

Chapter 2

A Cognitive and Interactionist Approach to SLA

This chapter presents the theoretical background of this book concerning interaction-based accounts of SLA. It begins with an account of the theoretical position of the study in SLA. Section 2.2 brings an introduction of input and SLA, concerning issues of evidence types of input and the role of input in L2 development. Then, Sect. 2.3 deals with issues of interaction and SLA, consisting of theories related with interaction and accounts of NF provided through interaction. The ensuing Sect. 2.4 provides an introduction of output and SLA, illustrating the role of output in L2 development and the psycholinguistic basis of the Output Hypothesis. Successively, Sect. 2.5 presents an illustration of learners' internal mechanisms and SLA, emphasizing the role of attention and its related notion of noticing, and perception in L2 development. Finally, Sect. 2.6 provides a summary of the theoretical framework, and presents the argument of this book.

2.1 Rationale

Throughout the various theories regarding how learning takes place, two influential positions have been summarized as the nature and the nurture positions in general (Egi 2004; Gass 1997, 2003). The nature position refers to “the possibility that learners (whether child first language learners or adult second language learners) come to the learning situation with innate knowledge about language” (Gass 2003: 224–225). On the other side, the nurture position claims that “language development is inspired and conditioned by the environment, that is, the interactions in which learners engage” (ibid.: 225).

As for the nature position, the innate knowledge about language is claimed to be Universal Grammar (UG), which is regarded as an innate language faculty equipped within learners (at least children) from birth to limit their grammar shaping (Chomsky 1981). Thus, when the input does not provide the information of abstractions for language learning, UG can allow children to learn the language.

Accordingly, children may eventually acquire target language owing to UG in spite of impoverished input, which merely functions as a trigger to set language-specific parameters. Although there is widespread agreement on some sort of innately specified knowledge born within children, it is still controversial whether L2 learners have access to UG (cf. Bley-Vroman 1990; O'Grady 1996; Wolfe-Quintero 1996). On the other hand, the nurture position attributes children's and adults' language learning to linguistic environment to a large degree. Thus, input here is assigned a more important role in language representation formation. Nevertheless, the two positions are not only contrary to each other, but also complementary for each other. It is widely acknowledged that the human brain is equipped with some means in order to organize the language experiences presented to human beings in the course of their development (Braine 1994). As Wolfe-Quintero (1996: 338) pointed out, "there is a symbiotic, non-arbitrary relationship between the innate cognitive capacity for language learning and the input available in the environment, neither of which can be ignored". In this view, language learning is dynamic concerning not only how linguistic knowledge comes into being but also how language develops as a function of interactions in which learners are engaged. Gass (1997) has posited that the question is how innate knowledge interacts with the environment and input in the creation of linguistic knowledge.

Drawing on the contribution of the two positions in language learning, the book takes a cognitive and interactionist approach to SLA. According to Gleason (2005), the interactionist approach indicates that various factors affect the course of language development during which these factors are mutually dependent on, interact with, and modify one another. It also claims that language learning is stimulated by communicative pressure because "the conversational interaction provides learners with an acquisition-rich environment where they have access to comprehensible input, output opportunities, and interactional feedback" (Egi 2004: 6). Moreover, the cognitive perspective on SLA is interested in learners' internal mechanisms (e.g., attention, perception) that mediate between conversational interaction and acquisition. Therefore, the book takes a cognitive and interactionist approach to investigate the roles of various factors during the interactional process for L2/FL development.

2.2 Input and SLA

2.2.1 Evidence Types in Input

Input, as one of the language learning requirements, may provide learners with various types of evidence. According to Gass (1997, 2003), there are three types of evidence available to learners in the process of language learning (both L1 and L2): positive evidence, negative evidence, and indirect negative evidence. Indirect

negative evidence will not be addressed below because it is the least relevant to interaction and the book does not concern this one.

2.2.1.1 Definition of Evidence Types

Positive evidence refers to the input and comprises the set of well-formed sentences to which learners are exposed (Gass 1997: 36). In general terms, positive evidence can take the form of either spoken language (or visual language in the case of sign language) or written language. According to Gass (1997, 2003), it is the most direct means for learners to form linguistic hypotheses. It is also regarded as models in SLA studies. According to Oliver (2000), positive evidence can be provided either as authentic input or as modified input or teacher talk.

In contrast, negative evidence refers to the type of information that is provided to learners concerning the incorrectness of an utterance (Gass 1997: 37). That is, NF provides information to learners about what is not possible in the target language (Oliver 2000). The incorrectness can be shown to learners explicitly or implicitly. If the negative evidence takes the form of explicit information, it will be direct information about the ungrammatical nature of the learner's utterance. If the negative evidence takes the form of implicit information it will be indirect information about the ungrammatical nature which must be inferred. In this case, it is probable that learners cannot understand the corrective nature of the implicit negative evidence.

2.2.1.2 Contribution of Evidence Types to SLA

The issue of evidence types in input was put forward from a theoretical linguistic perspective. The contribution of positive evidence is much clearer than negative evidence to SLA. According to Gass (1997, 2003), positive evidence, as the most obviously necessary requirement for learning, can provide learners with opportunities of exposure to a set of grammatical sentences for the target language learning to occur.

However, the significance of negative evidence is less clear either in L1 or L2. According to Gass (1997, 2003), in L1 acquisition negative evidence provides the basis of the innateness argument. It is because of lacking in correction in the learning environment, that there is a need for innateness. Moreover, even if such correction, when available for children, may inform them of the occurrence of errors, it may not show children how to correct the errors and how to revise their previous hypotheses. Similarly, in L2 acquisition, adults are assumed to have access to the same innate universal constraints or properties as children due to a lack of negative evidence. Nevertheless, different from the situation in L1, the assumption of lack of negative evidence in L2 acquisition is not warranted clearly (Gass 1997). Additionally, Schwartz (1993) has claimed that only positive evidence contributes to the formation and restructuring of L2 grammars, and also questions the role of

negative evidence in the aspect of the extent to which negative evidence could engage UG.

It should be noted that although the researchers holding a nativist explanation of acquisition have claimed that positive evidence is all that is required for acquisition, the researchers holding an interactionist perspective have proposed a role for both positive and negative evidence. When learners are provided with information of negative evidence, they are likely to search for additional evidence for correction. It is necessary to find out whether negative evidence or positive evidence determines the change. White (1991), and Trahey and White (1993) examined the role of negative evidence and positive evidence respectively. The two studies have shown that both positive and negative evidence are beneficial in L2 learning. Positive evidence can present to learners the target language information whereas negative evidence can show ungrammatical nature of learners' output (Gass 1997). Furthermore, according to Oliver (2000), negative evidence can be provided preemptively or reactively. Reactive negative evidence highlights differences between the target language and learners' output and thus may benefit the target language learning. Because the role of negative evidence in SLA is still a contentious issue, it is necessary to reexamine the potential role of negative evidence in SLA by investigating the nature and structure of conversational interactions where negative evidence may be present, which has been expatiated in Sect. 2.3.

2.2.2 Role of Input in SLA

The study of the role of input in SLA has a long history, beginning from the early twentieth century. From then on input has been assigned an important role in SLA research by researchers in various views of language. Ellis (1994) distinguished three different views about the role of input, i.e., the behaviorist, the mentalist, and the interactionist.

The earliest conceptualizations of L2 acquisition, on the basis of a behaviorist view, rely heavily on the input provided to learners (Gass 2003). In this view, language learning is the consequence of stimulus-response and habit formation by way of imitation. With the disfavor of the behaviorist, the mentalist view regards input only as a "trigger" that sets off internal language processing (Gass 1997). In this view, the role of input is minimized. Different from the above two views, the interactionist view of language agrees on the important role of input within the constraints imposed by learners' internal mechanisms. In this view, the conversational interaction is also assigned an important role for language learning in making L2 salient to learners.

To date, the important role of input has not diminished, whereas what has changed is the conceptualization of how individuals process the input, and how the input interacts with the mental capacities of those learning a language (Gass 2003).

2.2.2.1 Input Hypothesis

The Input Hypothesis, developed by Krashen (1985), is the central part of the Monitor model in which the input plays a dominant role. “The Input Hypothesis claims that humans acquire language in only one way—by understanding message, or by receiving ‘comprehensible input’” (Krashen 1985: 2). Comprehensible input is defined as “the message acquirer is able to understand”, and is identified as “the essential ingredient in language acquisition” (Krashen 1985: 101). In other words, comprehensible input is considered as “bit of language that is heard or read and that contains language slightly ahead of a learner’s current state of grammatical knowledge” (Gass 1997: 81). Krashen has also claimed that learners must be exposed to comprehensible input which contained language structures beyond their current level of interlanguage development called “ $i + 1$ ” (1985: 2). When learners move from i , their current level, to $i + 1$, they should understand input containing $i + 1$, during which learners focus on the meaning and not on the form of the input. In that case, language learning can take place. Furthermore, as Gass (1997) has stated, Krashen assumed a language acquisition device, that is, an innate mental structure capable of handling both L1 and L2 acquisition. Although input can activate this innate mental structure, only input on the level of $i + 1$ can help to alter learners’ grammar. In addition, Krashen (1985) regarded speaking as a result of acquisition but not as its cause because in his view input being understood was enough for the necessary grammar to be automatically provided. Therefore, Krashen’s Input Hypothesis has assumed input to play a determinative role in SLA and only input on the level of $i + 1$ is related with SLA.

Although the Input Hypothesis can account for a wide variety of phenomena and has brought a great impact on SLA research, it has been criticized theoretically and empirically. Theoretically, Krashen’s claim that comprehensible input actually causes acquisition is the subject of the criticism. Researchers (e.g., Trahey and White 1993; White 1987) have argued that comprehensible input is insufficient for L2 acquisition when learner hypotheses or L1 structures lead to L2 overgeneralization because it is impossible to revise their utterances on the basis of positive evidence alone. It is possible for learners to understand the meaning of the input beyond their grammatical knowledge, whereas it is impossible for learners to develop the input into grammatical acquisition only by comprehension. Thus, comprehension does not necessarily guarantee acquisition. Empirically, the insufficiency of comprehensible input has been shown by studies on the L2 achievement by learners in Canadian French immersion programs, reviewed by Swain (1985, 1995, 1998). The studies showed that immersion L1 French learners of English were found to perform comparably with NSs on listening and reading comprehension, but not on production measures. Even after continuous L2 exposure in the subsequent years of education, immersion learners were still found to make a wide variety of grammatical errors in production. Therefore, comprehensible input can never be sufficient for SLA. Krashen has overlooked the difference between input and intake and then has oversimplified the complex acquisition process.

Despite the inadequacies, the Input Hypothesis, however, should not be abandoned utterly because it has contributed to SLA research in drawing our attention to the role of input. Considering the significance of the Input Hypothesis, the book tries to take a more holistic view on input. That is, we regard input as one necessary component in language development in order to explore the role of input and the relationship between input and other components during interactional processes, such as learners' internal capacity, output, etc.

2.2.2.2 Input Processing

According to Gass (2003), a crucial question in understanding the role of input is related with processing. VanPatten (1995, 1996) has proposed a model of Input Processing, which deals with presentation, timing of input, and the elements which L2 learners focus on as they process input. In particular, it concerns the conversion of input to intake and specifically centers on form-meaning relations (Gass 1997). Crucial to the model of Input Processing is the assumption that human beings possess limited processing capacities (Izumi 2003). VanPatten and his colleagues' research is based on the concept of attention to form and its role in the process in which a learner moves from input to intake and then to output. It has been claimed that learners are not able to attend to all the information in the input, only some of which can be processed as the focus of attention (Gass 1997; McLaughlin 1987; Robinson 1995). In VanPatten's view, certain parts of input that are immediately relevant to the message content may tend to be attended. Certain principles are believed to guide the ways in which learners can process grammatical form in their attempt to comprehend input strings (Izumi 2003). L2 learners with limited processing capacities may firstly search the input for content words, and then the forms with high communicative value, and finally the forms with low communicative value only under the condition that their attentional resources are not consumed during the processing of forms. It is possible that learners may "never attend to purely formal, functionally redundant forms unless some form of instructional intervention forces them to do so (Izumi 2003: 179). In this sense, VanPatten's model of Input Processing connects the input with one of the learner's internal capacities, i.e., attention.

Moreover, VanPatten's model of Input Processing has prompted a wide range of studies to address how the input can facilitate learners' L2 development. According to Gass's (1997, 2003) review, in order to investigate how the input is processed and hence how an internalized system develops, VanPatten compared two instructional models: (a) a traditional grammar instruction in which grammatical information (i.e., input) was presented to the learner and then practiced, and (b) the input had been presented before an internalized system began to develop to change the way that input was perceived and processed. The results have indicated that there is a positive effect for the second instructional model over the first one. Then, in the examination of how explicit information benefits processing, VanPatten and Oikkenon's (1996) study, a replication study of VanPatten and Cadierno (1993),

has shown that the beneficial effects of instruction derive from the structured input activities but not the explicit information. DeKeyser and Sokalski's (1996) study, another replication study of VanPatten and Cadierno (1993), investigated the effects of production versus comprehension activities. They have found a different result from the original studies, specifically in the fact that "practice at the level of input versus practice at the level of output differentially affected comprehension and production, with the former being better for comprehension and the latter for production" (Gass 2003: 232). This finding has suggested that the skills of comprehension and production are acquired separately. Another study on comprehension and production activities, conducted by Tomasello and Herron (1988, 1989), concerned retreating from overgeneralized errors. They have found that "the type of input that allowed corrective feedback to occur after the learner had made an error was more meaningful than input that attempted to prevent an error from occurring" (Gass 2003: 232). It indicated that the occurrence of errors and the appropriate feedback to errors have a greater likelihood of drawing learners' attention to the errors.

In sum, the model of Input Processing and the related empirical studies have addressed what kind of input is efficient in SLA, how input can facilitate SLA, and how input interacts with learners' internal capacities. It is assumed that input may work to facilitate L2 development under the circumstance that learners convert it into intake, i.e., something meaningful as part of the process of grammar formation. It is also assumed that different from comprehension of input, production, i.e., output, plays a substantive role in L2 development. Therefore, we may draw the conclusion that input is related with learners' internal capacity, such as attention, in terms of the aspect how input is converted into intake during conversational interaction, and that input and output may function differently in the process of L2 development.

2.3 Interaction and SLA

2.3.1 *Position of the Book on Interaction*

In general terms, interaction refers to the interpersonal activity that occurs during communication. According to Gass and Selinker (1993), when the flow of conversation is interrupted, participants negotiate what is not understood, that is, they may question particular utterances and/or request conversational help to compensate. Such negotiation of meaning is regarded as interaction, which consists of "those instances in conversation when participants need to interrupt the flow of the conversation in order for both parties to understand what the conversation is about" (Gass and Selinker 1993: 272). Then, in the early work focused on input, interaction refers to "the ways that proficient speakers (generally native speakers) modify their speech, presumably with the goal of making their speech

comprehensible, to those with limited knowledge of the target language” (Gass 2003: 232). However, within that tradition, interactional structure was not investigated. After that, when research focus was shifted onto the interactional structure of conversation, the emphasis has been placed on the role which negotiated interaction between NSs and NNSs, and between two NNSs plays in L2 development (Gass 2003). The book, along this line of research, focuses on the role of the interactional structure of conversation in L2/FL development.

2.3.2 Function of Interaction in SLA

Long (1996) has addressed the function of interaction through the revised version of the Interaction Hypothesis, which takes as the starting point the notion that conversational interaction is the basis for L2 development rather than being only a way to practice language (Gass 2003). According to Mackey (1999), Long’s Interaction Hypothesis (Long 1983a, b, 1985, 1996) evolved from Hatch’s (1978) study on the role of conversation in developing grammar and from Krashen’s (1985) claims on the role of comprehensible input for SLA. In the revised version of the Interaction Hypothesis, Long (1996: 451–452) stated:

negotiation for meaning, and especially negotiation work that triggers interactional adjustments by the NS or more competent interlocutor, facilitates acquisition because it connects input, internal learner capacities, particularly selective attention, and output in productive ways.

Clearly, in a holistic perspective, negotiated interaction is supposed to integrate input, the learner, and output. Then interaction is assigned an important role as the means by which learning takes place. Long (1996: 414) also stated:

it is proposed that environmental contributions to acquisition are mediated by selective attention and the learner’s developing L2 processing capacity, and that these resources are brought together most usefully, although not exclusively, during negotiation for meaning.

It can be seen from the statement that the Interaction Hypothesis has accounted for how interaction contributes to language acquisition by specifying the learner’s internal capacities. It indicates that input cannot be converted to output to facilitate language acquisition without learners’ internal capacities, in particular, attention as a mediator through negotiated interaction. Moreover, the Interaction Hypothesis reveals that the conversational interaction is able to draw learners’ limited attentional resources to a discrepancy between their interlanguage and the target language, and to new information about L2 not yet being acquired (Gass 2003). As Gass (1997, 2003) has stated, the conversational interaction may serve as a priming device, preparing the stage for learning to take place.

Long’s Interaction Hypothesis has stimulated research into the role of interaction in SLA. A variety of empirical studies have examined the effects of different interactional conditions on L2 production and acquisition (e.g., Gass 1997; Gass

et al. 1998; Gass and Varonis 1994; Mackey 1999; Pica 1994). Pica's (1994) comprehensive review of negotiated interaction has demonstrated that interaction may facilitate the necessary conditions and processes that are supposed to be important in L2 learning. Those conditions and processes can provide opportunities for learners to notice the form of the target language when linguistic units are rephrased, repeated, and reorganized to aid comprehension. Pica (1994) also showed how certain features of syntactic elements, being segmented or manipulated through interaction, could be made salient to learners by way of stress, intonation, and foregrounding. Furthermore, on the function of interaction, Gass (1997) has added that the effects of interaction may not be immediate, claiming that it is important to look for delayed developmental effects of interaction.

Among the studies on the function of interaction, the role of negotiation in SLA has also been emphasized by researchers (e.g. Gass 1997; Lyster 1998a, b; Pica 1992). Gass (1997) has noted that negotiation includes negotiation of form and negotiation of meaning, though they are not always easily separable. Pica (1992) examined the role of negotiation of meaning in L2 acquisition. Pica (1992: 200) regarded negotiation as a type of interaction through which "learners and their interlocutors adjust their speech phonologically, lexically, and morphosyntactically to resolve difficulties in mutual understanding that impede the course of their communication". Pica (1992: 205) has found that negotiation can provide learners with: "(1) L2 input adjusted or modified for their comprehension needs; (2) feedback on semantic and structural features of interlanguage; (3) opportunities to adjust, manipulate, or modify semantic and structural features of their interlanguage; and (4) a source of L2 data that highlights L2 semantic and structural relationship". The results have indicated that negotiation of meaning is always related with negotiation of form, that negotiation is able to result in interactional feedback, that negotiation is able to push learners and their interlocutors to modify their utterance either from semantic aspect or from structural aspect or from both, and finally that negotiation is able to establish form-meaning relationship. Pica's (1992) study is also quite an illustration of how interaction potentially facilitates L2 learners' interlanguage development.

Furthermore, more and more researchers began to investigate the role of negotiation of form in L2 learning. Long (1996) and Ellis (1985) have defined the types of negotiation of form. Lyster (1998a, b) coded corrective feedback (also called NF by many researchers, e.g. Ayoun 2001; Iwashita 2003; McDonough 2005) as negotiation of form, and identified the relationship among error types, corrective feedback types, and immediate learner repair. Morris (2002) examined the role of negotiation of form, categorized as NF, in pair work of adult learners of Spanish. Obviously, interaction research then began to focus on the effects of specific interactional feedback on L2 development. In particular, one common account has suggested that interaction may be beneficial because it provides learners with exposure to NF in response to their nontarget-like utterances (Gass 1997; Long 1996; Pica 1994). Long (1996) has specifically addressed the role of NF during conversational interaction. In the updated version of the Interaction Hypothesis, Long (1996: 414) stated:

NF obtained during negotiation work or elsewhere may be facilitative of L2 development, at least for vocabulary, morphology, and language-specific syntax, and essential for learning certain specifiable L1-L2 contrasts.

From the above statement it is clear that negotiated interaction may also facilitate L2 learning by eliciting NF in response to learners' nontarget-like utterances. In this case, NF can function by inducing learners' attention to the target language forms.

As aforementioned in Sect. 2.2.1, it is necessary to reexamine the potential role of negative evidence of input in SLA by investigating the nature and structure of conversational interaction where negative evidence may be present. Therefore, both the research on interaction and the research on input converge on the issue of identifying the effects of interactional feedback on L2 development. The present book intends to explore the useful types of input and the function of interaction through investigating the target language development and NF which has been illustrated in the following section.

2.3.3 *NF and SLA*

2.3.3.1 Definition of NF

NF relates to the issue of how competent speakers react to learners' language errors. It has been entitled a variety of terms according to the disciplinary orientation of the researcher. The various terms also indicate different research focuses and different data collection methods (Schachter 1991). As Lyster and Ranta (1997: 38) has noted, it was examined in terms of negative evidence by linguists, as repair by discourse analysts, as NF by psychologists, as corrective feedback by L2 teachers, and as focus-on-form in more recent work in classroom SLA. In this book, NF and corrective feedback are used interchangeably referring to the same concept. We have adopted Iwashita's (2003) definition of NF. According to Iwashita (2003: 2), "the term 'feedback' refers to some kind of NS response to what the learner has said; the feedback that learners receive during interaction can either be positive or negative. NF is an interlocutor's interactional move that indicates explicitly or implicitly any nontarget-like feature in the learner's speech".

2.3.3.2 Categorization of NF

Iwashita's definition indicates that in general terms NF can be divided into two categories, that is, explicit NF and implicit NF. According to Ellis (1985) and Long (1996), explicit NF is an overt error correction per se, while implicit NF usually takes the form of recasts or negotiation moves (i.e. confirmation checks, CRs and repetitions) that indicate to the learner that there is a problem with his output. Explicit NF is relatively infrequent in naturalistic interaction while implicit NF is

more frequently provided (Mackey et al. 2003; Oliver 1995, 2000; Pica 1994). More researchers are interested in implicit NF because there is still controversy on the role of implicit NF, which is also within the consideration of the book.

Recasts, as a type of implicit NF, have aroused many researchers' interest. Recasts are defined as target-like reformulations of ungrammatical utterances that maintain the central meaning of the original utterance (Long 1996). There is an example of a recast in the instructor's response to the learner's ungrammatical utterance in (1).

- (1) Learner: Why the man came to see his teacher?
 Instructor: Why did the man come to see his teacher? Well, because today is the woman's birthday. ...

(the data from the study in the book, Learner 26 in treatment 2 Task 2)

A CR refers to an interactional move in which a speaker solicits aid in understanding a partner's previous utterance by means of questions or statements of non-comprehension (Long 1996; Ellis 1985). The instructor's utterance in (2) is an instance of a CR.

- (2) Learner: Does they're sister?
 Instructor: Sorry?
 Learner: What's the relationship between them?

(the data from the study in the book, Learner 34 in treatment 1 Task 2)

A confirmation check is defined as the repetition with rising intonation of all or part of a partner's previous utterance in an attempt to confirm that the message was understood correctly (ibid.). An example of a confirmation check is shown in the native speaker's response in (3) below.

- (3) NNS: He have two bikes.
 NS: Have two bikes?

(the data from Morris 2002: 15)

A comprehension check refers to the response provided at the time when speakers attempt to verify that their immediately preceding utterance has been understood by their partner (ibid.). Typically a speaker uses a question to perform this function, as seen in turn 2 of Learner 3 in (4) below. The italic parts are translations of Spanish.

- (4) Turn 1 Learner 3: El estres es mas o menos cuando tu estas en tu trabajo?
 (The stress is more or less when you are in your job?)
 Turn 2 Learner 3: Comprendes?
 (Do you understand?)

(the data from Bearden 2003: 17)

As for a repetition, the teacher repeats the ill-formed part of the student's utterance, usually with a change in intonation (Panova and Lyster 2002), as seen in (5) below.

- (5) Teacher: ...Here, when you do a paragraph, you start here, well let's see, anyway, you write ...write, write, write (pretends to be writing on the board), remember this is ... What is this called?
 Student: Comma.
 Teacher: Comma? (repetition)
 Student: Period.

(the data from Panova and Lyster 2002: 584–585)

Although among researchers it is widely accepted that NF can be divided into explicit NF and implicit NF, the categorization and coding of implicit NF types during interaction are still problematic, because negotiation moves and recasts are not mutually exclusive categories (Mackey et al. 2003). Confirmation checks, for instance, generally regarded as negotiation moves, can also contain recasts (Leeman 2000; Mackey et al. 2003; Oliver 2000). The NS's utterance is such an example shown in (6) below:

- (6) NNS: And I 'ave two-two cup.
 NS: You have two cups?
 NNS: Yeah.

(the data from Oliver 2000: 120–121)

Mackey et al. (2003) have noted that some studies attempt to differentiate among NF types based on interesting criteria, such as whether feedback includes the target form (Gass 1997; Leeman 2000, 2003), and whether feedback enhances the salience of the target form (Leeman 2000, 2003). As aforementioned in Sect. 2.3.2, Pica (1992) has found negotiation moves can provide learners with opportunities to modify their nontarget-like utterance. Swain (1985, 1995) has also assumed the importance of this pushed output. Additionally, researchers have found empirical evidence (Lyster 1998a, b; Lyster and Ranta 1997; Oliver 1995, 2000) that some types of feedback seem to promote MO, while some do not. Given all these, another way to categorize NF is whether the NF provides opportunities for MO (Mackey et al. 2003). The present study attempts to explore NF according to this criterion.

2.3.3.3 Role of NF in SLA

The issue of whether NF has effects on L2 development has become quite a concern of SLA researchers and FL teachers. It is necessary to have a systematic discussion about NF and SLA, that is, to confirm the availability of NF firstly, then to address the role of NF in L2 development, and finally to elucidate the reason why NF facilitates L2 development.

Early studies have doubted whether NF actually exists at all and the argument about its existence is still alive up to the present day (e.g. Beck and Eubank 1991; Grimshaw and Pinker 1989; Marcus 1993). The doubt may stem from the fact that the focus of the early studies is explicit, not implicit NF, which is found to be largely ignored in early studies (Oliver 2000). For instance, in Chaudron's (1986, 1987) studies, although NF was not found in NNS-NS interactions, the feedback under investigation was explicit correction *per se*. Similar results have been found in several other studies (e.g. Chun et al. 1982; Day et al. 1984) which all regarded explicit correction as NF alone. Obviously, the definition of NF in early studies was too narrow. Therefore, it seems that the lack of support for the role of NF in early studies is due to the limitation of its definition.

In contrast, recent SLA research showed that implicit NF was indeed provided to and used by L2 learners (e.g., Chaudron 1977; Doughty 1994; Lyster 1998b; Lyster and Ranta 1997; Mackey et al. 2003; Morris 2002; Oliver 1995, 1998, 2000). Chaudron (1977) suggested that NF in the form of recasts was available to learners and they might incorporate the feedback in their subsequent turn under some conditions. Doughty (1994) found that learners did receive NF and some were able to recognize the correct forms in recasts and to make use of the information to formulate target-like utterances. Oliver (1998) also suggested the availability of implicit NF, particularly negotiation moves and recasts, in child (NNS-NNS and NNS-NS) dyads. Mackey et al. (2003) examined the provision and use of NF in both NS-NNS and NNS-NNS adult and child dyadic interactions. Their results did show that participation in task-based interaction was able to provide exposure to feedback in theoretically sufficient amounts.

However, these studies did not assess the potential role of NF in learners' L2 development. Employing pretest and posttest measures, recent experimental interaction studies have explored the precise effects of NF on L2 development (e.g. Ayoun 2001; Doughty and Varela 1998; Leeman 2000; Long et al. 1998; Mackey and Philp 1998). All these experimental studies have demonstrated the effects of NF, particularly recasts, on L2 development through NNS-NS or teacher-learner interactions in the context of the laboratory or the classroom, at least for some structures in some languages. The detailed review of these studies has been presented in Chap. 3.

Then how does NF facilitate L2 development? Muranoi (1996) has stated that from the cognitive perspective, NF is considered to be crucial in language learning, for it is a type of cognitive skill learning, requiring NF for hypothesis testing and especially for restricting overgeneralized rules (e.g. Anderson 1983; Cook 1993; Levelt 1978; McLaughlin 1987; Schachter 1991). Cook (1993: 264) made a brief and comprehensible summary of Anderson's language learning cycle as follows. Anderson (1983) has argued that NF is crucial in discovering the semantic and structural relationships of the target language, and has expatiated on the cycle. It has been claimed that learners firstly form a semantic base, and then transform the semantic base into a sentence according to the production rules they have already possessed. Then, NF on the correctness of the utterance is provided to learners so as to make them modify their production rules by formulating new ones and

strengthening or dropping old rules. These new revised rules are beneficial for learners to form other semantic bases. Therefore, NF is crucial in this cycle of language learning. Moreover, according to Anderson's language learning cycle, NF functions in language learning by virtue of enabling learners to modify their production rules. In most studies on the availability of NF discussed previously (Chaudron 1977; Doughty 1994; Oliver 1995; Lyster and Ranta 1997; Oliver 2000; Morris 2002), learners' modification (also called reformulation or repair by some researchers) of their previous utterance has been found in response to NF, in particular, negotiation moves. In those studies NF are also considered to facilitate L2 development through pushing learners to produce MO. Additionally, it should be noted that there is a prerequisite for the production of MO, that is, learners have to notice the NF and perceive it as corrective. Ortega and Long (1997) have assumed that NF can facilitate L2 development because it promotes the noticing and storage of new input, and highlights the cognitive comparison between the new and old structural descriptions. Therefore, it seems that NF may facilitate L2 development through promoting learners' noticing target language forms and pushing learners to modify their previous output. The following sections focus on output and learners' internal capacities.

2.4 Output and SLA

The crucial consideration in any study of SLA is an understanding of the nature of learner systems and how those learner systems come to be (Gass 1997: 134). The previous parts have provided an account of where learner systems may come about. It has been argued that the learner should be aware of a knowledge gap between input and their interlanguage system through interactions. Because of the widely accepted proposition that input alone is not sufficient for acquisition, SLA researchers have begun to have an eye on output, which is a third component that has been argued to be required for successful L2 development.

2.4.1 Output Hypothesis

In the 1980s, the word "output" was used to indicate the outcome, or product, of the language acquisition device. Output was synonymous with "what the learner has learned". There has been a shift in meaning from the 1980s until now from output being understood as a noun, a thing, a product to output being understood as a verb, an action, and a process (Swain 2007). Output as a process "may force the learner to move from semantic processing to syntactic processing" (Swain 1985: 249).

Swain has attempted to examine the lack of L2 development by immersion children even after years of academic study in that language. By studying children learning French in an immersion context, Swain has hypothesized that what is

lacking in their development as NSs of French is the opportunity to use language productively as opposed to using language merely for comprehension. She has compared results of various aspects (e.g., grammatical, discourse, and sociolinguistic) between sixth-grade children in a French immersion setting and sixth-grade native French-speaking children. The immersion children's lacking in proficiency and productive use of French has led her to assign the crucial role of output to the L2 development (see Gass 1997: 138–139; Gass and Selinker 1993: 277, for a brief discussion of Swain's important study of immersion children French learning).

Accordingly, in contrast to comprehensible input (Krashen 1985), Swain (1985) has proposed the notion of comprehensible output or pushed output, which refers to the need for a learner to be “pushed toward the delivery of a message that is not only conveyed, but that is conveyed precisely, coherently, and appropriately” (p. 249). She also termed this the Output Hypothesis for SLA. Swain stated (1985: 249):

...producing the target language may be the trigger that forces the learner to pay attention to the means of expression needed in order to successfully convey his or her own intended meaning.

In the above statement, Swain emphasized the important role of producing output as a trigger for learners' noticing target language forms. In an extended version of the Output Hypothesis, Swain (1995: 128) claimed:

...output may stimulate learners to move from the semantic, open-ended, nondeterministic, strategic processing prevalent in comprehension to the complete grammatical processing needed for accurate production. Output, thus, would seem to have a potentially significant role in the development of syntax and morphology.

Swain (2007), in a presentation on the Output Hypothesis, proposed that:

The Output Hypothesis claims that the act of producing language (speaking or writing) constitutes, under certain circumstances, part of the process of second language learning.

According to Swain, output is supposed to be connected with learners' internal capacity, noticing, in particular. As a trigger of noticing target language forms, output is able to guarantee learners' interlanguage development. Additionally, it is through production that learners are able to receive NF during conversational interactions (Gass 2003), which has been discussed in the previous section. Therefore, output is also an indispensable component in L2 development.

2.4.2 Functions of Output

On the basis of the Output Hypothesis, Swain (1995) has elaborated three functions of output in L2 learning. The first function is “the ‘noticing/triggering’ function or what might be referred to as its consciousness-raising role” (Swain 1995: 128). That is, language production may prompt L2 learners to notice a knowledge gap between the target language and their interlanguage. Through the activity of producing the

target language, L2 learners may be aware what they need to acquire in the target language. The second function is “the hypothesis-testing function” (Swain 1995: 128). In other words, output is an opportunity for learners to see what is acceptable and what is not in the target language. The third function is “the metalinguistic function or what might be referred to as its ‘reflective role’” (Swain 1995: 128). This function can also be called negotiation of form, which has been discussed in the previous section. Learners may receive feedback by way of reflection on the target language form through conversational interactions. Then learning is supposed to result consequently.

Moreover, Gass (1997) has addressed the question how output functions as a central role in the learning process. She has proposed “four possible ways in which output may provide learners with a forum for important language learning functions: (1) testing hypotheses about the structures and meanings of the target language; (2) receiving crucial feedback for the verification of these hypotheses; (3) developing automaticity in interlanguage production; and (4) forcing a shift from meaning-based processing of the second language to a syntactic mode” (Gass 1997: 139–140).

As for hypothesis testing, Gass’s emphasis is on output in the negotiation sequence. According to Gass (1997) negotiation and feedback can make learners be aware that when they produce language they are entertaining simultaneously. In other words, using language productively may promote learners to think about language. Gass (1997) presented evidence from the two aspects: talking about the form and self-correction. From the aspect of talking about the form, Gass (1997) supported Swain’s (1995) suggestion that learners should conduct testing hypotheses through the interaction. Swain (1995) found the evidence of talking about the form in the interaction between L2 learners participating in an immersion program in Canada. Through the interaction learners were able to come to a correct conclusion after an initially faulty hypothesis. From the aspect of self-correction, Gass (1997) also showed pieces of evidence. For instance, learners received corrective feedback through negotiation sequences and were ready to fish for the right form (Gass and Varonis 1989). CRs could elicit learners’ MO and learners could “test hypotheses about the second language, experiment with new structures and forms, and expand and exploit their interlanguage resources in creative ways” (Pica et al. 1989: 64).

As for feedback, Gass (1997) has argued that because feedback focuses on incorrect forms, it serves as a catalyst for change. When learners are informed of incorrect forms, they are likely to search for additional input for correction. If additional input is not available, learners can not obtain confirmatory or disconfirmatory evidence (Gass 1997). It seems that acquisition requires both negative evidence and positive evidence. Recasts, for instance, as a type of NF can also provide learners with positive evidence. The role of recasts has been confirmed by a number of studies reviewed in Sect. 2.3. However, recasts have also been found inefficient to elicit learners’ modification. Pica et al. (1989), focusing on different types of NS signals to NNS errors, have found that the greatest amount of

modification comes in response to CRs, with the interactional episode from Nobuyoshi and Ellis's (1993) study as an example shown in (7) below.

- (7) NNS: He pass his house.
NS: Sorry?
NNS: He passed, he passed, ah, his sign.

Although studies provided evidence to support the role of feedback to a faulty hypothesis, Gass (1997: 147) has discussed the obvious limitations to this view as well. First, corrections can not occur with all incorrect forms. Second, many so-called errors are errors of interpretation for which there may be no evidence that an error has even occurred. Third, error acknowledgement, such as expressions of non-understanding (e.g., huh?), does not provide information that is sufficiently specific to inform learners where exactly an error has been made. It seems that the role of feedback has not been safely warranted yet so that more studies have to be done to deepen and extend our understanding of this view.

As for automaticity, Gass (1997: 148) viewed output as "the development of fluency and automaticity of processing" and demonstrated this function of output on the basis of the information processing account of SLA (McLaughlin 1987). With the assumption that the human mind has a limited capacity for processing information, McLaughlin (1987) has distinguished two processes: automatic processing and controlled processing. Automatic processing involves "a learned response that has been built up through the consistent mapping of the same input to the same pattern of activation over many trials", whereas controlled processing "is under attentional control of the subject and, since attention is required, only one such sequence can normally be controlled at a time without interference" (McLaughlin 1987: 134–135). Gass (1997) extended the notion of automaticity to output, and held that "the consistent and successful mapping (i.e., practice) of grammar to output results in automatic processing" (p. 148).

As for a shift from meaning-based to grammatically based processing, Swain (1985) has also presented the same view in the Output Hypothesis, that is, output "may force the learner to move from semantic processing to syntactic processing" (p. 249). Semantic processing is suggested to be insufficient in understanding the syntax of the language, which is essential to language production.

In sum, taken together, Swain's (1995) and Gass's (1997) further discussion of the function of output has indicated that output can "provide learners with the opportunity to produce language and gain feedback, which, by focusing learners' attention on certain local aspects of their speech, may lead them to notice either a mismatch between their speech and that of an interlocutor (particularly if as part of the feedback a linguistic model is provided) or a deficiency in their output" (Gass 1997: 148). Additionally, it seems that attention has played a role in the whole process in which output works. This leads to a discussion on learners' internal capacity in Sect. 2.5.

2.4.3 *Psycholinguistic Basis of the Output Hypothesis*

The specific functions of output have been investigated by many researchers (e.g. Ellis and He 1999; Nobuyoshi and Ellis 1993 for the hypothesis-testing function; Swain 1995, 1998 for the metalinguistic function; Izumi 2002, Swain and Lapkin 1995 for the noticing function). Despite the empirical research, what should be noted is the psycholinguistic basis of the Output Hypothesis. Izumi (2003) has elucidated the mechanism by which output may promote SLA by drawing on a speech production model developed by Levelt (1989; Levelt et al. 1999), the most influential psycholinguistic model of speech production. Originally developed to account for the speech production by L1 adults, Levelt's speech production model has been adapted to elucidate L2 learning in recent years (e.g., Bygate 2001; de Bot et al. 1997; Kormos 1999). A brief introduction of the model is presented below.

Levelt's production model consists of five distinct components: the conceptualizer, the formulator, the articulator, the auditor, and the speech comprehension system. The model involves three sources of knowledge as well: lemmas and forms contained in the lexicon and discourse model, situation and encyclopedic knowledge connected to the conceptualizer, seen in Fig. 2.1.

According to the above Figure, an overt speech starts from preverbal message generation in the conceptualizer. Then the preverbal message is converted into a phonetic plan in the formulator through the grammatical encoding and the phonological encoding. Both the semantic specification provided in lemmas and the morpho-phonological information stored in the forms, contribute respectively to the grammatical encoding and the phonological encoding. Meanwhile, the phonetic plan is internally scanned by the speaker through the speech-comprehension system. After the phonetic plan is converted into actual speech by the articulator, the overt speech is then guided through the auditor into the speech-comprehension system which is responsible for checking the output. In succession, the output is converted into parsed speech as a phonological, semantic, morphological and syntactic representation of the input speech. It should be noted that the conceptualizer also functions as a monitor to attend to the output deriving from the speech-comprehension system either prior to articulation or subsequent to articulation (see Izumi 2003: 181–182, for a brief description of Levelt's model).

Production processing is not language learning per se, but “a process in which a concept is encoded in a speech form that is to be communicated” (Izumi 2003: 183). Likewise Levelt's production model is not developed to account for language learning. It can nevertheless shed light on how learning takes place through production processes (de Bot et al. 1997; Kormos 1999). As shown in Fig. 2.1, Levelt's model demonstrates how a surface structure of a message is derived through grammatical encoding which requires a focus on the syntactic form provided by the language producer. During production processes, grammatical encoding is requisite in message generation and formulation. Alternatively, production cannot take place without syntactic operations. In this sense, output can force the learner to move from “the semantic processing prevalent in

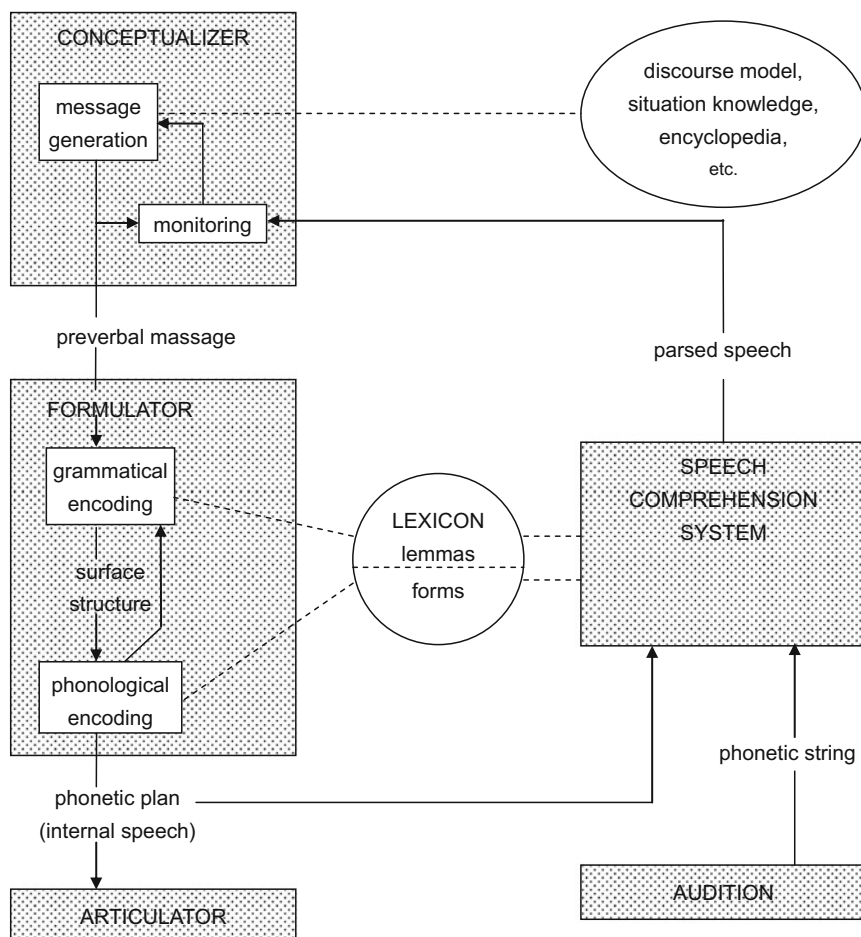


Fig. 2.1 Levelt's speech production model (Levelt 1989: 9)

comprehension to the syntactic processing needed for production” (Swain and Lapkin 1995: 375).

During the production processing, grammatical encoding and monitoring are regarded as the most important for L2 learners (Izumi 2003). Different from adult NSs, L2 learners require a great deal of controlled processing and attention (Kormos 1999). It is suggested that “the very process of grammatical encoding in production sensitizes learners to the possibilities and limitations of what they can or cannot express in the target language” (Izumi 2003: 183). Moreover, it is monitoring speech that supports such sensitization. As aforementioned, the monitoring mechanism is responsible for matching between the preverbal message and the outcome of the formulation and articulation. Thus, the monitoring mechanism may direct attention to the well-formed structures and appropriate expressions of the

production outcome (Kormos 1999). Therefore, the production processes, in particular, grammatical encoding and monitoring, “can, under certain circumstances, serve as an internal priming device for grammatical consciousness raising for the language learners (Izumi 2003: 184). It should be noted that the discussion of input, interaction, and output in this chapter has all mentioned learners’ internal mechanisms, particularly, attention which has been addressed in the following section.

2.5 Learners’ Internal Mechanisms and SLA

Up to now, I have demonstrated that input, interaction, and output can all contribute to L2 development. However, none of them can work without the operation of learners’ internal mechanisms, especially attention which concerns why a learner selects certain stimuli and ignores others and what role attention plays in L2 development. Additionally, having selected stimuli for attention, how do learners perceive them? This question concerns another cognitive mechanism, i.e., perception. Therefore, I will discuss learners’ internal mechanisms of attention and perception in this section.

2.5.1 *Attention and SLA*

Researchers in the field of SLA have become increasingly interested in the concept of attention since the 1980s. The concept of attention has become especially important because of its crucial role in many aspects of SLA theory such as input, processing, development, variation, and instruction (Al-Hejin 2004). A number of researchers have pointed to the confusion regarding the exact notion of attention (e.g. Hwang 1999; Truscott 1998). Thus, I will first address the concept of attention and its related notions.

2.5.1.1 Concept of Attention and Related Notions

Attention has been a major concern in the research of psychology for a long time, but it is far from being dealt with explicitly enough in SLA (Schachter 1998). There are several related notions of attention with overlapping meanings in literature, such as noticing, awareness, and consciousness, often used interchangeably in literature. This may be due to not only the inherent subjectivity in defining these concepts, but also the fact that these concepts are inherently connected, with one often entailing the other (Al-Hejin 2004). Attention has been explored in the field of SLA in recent years, although there has been controversy over the definitions and operationalization of attentional constructs such as noticing and awareness, and their roles in L2 development (Mackey et al. 2002). In general terms, there are two major

theoretical positions on attention in the field of SLA: one put forth by Tomlin and Villa (1994) and the other by Schmidt (1990, 1993, 1995) and Robinson (1995, 2003).

On the one hand, Tomlin and Villa's (1994) study has viewed attention as a limited-capacity system and has supported a need to address a fine-grained analysis of attention which incorporates three principal components, i.e., alertness, orientation and detection. Alertness refers to "an overall, general readiness to deal with incoming stimuli or data" (Tomlin and Villa 1994: 190). Orientation refers to the idea that "the specific aligning of attention (orienting) on a stimulus has facilitative or inhibitory consequences for further processing depending on whether information occurs as expected or not as expected (ibid.: 191). Detection, as "the cognitive registration of sensory stimuli", "is the process that selects, or engages, a particular and specific bit of information" (ibid.: 192). In Tomlin and Villa's (1994) view, detection is indispensable for learning while neither awareness nor alertness nor orientation is required for detection to occur. In other words, none of the three components of attention require awareness, either to operate or as the result of processing. Within SLA literature, noticing is often discussed as a related notion of attention. Tomlin and Villa (1994) have defined noticing very concisely as detection within selective attention, not necessarily involving awareness. They have differentiated between detection with and without awareness, and have proposed "registration" rather than "noticing" as a more neutral word "for the cases that do not implicate awareness or for processing of nontargets" (Tomlin and Villa 1994: 200).

On the other hand, Schmidt (1990, 1993, 1995) and Robinson (1995, 2003) have argued for a critical role of awareness in learning. Schmidt (1994a) has identified four dimensions of the concept of consciousness, i.e., intention, attention, awareness, and control. Intention refers to the deliberateness on the part of learners to attend to the stimulus. Attention refers to the detection of a stimulus. Awareness refers to the learner's knowledge or subjective experience that he/she is detecting a stimulus. Control refers to the extent to which the language learners' output is controlled, requiring considerable mental processing effort, or spontaneous, requiring little mental processing effort (see Al-Hejin 2004, for a description of Schmidt's illustration about four dimensions of the concept of consciousness). Within the SLA field both Schmidt (1990, 1993, 1994a, b, 1995) and Robinson (1995, 2003) have described noticing as cognitive registration. In contrast with Tomlin and Villa (1994), they distinguished detection from noticing on the basis of awareness (Mackey et al. 2002). Schmidt (1994b) defined it as the "registration [detection] of the occurrence of a stimulus event in conscious awareness and subsequent storage in long term memory ..." (p. 179). Additionally, Robinson (1995) defined noticing as "detection with awareness and rehearsal in short-term memory ... necessary to learning and the subsequent encoding in long-term memory" (P. 318). Accordingly, Al-Hejin (2004) has claimed that Schmidt's and Robinson's definition of noticing may be represented as follows: noticing = detection + awareness. He has forwardly suggested that since it is impossible to be aware of something without detecting it, the equation might as well be simplified to noticing = awareness. Furthermore,

Schmidt (1993) has differentiated the two levels of awareness: awareness at the level of noticing (e.g., simply being aware of linguistic forms in input) and awareness at the level of understanding (e.g., understanding the underlying rules of the linguistic form). It is awareness at the level of noticing that Schmidt has claimed is crucial for language learning, whereas awareness at the level of understanding is facilitative but not necessary for SLA (Schmidt 1993).

Obviously, both of the theoretical positions presented above agree that attention is necessary for learning, whereas they have proposed opposing views on the role of awareness in learning, that is, a distinction between detection of input with awareness (Schmidt 1990, 1993, 1994a, b, 1995; Robinson 1995, 2003) and detection of input without awareness (Tomlin and Villa 1994). In this book, we have employed Robinson and Schmidt's descriptions of noticing which have been widely utilized in SLA literature, focusing on learners' noticing of the target language form in the context of interaction, in the sense of detection with awareness. Accordingly, attention and noticing have been utilized interchangeably in this book.

2.5.1.2 Role of Attention/Noticing in SLA

Although disagreement exists as to the amount and type of attention needed for learning to take place, there is a general agreement on the importance of attention. As stated previously, current SLA research has gone beyond general interest in comprehensible input (Krashen 1985), which is considered necessary but insufficient for L2 learning (Ellis 1994; Gass 1997; Long 1996). Instead, researchers intend to obtain a more precise understanding of how learners process, and interact with input to develop their interlanguage system. Given that not all of the input that learners are exposed to can be converted into intake for L2 learning, research in cognitive psychology and SLA has examined the role of attention in mediating input and learning (Izumi 2002). As Long (1996) has stated, attention may be at the heart of the Interaction Hypothesis. Negotiation and other types of corrective interaction can draw learners' attention to the parts of their language different from the target language. This may provide an explanation for the question how learners utilize the content of the negotiation to advance their own knowledge through interaction. Gass (1997: 132) has pointed out an important role of attention in her statement that "attention, accomplished in part through negotiation is one of the crucial mechanisms in this process". Attention may explain why interaction and learning are related, which has been suggested by numerous studies.

Meanwhile, noticing, as a related notion of attention, has been receiving an increasing amount of attention from SLA researchers (e.g., Ellis 1995; Robinson 1995; Schmidt 1990, 1994a; Swain 1985, 1995; Swain and Lapkin 1995). Schmidt (1990) has considered noticing as the subjective manifestation of attention which can be operationalized as a cognitive operation that takes place both during and immediately after exposure to the input. The significance of noticing for L2 learning has been proposed as the Noticing Hypothesis (Schmidt 1990, 1995, 2001; Schmidt

and Frota 1986), claiming that “intake is that part of the input that the learner notices” (Schmidt 1990: 139). Thus, noticing is supposed to crucially require focal attention and awareness on the part of learners. The Noticing Hypothesis (Schmidt 1990, 1995) emphasizes the role of awareness in language learning and argues that learners must consciously notice linguistic input before it is converted into intake. Thus, noticing that has resulted in intake may lead to restructuring of the learner's interlanguage system.

Furthermore, the nature and the role of noticing have been refined. Schmidt (1995) has considered noticing as conscious registration of the occurrence of some event. Schmidt (2001) has claimed that noticing is used in a restricted sense with its object being “elements of the surface structure of utterances in the input—instances of language, rather than any abstract rules or principles of which such instances may be exemplars” (p. 5). In response to debate on the necessity of awareness in learning, Schmidt (2001) has suggested that the important question is not whether there exists any learning without involvement of attention and consciousness but whether more attention results in more language development. He added that “noticing is the first step in language building, not the end of the process” (Schmidt 2001: 31).

In addition, Robinson (1995, 2003) has agreed with Schmidt to the argument that no learning can occur without awareness at the level of noticing. Robinson (1995) identified noticing as “what is both detected and then further activated following the allocation of attentional resources from a central executive” (p. 297). He further addressed the role of noticing from the aspect of memory. In Robinson's view, learners are able to be consciously aware of the information when activation of information in short-term memory exceeds a certain threshold. Noticing refers to the “subset of detected information that receives focal attention, enters short-term, working memory, and is rehearsed” (Robinson 2003: 34). Accordingly, noticing is a consequence of this process of rehearsal, which makes it possible for that information in short-term memory to be encoded in long-term memory. In this sense, noticing is crucial for learning.

Finally, the role of noticing can also be addressed in terms of “noticing the gap” (Schmidt and Frota 1986), that is, learners may notice not only the target language form itself but also the difference between the target language and their own interlanguage. In order to convert input to intake, learners should make a comparison between what they have observed in the input and what they have acquired on the basis of their current interlanguage system. In most cases, learners are most likely to notice what they want to say but cannot say precisely when provided with input in the target language. Doughty and Williams (1998) have called this situation as noticing a hole in learners' interlanguage. Therefore, Swain and Lapkin have argued that noticing is in this sense crucial in L2 learning because noticing the hole may trigger cognitive processes that may generate new linguistic knowledge or consolidate the learners' existing knowledge.

To sum up, although there is still controversy on the necessity of noticing for SLA, the role of noticing for L2 learning has been investigated by a number of researchers (e.g. Adams 2003; Izumi 2002; Leow 2001, 2002; Mackey 2006c;

Swain and Lapkin 2002). In the context of interaction research, the relationship between noticing and learning is clearly warranted just as the Interaction Hypothesis claims that regular interaction works through learner-internal factors, such as noticing (Long 1996). However, theories of attention in SLA are far from being fully established. There is a need to further study what kind of interlanguage development results from noticing specific linguistic aspects.

2.5.2 *Perception and SLA*

Attending to the input is only part of the story because we need to interpret the selected information. This internal analysis of the selected information by the brain is termed perception which is closely connected with attention and contributes to human information-processing (Child 1981). Perception is also one of learners' internal mechanisms considered in the book.

2.5.2.1 Operationalization of Perception

Perception is originally a technical term in the field of psychology. However, in language acquisition studies, Saxon (1997) has used the term perception in a nontechnical sense in his Direct Contrast Hypothesis about the role of recasts in L1 acquisition: "...the child may perceive the adult form as being in contrast with the equivalent form. Cognizance of a relevant contrast can then form the basis for perceiving the adult form as correct alternative to the child form" (p. 155). This kind of nontechnical use of the term perception has also been adopted by researchers in interaction research (e.g., Carpenter et al. 2006; Mackey et al. 2000). Since we intend to search for the relationship between learners' perception and L2 development during the conversational interaction, we follow Carpenter et al. (2006), Mackey et al. (2000), and Saxon (1997) to address perception in a nontechnical sense. To term it another way, we focus on how learners interpret interactional feedback provided to them during the task-based interaction, and whether their interpretations of feedback may affect their L2 development.

2.5.2.2 Role of Perception in SLA

According to Long (1996), the linguistic modifications provided due to breakdowns in communication between L2 learners and their competent interlocutors may contribute especially to the development of learners' interlanguage system. The negotiation of meaning and recasts to accompany communication breakdowns are supposed to provide learners with NF and positive input in case of their problematic production (Carpenter et al. 2006). As aforementioned, the NF can facilitate L2

development in a certain degree when the gap between learners' interlanguage system and the target language is apparent to learners.

The NF in the form of recasts, for instance, has been found effective in promoting L2 development in numerous studies (e.g., Iwashita 2003; Han 2002; Nicholas et al. 2001). Nevertheless, some researchers have questioned the accessibility of the NF in the form of recasts given that recasts can be ambiguous to learners (e.g., Lyster 1998a, b; Lyster and Ranta 1997; Panova and Lyster 2002). The nature of the interaction may obscure the corrective nature of recasts and learners may fail to detect the difference between their deviant utterances and the corrective forms in recasts (Carpenter et al. 2006). In other words, when L2 learners have noticed interactional feedback provided to them during the interaction, they may or may not interpret feedback as intended, in particular, the NF in the form of recasts. As Long (1996) has stated, "from a learner's perspective, interlocutors might be repeating part of an utterance quizzically because they did not catch all of it, because the meaning was clear but surprising, because there is another way of saying the same thing, because they disagree, because something was linguistically awry, or for multiple reasons" (p. 433). Thus, learners' perceptions about recasts may affect the role of recasts in L2 development. As Carpenter et al. (2006) have suggested, a better understanding of how learners perceive NF during interaction is an important and necessary step in describing the relationship between interactional processes and L2 development. In this sense, learners' perceptions about NF may also be a learner-internal factor that affects L2 development.

2.6 Summary

In this section we make a summary of the theoretical framework mainly on the basis of the theoretical work done by Gass (1997, 2003), Long (1985, 1996), Swain (1985, 1993, 1995). According to Gass (1997, 2003) input, as a necessary but insufficient component in L2 development, is supposed to be able to facilitate L2 development when converted into intake, i.e., something meaningful as part of the process of grammar formation. Input alone is not beneficial enough for learners to develop their interlanguage system because one can interpret the meaning without the use of syntax. To compensate for the deficiency of input, output, as an indispensable component in L2 development, is claimed to have a potentially significant role in L2 development in terms of testing hypotheses about the structures and meanings of the target language, receiving crucial feedback for the verification of these hypotheses, developing automaticity in interlanguage production, and forcing a shift from meaning-based processing of L2 to a syntactic-based processing (Gass 1997, 2003). According to Long (1996), interaction, as a way to connect input and output, can facilitate L2 development by providing opportunities for learners to receive comprehensible input, to produce output, and to notice gaps between their interlanguage and the target language. As Long (1996) has also stated, the Interaction Hypothesis consists of some aspects of the Input Hypothesis (Krashen

1985) together with the Output Hypothesis (Swain 1985, 1993, 1995). During the interactional processes, learners' internal mechanisms, such as attention and its related notions, noticing, and perception, may also facilitate L2 development by attending to the target language form and being aware of corrective nature of interactional processes. Therefore, input, interaction, output, and learners' internal mechanisms function differently in the process of facilitating L2 development.

Based on such a theoretical framework the current study intends to make a deeper understanding of how interaction works to bring about positive effects on L2 development, which is assumed to be a result of providing NF conducted as input, producing MO in response to NF, noticing target language forms, and interpreting NF as corrective through interactional processes.

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