding word” and “mumbling” are similar in that the word used is metrically similar to the problematic lexical item but are different in that mumbling is not characterized as proper substitution of phonetic segments but phonetic segments are rather “swallowed.” In the next section I review problem-solving devices that are related to time pressure.

Problem-solving devices related to time pressure

As described elsewhere, one of the defining characteristics of L2 speech production (at least for beginners) is the lesser degree of automaticity when compared with the L1 counterpart (e.g., de Bot, 1992; Poulisse, 1997). Accordingly, the L2 speaker tends to have perceived needs for extra processing time. At the conversational level, this need for extra processing time is related to, at least in English conversation, certain “temporal organizational principles” such as the one to avoid length silences “in order to be able to remain in the conversation” (Dörnyei and Kormos, 1998, p. 368). A natural conclusion then is that the need for extra processing time due to the lack of automaticity poses considerable problems for L2 speakers. Dörnyei and Kormos (1998) point out four stages of L2 speech production, where instances of such problems may occur: (1) when the speaker conceptualizes the message (i.e., marco- and micro-planning stages); (2) when the preverbal message is being processed to be articulated; (3) when the speaker commits him/herself in monitoring; (4) when the speaker processes the interlocutor’s speech (i.e., during comprehension). Figure 2 summarizes Dörnyei and Kormos’ taxonomy of stalling mechanisms to cope with time pressure problems.

According to Dörnyei and Kormos, when the learner perceives that the current L2 production system or the communication situation does not allow
faster processing, the following three problem-solving options are available to the speaker: (1) the original message content may be reduced or abandoned because the processing of the original message content may cause hesitations; (2) the speaker may use other recourse-deficit problem-solving strategies because their use may allow faster processing than encoding the original preverbal message; (3) the speaker resorts to “stalling mechanisms” in order to “keep the communication channel open and provide more time and attentional resources” (p. 368). Dörnyei and Kormos (1998) note that these three options are not mutually exclusive because the first two options also contribute to the use of less attention resources and because both often accompany stalling mechanisms.

In the classification framework developed by Dörnyei and Kormos, there are two major categories of stalling mechanisms: pauses and repetitions. Pauses are subdivided into nonlexicalized and lexicalized pauses. Non-lexicalized pauses include unfilled pauses, umming and erring (e.g., um, er), sound lengthening (i.e., use of drawls). Unfilled pauses and umming and erring are “inadequate in maintaining the appearance of fluency” whereas sound lengthening is “more elaborate” and “effective in holding the floor” (p. 370). Lexicalized pauses are filler; that is, use of filler words including more complex prefabricated chunks (e.g., “I mean,” “you know,” “how can I say
that”). In attentional terms, fillers are stored as one chunk in memory and when they are automatized, it functions as a time-saving device and attentional resources are also saved.

The other type of stalling mechanisms, repetitions, is divided into two categories. One is “own-repetition,” which is the repetition of what the speaker has just said. According to Dörnyei and Kormos, own-repetitions have the same function as lexicalized pauses in that repeats are retrieved from short-term memory and so attentional resources are not severely consumed. The other type of repetition is “other-repetition,” which is to repeat what the interlocutor has said. Dörnyei and Kormos point out that those repeats are retrieved from the speech comprehension system as one unit; therefore, time- and attention-saving functions are both fulfilled.

Problem-solving mechanisms that are related to perceived deficiencies in one’s own language output

Problem-solving mechanisms that are related to perceived deficiencies in one’s own output are dependent on the workings of the monitor component. When a problem during L2 speech production is detected, a signal is sent to the conceptualizer, the formulation of the current utterance comes to a halt, and a new preverbal message is issued. The monitor can attend to meaning as well as form and self-repairs can be overt or covert because the speaker can attend to overt and internal speech (Levelt, 1989). It should be noted that errors may not be repaired upon detected and repairs can be done by the interlocutor (e.g., Kormos, 1999). However, part of the problem-solving devices described in this section concerns overtly conducted, self-initiated, self-repairs or self-corrections only. Dörnyei and Kormos’ taxonomy of problem-solving mechanisms related to perceived deficiencies in one’s own output is represented in Figure 3.
Figure 3. Taxonomy of problem-solving mechanisms related to perceived deficiencies in one’s own output (based on Dörnyei & Kormos, 1998).

As Figure 3 shows, there are two major categories of the problem-solving mechanisms related to perceived deficiencies in one’s own output: self-correction and asking check questions. Regarding self-correction, it includes error repair, appropriacy repair, different repair, and rephrasing repair. The first three repair categories were already described elsewhere. Briefly, error repair includes lexical, syntactic, and phonetic repairs. Both appropriacy and different repairs involve not error repairs but complete or partial reformulations of message content and preverbal message. Along with these repair categories originally developed by Levelt (1983), the last repair category, rephrasing repair, is newly added by Dörnyei and Kormos.

Rephrasing repair is different from error repair in that it is not due to the encoding lap but the result of the speaker’s “uncertainty” about the correctness of the utterance. It is also different from appropriacy and different repairs in that it involves reformulations of the preverbal plan only while leaving the message content untouched: “In order to ensure that the conversation partner understands the intended message, the speaker over-insures it by repeated verbalization through slightly modifying the preverbal plan” (p. 373). To illustrate, a sample rephrasing repair provided by Dörnyei and Kormos is: “we will er reflect er to you in another letter we will answer you.” The learner’s subsequent retrospective comments revealed that he or
she was not sure whether "reflect" could really mean "answer"; thus, the underlying intended message content was the same but the speaker replaced part of the preverbal message out of uncertainty about correctness of the utterance.

The other sub-category of the problem-solving mechanisms related to perceived deficiencies in one's own output is "asking check questions." Asking check questions are distinctive from repairs but they function as pre-repair mechanisms. Thus, rather than immediate self-repair, the speaker elicits feedback from the interlocutor and based on the response he or she makes a decision whether a repair is necessary. For instance, the speaker may ask a comprehension question to the interlocutor ("comprehension checks"). If the speaker perceives some cues that interlocutor cannot understand what the speaker just said, he or she may repair the problematic part of the utterance. Alternatively, rather than asking a check question to the interlocutor, the speaker may check the correctness of the utterance by asking a question to his/herself ("own-accuracy checks"). A sample self-question for checking provided by Dörnyei and Kormos is "it's red copper ... I ... is it?"

Problem-solving devices related to perceived deficiencies in other-performance problems

The final problem area concerns not the speaker's own production problems but the interlocutor's performance problems (Figure 4). Because the major goal of Dörnyei and Kormos (1998) is to classify a variety of L2 problem-solving mechanisms within Levelt's psycholinguistic framework, their treatment of this last problem area is not extensive as acknowledge by the authors. This is also true of the present study, the main target of whose investigations is the L2 learner's performance of monologic tasks. However, for the sake of sufficient overview I briefly describe those problem-solving
strategies identified and classified by Dörnyei and Kormos. In fact, these problem-solving strategies are indeed related to the speech perception and the speech comprehension systems, both of which are included as part of Levelt’s model.

The problem-solving devices related to this area, collectively termed “meaning negotiation,” are caused by several reasons. First, when the speaker could not hear what the interlocutor has just said, which concerns a problem in acoustic-phonetic analysis in psycholinguistic terms, the speaker may “ask for repetition” (e.g., “Pardon?”). Secondly, some part of the interlocutor’s utterance is perceived to contain an error, which may or may not be followed by an “other-repair.” Thirdly, the speaker does not understand, misunderstands or partially understands the interlocutor’s speech. These may occur due to the lack of L2 knowledge on the part of the listener due to the L2 listener’s problems in either: (1) segmenting words; (2) perceiving the difference between certain non-redundant word features; (3) matching the sensory input with a lexical entry, which leads to difficulties in accessing its lemmas (i.e., syntactic and semantic information); (4) decoding grammatical information due to insufficient L2 rule knowledge; or (5) processing discourse meanings (e.g., of indirect speech act and conversational implicature etc.). According to the authors, in all these cases, meaning negotiation strategies of “expressing-non-understanding,” “asking-for-clarification,” and “asking-for-repetition” can be employed. If the learner’s understanding of the interlocutor’s utterance is partial or if he or she is uncertain about understanding, “asking-for-clarification,” “interpretive summary,” or “guessing” strategies can be employed in order to obtain the intended meaning of the unknown item. These three strategies, according to Dörnyei and Kormos, can also be employed when the interlocutor and the listener do not share the same frame (i.e., violations of expectation). Finally,
there are some cases where the learner does not employ meaning negotiation strategies, intending to keep the conversation as if he or she understood what the interlocutor said (i.e., “feigning-understanding” strategy).

**Conclusion**

In this article, Dörnyei and Kormos’ classification framework of various problem-solving mechanisms employed by the L2 learner was reviewed. Dörnyei and Kormos’ classification framework is an attempt to capture the learner’s linguistic coping behaviors based on Levelt’s speech processing stages. Continuous research on L2 linguistic behaviors within a coherent framework has considerable significance for the field.

**References**


