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Review article

Input processing theory

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ABSTRACT

This presentation deals with input processing theory (hereafter IP theory) of VanPatten (2002a, 2002b, 2004, and 2009) and VanPatten and a number of his collaborators (e.g. VanPatten and Cadierno, 1993a, and 1993b; Wong and VanPatten, 2003). For this it explains the importance of input in discussions of language learning especially the learning of a second or foreign language. Then an elaboration of IP theory will be presented, theoretical and pedagogical implications of this theory for second language acquisition (SLA) will be pinpointed, and finally criticisms on IP will be discussed.

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1. Introduction

According to Gass (2010) input is without a doubt the *sine qua non* of acquisition. No acquisition (child or second) can take place without some regular and consistent input to feed the growing language system. This is not disputable; what is disputable is the function that input serves and this depends in large part on the theoretical perspective that individual researchers take (pp. 194-195).

Carroll (2001) notes that "there is no agreement on what kind or how much exposure a learner needs. Indeed, we know very little still about the kinds of linguistic exposure learners actually get" (p. 2). Regarding the importance of input as a widely recognized concept in the field of second language acquisition, Gass (cited in Sun, 2008) points out that second language acquisition cannot take place without input of some sort.

As Sun (2008) states based on this understanding, a number of issues have been actively debated in the field of SLA including (1) how input is processed and incorporated into the learners' interlanguage systems. A number of SLA scholars have been focusing on this issue including Carroll (1999, 2001), Chaudron (1985), Krashen (1982), Sharwood Smith (1986, 1993), and especially VanPatten (2002a, elsewhere); (2) the amount of input for acquisition to be enabled. With regard to this Ellis (2002), Krashen (1982) and White (1987) published noteworthy studies; (3) the various attributes of input and their facilitating or hindering effects like frequency, saliency, and transparency (e.g. Biber and Reppen, 2002; Bley-Vroman, 2002; Ellis, 2002; Harrington and Dennis, 2002; and Larsen-Freeman, 2002); and finally (4) instructional methods that may enhance input to promote acquisition including input enhancement, recasts, and processing instruction (e.g. Ellis & He, 1999; Izumi, 2002; White, 1987; White, Spada, Lightbown & Ranta, 1991).

Defining the term input, Gass (2010) states that input, in its simplest definition, is the language that a learner is exposed to (...) Input refers to the ambient linguistic information (...) This can come in written form (reading) or from the spoken language, or, in the case of sign language, from the visual mode (p. 195).

Looking through the articles and books concerning any form of language learning reveals an interesting point: input is among the very frequently used words in such manuscripts, an attached importance for which is seen especially in Krashen's proposal (cited in Gass, 2010), the input hypothesis, developed by Krashen, as part of his overall monitor model which he argued was a way of understanding of how second languages were learnt.

Although input is an important issue in the discussions of SLA, VanPatten (cited in Rast, 2008) states that "...in spite of the significant advances made by SLA research and the diversification of theoretical and research frameworks in which to conduct this research, our knowledge of the role of input has remained relatively unchanged during the last 30 years (p. 294)". Carroll (2001) confirms VanPatten's concerns when describing input as "...one of the most under-researched and under-theorized aspects of second language acquisition" (p. 1). This lack of research as Rast (2008) notes has become apparent in part because everyone, regardless of the theoretical framework, seems to agree on the importance of input in language acquisition. As VanPatten (...) points out, 'We seem to concur that input is somehow central to SLA, that without it successful SLA is not possible' (p. 4).

Carroll (2001) makes a similar remark: "...one point on which there is consensus is that SLA requires exposure to the second language" (p. 2). Having this brief introduction in mind, we should note that for input to result in acquisition or learning, it needs to be processed. This requires a closer look at VanPatten's IP theory. Following, this theory will be presented in more details.

2. IP theory

IP as Benati (2005) states is among the current SLA approaches dealing with input. Benati (2013) adds that IP "is not a full theory which can account for all processes involved in the acquisition of a second language" (p. 93). Evidence for this claim is VanPatten's (cited in Benati, 2013) statement that "[...] it is only concerned with how learners come to make form-meaning connections or parse sentences (p. 127)". Benati (2013) also mentions that "the main scope of input processing theory and research is limited to examine which psycholinguistic strategies and mechanisms learners use to derive intake from input" (p. 93).

3. A word on intake

As VanPatten and Benati (2010) assert intake is a term that was originally coined by Corder to be distinct from the term input. Contrary to input which is the language that learners are exposed to, intake is what language learners actually absorb from the input provided to them. There are a number of different conceptions regarding this term whose overview is beyond the scope of this presentation, but simply put there are three views regarding the definition of the term intake as follows: 1. what the learner actually processes and acquires which later becomes part of her competence, 2. linguistic data processed

from the input and held in working memory, but not yet acquired, and 3. the mental activity that mediates between the input and the competence of the learner.

4. Back to IP again

Continuing our discussion on IP, it should be asserted that IP as VanPatten (2002a) asserts “is concerned with how learners derive intake from input regardless of the language being learned and regardless of the context (i.e., instructed, noninstructed)” (p. 757). In a simpler language, VanPatten (2004) elaborates on what IP is as follows: IP is just “one of the processes involved in SLA, the initial process by which learners connect grammatical forms with their meanings as well as how they interpret the roles of nouns in relationship to verbs” (p. 5).

Considering the limited input processing capacity of L2 learners, VanPatten claimed that only certain grammatical features would receive attention during input processing. This absolutely reminds us of the filter theory of attention in psychology (Boroadbent cited in Neumann, 1996). According to VanPatten (2002a), when learners process input, they tend to filter the input to reduce and modify it into a new entity called intake.

IP consists of two key principles, each of which includes a series of sub-principles to account for second language input processing. In the first principle, making form-meaning connections, VanPatten claims when L2 learners are engaged in interactions, they are more concerned with meaning than with grammatical forms. In the second principle, parsing, we see a process of mapping syntactic structure in the sentence so that the learner can ascertain what is the subject and what is the object in a sentence.

VanPatten (cited in VanPatten 2002a, 2004, 2009) originally identified a series of processing strategies used by L2 learners when they process linguistics data at the input level. He has revised this model a couple of times due to a number of revisions he himself felt necessary, more evidence he observed in support of IP, as well as a number of criticisms over the model. A revised and elaborated form of such strategies is found in VanPatten (2004) in which he reworked his theoretical framework providing a more detailed and clearer explanation of the processing principles. The two main processing principles in VanPatten's (2004) revised theory are:

Principle 1. The Primacy of Meaning Principle. Learners process input for meaning before they process it for form. Principle 1a. The Primacy of Content Words Principle. Learners process content words in the input before anything else. Principle 1b. The Lexical Preference Principle. Learners will tend to rely on lexical items as opposed to grammatical form to get meaning when both encode the same semantic information. Principle 1c. The Preference for Nonredundancy Principle. Learners are more likely to process nonredundant meaningful grammatical form before they process redundant meaningful forms. Principle 1d. The Meaning-Before-Nonmeaning Principle. Learners are more likely to process meaningful grammatical forms before nonmeaningful forms irrespective of redundancy. Principle 1e. The Availability of Resources Principle. For learners to process either redundant meaningful grammatical forms or nonmeaningful forms, the processing of overall sentential meaning must not drain available processing resources. Principle 1f. The Sentence Location Principle. Learners tend to process items in sentence initial position before those in final position and those in medial position (14).

In (VanPatten, 2004) we can also see the second principle of the IP model and its sub-principles as follows:

Principle 2. The First Noun Principle. Learners tend to process the first noun or pronoun they encounter in a sentence as the subject/agent. P 2a. The Lexical Semantics Principle: Learners may rely on lexical semantics, where possible, instead of the First Noun Principle to interpret sentences. P 2b. The Event Probabilities Principle: Learners may rely on event probabilities, where possible, instead of the First Noun Principle to interpret sentences. P 2c. The Contextual Constraint Principle: Learners may rely less on the First Noun Principle (or L1 transfer) if preceding context constrains the possible interpretation of a clause or sentence (p. 18).

A thorough explanation of each of these principles and their subcategories is found in Benati (2013) and VanPatten (2004) who dealt with IP providing the readers with evidence from a number of languages for each principle.

5. Pedagogical implications of IP

As Benati (2013) mentions “IP theory (...) provides the foundation on which the pedagogical model called Processing Instruction (PI) has been built” (p. 104). VanPatten (2002a) asserts that “PI is a type of grammar instruction or focus on form derived from the insights of IP” (p. 764). As such PI aims is to help L2 learners avoid the use of ineffective processing principles by what Wong (2004) calls deriving “richer intake from input by having them engage in structured input activities that push them away from the strategies they normally use to make form-meaning connections” (p. 33).

Benati (2013) calls PI as “an effective pedagogical intervention to alter processing principles and ensure that L2 learners establish form-meaning connections and syntactic mappings correctly” (pp. 104-105). To this end PI is considered to be an instructional technique guiding learners to focus on small parts or features of the second language.

There are three characteristics for PI identified by a number of scholars including Wong (2004) among others which are: (1) learners are given explicit information about a linguistic form or structure, (2) learners are informed about a particular IP strategy that may have negative effects on their choice of the form or structure during comprehension, and (3) structured input activities due to which input is manipulated in particular ways to make learners dependent on form and structure to get meaning. Here as VanPatten (2002a) notes “learners are pulled away from their natural processing tendencies toward more optimal tendencies” (p. 764).

As Benati (2013) asserts PI has been claimed to be an effective form of intervention in altering inappropriate processing strategies (e.g., Primacy of Meaning Principle; First Noun Principle; Lexical Preference Principle; Preference for Non- redundancy Principle and many other sub-principles) and instilling appropriate ones. PI has also been found to be an effective approach to grammar instruction as its main effects have been measured in different target languages (French, Italian, English, German, Japanese, Spanish), different grammatical forms (past tense, present tense, gender morphology) and structures (word order, passive constructions). It is an effective form of instruction for learners from different proficiency levels, background and native languages (e.g. Italian, Chinese, English, Korean, Japanese) (p. 105).

The secondary effects of PI are also noteworthy; L2 learners receiving PI are able to transfer the training received for one form to another form affected by similar or different processing principles. Research on PI has showed that traditional grammar teaching is inadequate, and grammar instruction should be more meaning-based and tied to input and communication and directed at manipulating input.

6. Criticisms against IP theory

Through the years a number of scholars have made criticisms against IP including Carrol (2004), DeKeyser, Salaberry, Robinson, and Harrington (2002), and Harrington (2004) among others. In response, VanPatten either replied the criticisms because he thought that people who proposed such criticisms were misunderstanding the tenets of IP, or accepted the criticisms and provided modifications to his theories. Here I will present a number of them.

DeKeyser et al. (2002) questioned the explanatory adequacy of IP. They also questioned both the validity of the limited-capacity, single-resource model of attention that VanPatten proposed for second language classroom learning. They also questioned the details of the mechanisms VanPatten believes are implicated in second language processing. DeKeyser et al. (2002) argued for alternative explanations of the effects found for IP instruction and against VanPatten’s claim that the studies he reviews are true replications of earlier findings.

Another line of criticism is over the role of first language transfer in IP. VanPatten argues that L2 learners assign the grammatical role of agent to the first noun encountered in an utterance which has been labeled as a universal principle by him. However, later he has acknowledged that L2 learners might transfer L1 parsing procedures to the L2 processing context called it this L1 Transfer Principle.

Another criticism against IP is related to the scope of IP theory. VanPatten asserts that IP is mainly responsible for processing input and enriching learners’ intake to confirm or reject Universal Grammar generated hypotheses (Chomsky, 1965) or the learner’s L1. Although VanPatten has confirmed that his

theoretical model is just a model of constraints, criticizing this Carroll (2004) stated that “ (...) the input processing model does not seek to be a model of input perception, parsing or sentence interpretation” (p. 297). Carroll further asserts that this model needs a theory of perception. In order for the model to account for processing problems Carroll (2004) has also argued that it needs a theory of parsing. If IP theory is about processing constraints, this theoretical model needs to fully define these constraining processes.

VanPatten (2004) accepting that his theory is not “a finished product but merely a starting point” (p. 325), addressed some of these concerns reformulating and re-explaining some of the input processing principles.

7. Final remarks

VanPatten’s theoretical framework has provided an important contribution to SLA theorizing, particularly to the role of input and grammar instruction. Mitchell and Myles (2004) describe VanPatten’s theory as explaining “the apparent failure of second language learners to process completely the linguistic forms encountered in second language input, and hence to explain their impoverished intake which in turn restricts the development of grammatical form” (pp. 187–188).

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