Review paper

A Review Towards Input Processing Theory: Dynamic System view

Zahra Pourtousi

Department of English, Science and Research Branch, Islamic Azad University, Tehran, Iran

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Abstract

Input is a significant factor in second language acquisition (SLA), and without it, the output or the production is not meaningful that is without the input of some sort, the learner cannot communicate effectively. Input processing model is proposed by VanPatten, and he explained his model with two main principles. While it is believed that input processing theory is not a very comprehensive model to explain all of the aspects of language acquisition, it can provide a better understanding of acquiring any language in any context. The principles, misunderstandings, claims, and implications are provided. Afterward, input processing is viewed from a dynamic system lens, and further details are discussed in the current review paper.

***Corresponding Author**: Zahra Pourtousi

Address: *Department of English, Science and Research Branch, Islamic Azad University, Tehran, Iran*

Tel: (+98) 9155757335 **E-mail:***pourtoosi@yahoo.com*

Introduction

First of all, it is needed to focus on the main theme of the paper which is input processing theory, it is vital to review the views of scholars regarding input. Input is considered one of the most vital aspects in the process of second language acquisition (SLA), and different scholars defined it or focused on its importance. In this regard, Gass (1997) stated that second language learning simply is not possible without some sort of input. Barcroft and Wong (2013) mentioned that Corder published an essay on learners' errors in 1967, which could be associated with the birth of contemporary SLA. The author was the first person who differentiated between input and intake and focused on the significance of the processes of SLA compared to the mere product. This process that the input becomes intake is known in VanPatten's framework as input processing. Input Processing (IP) was proposed by VanPatten (1993) and primarily it was according to Krashen's (1982) input hypothesis. The principles in the IP model explain how learners miss grammatical markers in the input or how they get them wrong (VanPatten, 2002); moreover, based on this model, learners process input for meaning before they process the form. IP is associated with perceiving and processing the linguistic data

that the language learners read and hear with psycholinguistic strategies as well as mechanisms that the language learners obtain intake from input (VanPatten, 1996). Based on Sanz and VanPatten (1998), IP emphasizes "a research domain about how learners make form-meaning connections as well as parse incoming sentences in the L2. It is the application of psycholinguistic inquiry to comprehension and processing of second language sentences" (p. 50).

Review of the Literature

This model concerns the cognitive processes, and it is mainly about second language learners' mechanisms which are problematic in the process of making a connection between form and meaning (Haghani & Maftoon, 2016). In this regard, Wong (2005) claimed that form-meaning connection refers to the way referential meanings are linguistically encoded. And, noticing the form and comprehending the content encoded within that form should go hand in hand so that form-meaning mappings can take place. Thus, IP is not a comprehensive model accounting for all the underlying psycholinguistic processes when L2 learners are exposed to L2. In fact, its major concern is how learners derive in-take from input regardless of their language or educational context.

VanPatten (1996) also presented an input-based, form-focused approach to the instruction of grammar which is known as Processing Instruction (PI), in which it is explained that language learners can correct the form and meaning connections. And the aim of the PI is to try to get an intake that is richer from the input by engaging the language learners in the structured input (Wong, 2004).

Claims

Some claims were provided by VanPatten (2015) explaining the linguistic data processing of language learners while they are comprehending the input. One of the claims is that the learners are getting meaning at the same time they are comprehending. The other one is that the process of comprehending is not an easy and simple process regarding working memory as well as cognitive processing. Another claim is that the information that the native speakers process and store is not comparable to the language learners and that the latter group has limited capacities. And the final claim is that the first language input parser is used and particular universals referring to IP are applied by the language learners.

Principles of IP

Principles of IP referring to VanPatten's (1996) model focuses on how the intake is obtained from the input. Also, it emphasizes psychological strategies the language learner depends on them in input processing. The strategies have been modified by VanPatten (2004 as cited in Hashemnezhad & Zangalani, 2013), and they include two principles as well as sub-principles. The first principle refers to the processing of morphological form, functional categories inside the input, as well as the location of the sentence, and the next principle relates to order.

Principle 1 is the Primacy of Meaning Principle. Language learners focus on the meaning of the input before focusing on and processing the form. In line with this principle, VanPatten (1996) believed that language learners process meaning prior to the form. It suggests that a kind of competition exists between meaning and form regarding the attentional processing resources and, therefore, meaning wins the competition.

This principle involves five sub-principles. Principle 1a is The Primacy of Content Words Principle. This sub-principle explains that the second language learners focus and process the content words existing inside the input prior to other words. Principle 1b is the next principle which is the Lexical Preference Principle. This sub-principle explains that second language learners are willing to focus on lexical items rather than grammatical ones while they are encoding the semantic information. Principle 1c which is the Preference for Non-redundancy Principle is the third sub-principle emphasizing the issue that language learners tend to process the meaningful grammatical form that is non-redundant prior to the meaningful forms which are redundant. Principle 1d which is the next principle is the Meaning-Before-Non-meaning Principle. This principle centers on the issue that language learners are willing to focus on meaningful grammatical forms prior to non-meaningful ones. Principle 1e is the Availability of Resources in which the language learners focus on non-meaningful and meaningful grammatical forms which are available processing resources in the input. Principle 1f that is The Sentence Location Principle is the next sub-principle centers on the issue that processing the items within the input which are in the beginning happen prior to those in the final and medial position of the input.

Principle 2 is the First Noun Principle explains that the first noun or pronoun is processed as the subject of agent by the second language learners. The First Noun Principle focuses on considering the first noun as the subject of the sentence that is irrespective of the order of various components in the first language of the learners (VanPatten, 1996). This principle has three sub-principles. Principle 2a is The Lexical Semantics Principle in which the language learners are willing to process the lexical semantics rather than the word order for the purpose of interpreting. Principle 2b is The Event Probabilities Principle centering on the issue that language learners tend to focus on event probabilities for interpreting the sentence. Principle 2c is The Contextual Constraint Principle which is the language learners do not focus much on the first noun if the preceding context limits the interpretation of a sentence or a clause.

Misunderstandings of IP

There are some misunderstandings regarding the IP model, and VanPatten (2015) provided answers to them which are provided as follows:

Misunderstanding 1 is that IP is a model of acquisition. In order to explain it, VanPatten mentioned that the focus of IP is form–meaning connections done by the language learners, and language acquisition includes various processes, and the IP model refers to the initial data gathering.

Misunderstanding 2 refers to the idea that input processing discounts a role for output and other different aspects including the role of social factors. VanPatten stated that emphasizing one aspect of the acquisition does not carry the meaning that other aspects are discounted.

Misunderstanding 3 refers to the idea that noticing is the equivalent of Input processing. Regarding this misinterpretation, VanPatten asserted that input processing refers to the connection that the language learners made between form and meaning; however, noticing is defined differently by Schmidt (1990), that is the language learners understand the formal features of the language, and it is limited to the morpholexical items.

Misunderstanding 4 is that input processing is a meaning-based approach ignoring the syntactic processes. To explain this, VanPatten (2015) stated that What is already known as adult native-speaking models referring to sentence interpretation are mainly syntactic, and the principle of the first noun is also concerned with the syntactic processes.

Misunderstanding 5 considers input processing as a pedagogical approach. In this regard, VanPatten (2015) mentioned that the existence of a pedagogical intervention is referred to as processing instruction which is obtained from the input processing model, and the model of input processing could be used for all language learners inside and outside the class that is the model is explains that the processes language acquisition no matter of the teaching and instruction.

Implications of IP

Regarding the implications of input processing, VanPatten and Cadierno (1993) stated that input processing and instruction are connected to each other. Based on the role of input in second language acquisition, instruction has a significant influence on learners' developing system. And therefore, language learners have more suitable processing of the knowledge as well as input if they receive instruction and they try to change the input processing. Based on the literature, input is a vital part of SLA, and the pedagogical interventions leading to focusing on the aspects of input are known as input enhancement (Barcroft & Wong, 2013). Input enhancement is a term coined by Sharwood Smith Sharwood Smith (1981), referring to pedagogical interventions trying to make the features of second language input more salient, and therefore, the language learners pay attention to them (Barcroft & Wong, 2013). Another issue that needs to be taken into consideration is input flood that is exposing second language learners to a high amount of target input in forms of written and oral (Barcroft & Wong, 2013). The next issue regarding input processing is typographical input enhancement which is also known as typographical textual enhancement. It includes engaging the language learners in typographical cues in written input and it may include highlighting, changing the font, etc (Barcroft & Wong, 2013). And the final issue is processing instruction and structured input which is an input-based pedagogical technique. This technique involves different components, including explicit information regarding the target form, and information referring to processing strategies and activities in relation to structured input (VanPatten & Cadierno, 1993a). Regarding the components of input processing and the influence of learning styles on

them, Haghani and Maftoon (2016) found that with regard to input processing, ectenic language learners had more form-based approaches rather than meaning-based ones. Moreover, based on their findings, the synoptic group of the study took advantage of structured input.

Dynamic system theory

Aside from giving some explanations for input processing theory, another aim of the paper was to view input processing theory from the perspective of dynamic system theory, so it is needed to elaborate on dynamic system theory and some of its characteristics. To begin with, it is needed to clarify the concept of dynamic system theory. It is stated in the literature that science has moved towards uncertainty leading to chaos complexity science (Valle, 2000). And Larsen-Freeman (1997) stated that the name of chaos complexity in science is paradoxical due to the fact that science refers to order; however, the complexity in Chaos Complexity is gained through a chaotic situation. By pointing out the previous point, Larsen-Freeman meant that in science, cause and effect connection is investigated, but this connection is not straightforward in Chaos Complexity. Larsen-Freeman (2012) mentioned that the systems include a number of components, interacting and giving rise to a different order of complexity at a higher level. Therefore, the systems are stated to be dynamic due to the fact that they are changing, which could be gradual or sudden.

Larsen-Freeman (2012) also stated that due to the complexity, the interconnectedness of the elements, dynamism, nonlinearity, and the openness of such systems to influences from outside of themselves, change in complex systems cannot be explained through simple cause-and-effect relationships. And finally, what Larsen-Freeman mentioned seems to be in line with Tsoukas (1998) who asserted that various issues, such as nonlinearity, sensitivity to initial conditions, iteration, feedback loops, novelty, process, emergence as well as unpredictability, have emerged and become common terms in science.

Discussion

In the previous sections, principles, claims, and misunderstandings of the IP model were fully explained and clarified. Aside from that some explanations regarding dynamic system theory were provided. Based on some features of input processing and dynamic system theory, some similarities could be found which are discussed in this section.

Dynamic systems suggest dynamicity, and such systems are nonlinear and self-organized as well. Aside from that input processing theory also deals with the process of linguistic data in the input the language learners receive while they are comprehending. Comprehension could be linked to these features of dynamic systems, so there are some studies in literature focusing on the comprehension aspect of language learning. It is also asserted by Hohenberger & Peltzer-Karpf (2009) that language learning is nonlinear and self-organized in its cognitive development. Based on Swinney (1981) language involves a cognitive function and it refers to a dynamic process. Therefore, input processing and dynamic system theory are similar regarding dynamicity and non-linearity. Another feature is iteration that could be linked to

input flood in which the second language learners are exposed to a high amount of target input in forms of written and oral (Barcroft & Wong, 2013). The dynamic system is dependent on sources, and also in language learning and input processing theory depends on the input of some sort that is based on Kumaravadivelu (2006), input could be oral or written language that the second language learners are exposed to it.

Aside from the above-mentioned features of the two theories and their components that could be compared to each other, the input itself could be considered as being dynamic, as concluded by Verspoor, Lowie, and Wander (2008). They found that input itself has the features of dynamic system theory by considering it as a resource or comparing different characteristics of dynamic system theory with input, such as adaptivity, interaction, and self-organization.

Conclusion

Based on the principles, and claims, some scholars criticized VanPatten's model until he provided answers to them, and hold the view that those who criticized his theory only misunderstood it. Also, based on the general idea of input processing, it seems that the model only completes a part of the second language acquisition puzzle, and therefore, it is not a very comprehensive model and it could not answer every single question about the acquisition of the language. Other parts of language acquisition have significant roles, including interaction with others and output.

All in all, input processing is connected with psycholinguistic strategies that the language learners derive intake from input, and they made the form-meaning connection; moreover, approaches focusing on comprehension seem to require more attention, while processing input by single language learners and their individual needs are required to be taken into consideration, such as learning styles. In this regard, Kumaravadivelu (2006) mentioned that how input becomes intake depends on factors and processes. The factors involve individual factors, negotiation factors, tactical factors, affective factors, knowledge factors, and environmental factors; moreover, the processes include inferencing, structuring, and restructuring. And finally, based on the previous sections of the paper, it could be concluded that the IP model and dynamic system theory have some characteristics in common.

References

Barcroft, J., & Wong, W. (2013). Input, input processing and focus on form. In *The Cambridge Handbook of Second Language Acquisition* (pp. 627–647). https://doi.org/10.1017/cbo9781139051729.036

Gass, S. M. (1997). *Input, interaction, and the second language learner.* Mahwah, NJ: Lawrence Erlbaum.

Haghani, M., & Maftoon, P. (2016). The Impact of Learning Styles on the Iranian EFL Learners' Input Processing. *Journal of Language and Translation*, *6*(2 (12)), 11–26.

http://www.iaujournals.ir/article_528747_34541af4517d3d65414677e66e47bf1a.pdf

Hashemnezhad, H., & Zangalani, S. K. (2013). Input processing and processing instruction: Definitions and issues. *International Journal of Applied Linguistics and English Literature*, *2*(1), 23–27. https://doi.org/10.7575/ijalel.v.2n.1p.23

Hohenberger, A., & Peltzer-Karpf, A. (2009). *Language learning from the perspective of nonlinear dynamic systems*.

Krashen, S. (1982). *Principles and practice in second language acquisition.* Oxford: Pergamon Press.

Kumaravadivelu, B. (2006). Understanding language teaching: From method to postmethod. In *Understanding Language Teaching: From Method to Postmethod*. Routledge. https://doi.org/10.4324/9781410615725

Larsen-Freeman, D. (2012). Chaos/Complexity Theory for Second Language Acquisition. *The Encyclopedia of Applied Linguistics*. https://doi.org/10.1002/9781405198431.wbeal0125

Sanz, C., & VanPatten, B. (1998). On input processing, processing instruction, and the nature of replication tasks: A response to Salaberry. *Canadian Modern Language Review*, *54*(2). https://doi.org/10.3138/cmlr.54.2.263

Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics*, *11*, 129–158.

Sharwood Smith, M. (1981). Consciousness-raising and the second language Learner. *Applied Linguistics*, *2*(2), 159–168.

Tsoukas, H. (1998). Introduction: chaos, complexity and organization theory. In *Organization* (Vol. 5, Issue 3, pp. 291–313). Sage Publications Sage CA: Thousand Oaks, CA.

Valle, V. (2000). *Chaos , Complexity and Deterrence*. 1–13. http://www.au.af.mil/au/awc/awcgate/ndu/valle.pdf

VanPatten, B. (1993). Grammar instruction for the acquisition rich classroom. *Foreign Language Annals*, *26*, 433–450.

VanPatten, B. (1996). *Input processing and grammar instruction: Theory and research.* Norwood, NJ: Ablex.

VanPatten, B. (2002). Processing Instruction: An Update. *Language Learning*, *52*(4), 755–803. https://doi.org/10.1111/1467-9922.00203

VanPatten, B. (2015). Input Processing in Adult SLA. In B. Vanpatten & J. Williams (Eds.), *Theories in Second Language Acquisition* (pp. 113–134). New York: Routledge.

VanPatten, B., & Cadierno, T. (1993). Explicit instruction and input processing. *Studies in*

Second Language Acquisition, 15, 225–243. https://doi.org/10.1111/j.1540-4781.1993.tb01944.x

Verspoor, M., Lowie, W., & De Bot, K. (2008). Input and Second Language Development from a Dynamic Perspective. In *Input Matters in SLA* (pp. 62–80). Multilingual Matters. https://doi.org/10.21832/9781847691118-006

Wong, W. (2004). Processing instruction in french: The roles of explicit information and structured input. In B. VanPatten (Ed.), *Processing instruction: Theory, research and commentary* (pp. 187–205). Mahwah, NJ: Erlbaum.

Wong, W. (2005). *Input Enhancement: From theory and research to the classroom*. NY: McGraw-Hill Companies.