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Review

The Nature, Role, and Effects of Structured Input Activities

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Abstract: This paper is the introductory paper of the Special Issue titled: "New Research on the Role and Effects of Structured Input in Assessing the Nature of Language Processing". It provides a clear analysis of the nature and role of structured input activities in second language research and language pedagogy. It presents the main findings of genuine empirical research investigating the effectiveness of structured input on different forms and structures across different languages and among different populations. The paper provides suggestions for future research within this framework.

Keywords: structured input activities; online effects; offline effects; input processing

1. What Is the Nature and Role of Structured Input Activities?

Structured input is a pedagogical intervention with a dual purpose: (i) to facilitate, at the input level, the connection of a linguistic feature to its meaning; and (ii) to help L2 learners assign appropriate word-order strategies. Form-meaning connections are the relationships L2 learners make between the referential meaning of a particular linguistic feature (form) and the way it is encoded linguistically. For example, when L2 learners hear the sentence, *I watched football on TV* and understand that *watched* means the action is in the past, a form-meaning connection is made. The use of structured input activities is predicated on VanPatten's (1996, 2015a) input processing theory, which identifies several processing strategies L2 learners use when processing language inputs. To be very clear about the nature of structured input activities, in order to avoid any misunderstandings and misconceptions, the following characteristics must be highlighted (VanPatten 2015b; VanPatten and Cadierno 1993a, 1993b; Benati 2021):

- The first characteristic is that structured input activities are specifically designed and used to help L2 learners process inputs accurately and appropriately (interpreting an input correctly and making the appropriate form-meaning connections). Structured input activities ensure that L2 learners simultaneously focus on form to obtain the meaning of the sentence they are exposed to, so that they improve their ability to process the right information and make the right form-meaning connections during comprehension. This is a different function from simply noticing a form in the input, as noticing simply means being consciously aware that the form is there (VanPatten 2015a). Structured input is fundamentally different from other focus-on-form pedagogical interventions such as input enhancement. This is because enhancing a feature in the input might help L2 learners to notice that feature, but it does not necessarily mean that L2 learners will make the necessary and appropriate form-meaning connections. Structured input practice is grounded in the input processing theory. Structured input research has demonstrated that it facilitates both form-meaning connections and the accurate processing of sentence structures;

- The second characteristic of structured input activities is that they aim at increasing the way L2 learners interpret the linguistic features contained in the language input. In structured input research, rules are not tested (e.g., grammaticality judgement tasks and fill-in-the-gap tasks, etc.), but their ability to process and interpret the linguistic features in the input is. Any measurements of rules in structured input research are therefore inappropriate;

- The third characteristic is that structured input activities alter how an input is processed by L2 learners, which, in turn, might affect their language development system. Structure input activities are not intended to assist with skill development, but they might help L2 learners to access the right information (form or structure) to express meaning;
- The fourth characteristic of structured input activities is that they are not used to help L2 learners to internalize rules. Structure input practice is about helping L2 learners to correctly process sentences and their morpho-phonological elements. Its effects should be assessed with the use of offline and online interpretation and processing measures. Appropriate structured input activities must be informed by the nature of input processing and based on the notion that structured input activities are aimed at facilitating the acquisition of the underlying formal features of the language.

The main role of structured input is to push learners away from non-optimal processing strategies, so that they are more likely to make correct form-meaning connections or compute basic structures in real-time during comprehension.

1.1. The S Stands for Structured and the I for Input

Before structured input activities were used as a pedagogical intervention, a large database of research existed that investigated how L2 learners initially perceive and process the language in an input. This research indicated that, when L2 learners are exposed to an input, they tend to rely on internal strategies to process this input (VanPatten 1996). As a result of their internal processing, they might not be able to make the correct form-meaning connections or assign the correct word-order strategies. Structured input activities always address a processing problem (see overview in Table 1 below). If there are no processing problems, then there is no need for structured input activities. The word "structured" and the word "input" are used, as in these activities, the input is structured in a way to facilitate language processing (e.g., making correct form-meaning connections and processing appropriate word-order structures).

Table 1. Structured input activities main studies.

Processing Strategy	Linguistic Items Investigated	Study
The First Noun Strategy. Learners tend to process the first noun or pronoun they encounter in a sentence as the subject/agent	Spanish object pronouns French negative and indefinite articles German case marking English causative constructions French causative English causative English passive constructions	VanPatten and Oikennon (1996) Sanz (2004) Wong (2004) Agiasophiti (2013) Benati and Batziou (2017, 2019) Wong and Ito (2018) Benati (2020a, 2023a, 2023b) Benati (2020b, 2022)
The Lexical Preference Strategy. Learners will tend to rely on lexical items as opposed to grammatical form to get meaning when both encode the same semantic information	Italian future tense Japanese past tense	Benati (2004a) Lee and Benati (2007)
The Preference for Non-redundancy Strategy. Learners are more likely to process nonredundant meaningful grammatical form before they process redundant meaningful forms	Italian adjectives agreement Arabic gender agreement	Benati (2004b) Benati and Farhat (2021)
The Sentence Location Strategy. Learners tend to process items in sentence initial position before those in final position and those in medial position	Italian subjunctive Spanish subjunctive	Chiuchiu and Benati (2020) Farley (2004)

The inputs are structured to facilitate L2 learners' input processing in a variety of situations. For example, L2 learners pass through a phase of development in which they use word order as a template for assigning the grammatical roles of the subject or agent and object (First Noun Strategy). Using this word-order template, they assign the grammatical role of the subject or agent to the first noun or pronoun encountered in an utterance. This processing problem is quite severe for language acquisition, in that the first noun or pronoun is not always the subject/agent (e.g., passive constructions and causative constructions); therefore, reliance on this strategy can cause misprocessing and misunderstanding issues.

Another processing problem is caused by L2 learners relying on lexical items (e.g., temporal adverbs) as opposed to grammatical form (e.g., verbal inflections), in order to obtain meaning when both encode the same semantic information (Lexical Preference Strategy). When L2 learners process a sentence where a particular form is made redundant by another element of the sentence, such as a lexical item, they might delay in making the correct form-meaning connection (The Preference for Non-redundancy Strategy). Structured input might be effective in altering these processing strategies that can cause delays and misprocessing, and in delivering a better intake to L2 learners' internal systems. This better intake should yield an improved competence in interpreting and processing inputs. An additional processing problem is caused by the fact that L2 learners tend to pay attention to what comes first and what comes last in a sentence. In terms of processing, the initial and final positions are privileged over the medial position. The problem for L2 learners is that many grammatical features (e.g., subjunctive) occur in the sentence's medial position. If L2 learners do not attend to the sentence's medial position, then the consequence for their second language acquisition is that no intake is derived around the form (The Sentence Location Strategy). A delay in processing the elements of a sentence causes a delay in acquisition (e.g., a failure in making appropriate connections, misunderstanding the meaning of a sentence).

1.2. The A Stands for Activities

In structured input activities, inputs are manipulated in particular ways to push learners to become dependent on form and structure to obtain meaning. Structured input practice pushes L2 learners to abandon their inefficient processing strategies and adopt more optimal ones, so that better form-meaning connections can be made. VanPatten and Sanz (1995) originally produced the following guidelines for structured input activities:

1. Present one thing at a time.
2. Keep the meaning in focus.
3. Move from sentences to connected discourse.
4. Use both oral and written inputs.
5. Have the learner do something with the input.
6. Keep the learner's processing strategies in mind.

Researchers would need to follow these guidelines to the letter to develop effective structured input activities. Identifying the processing problem to be investigated is the most important step in developing these activities. Structured input activities should be designed to make L2 learners enact something with the input they receive (i.e., agreeing or disagreeing; false or true; and likely or unlikely). During structured input activities, L2 learners should be engaged in processing the input (with a specific reason for processing the input) sentences and must respond to the input sentence in some way. Structured input activities are of two types: referential and affective. Referential activities are those for which there is a right or wrong answer and for which the learner must rely on the targeted grammatical form to obtain the meaning. Affective structured input activities are those in which learners express an opinion, belief, or some other affective response and are engaged in processing information about the real world. Affective activities reinforce the form-meaning connections established during referential structured input activities. During structured input activities, L2 learners do not receive any explanation about the target form, no specific feedback on their responses, and they do not engage in any output practice.

2. What Are the Effects of Structured Input Activities?

2.1. Nature and Role of Structured Input Activities Are Not Always Clear in Second Language Research

It is paramount that scholars who would like to measure the effects of structured input activities pay close attention to the role and nature of these structured input activities. It is clear from some previous empirical research that this has not always been the case (e.g., Allen 2000; DeKeyser and Sokalksi 1996; and Salaberry 1997). The role of structured input activities is to alter learners' processing strategies to enrich their intake (form-meaning connections). Therefore, for an instruction to be a genuine structured input, the processing problem or inefficient strategy that the learners use to process the target form must first be identified.

In DeKeyser and Sokalksi (1996), there were some methodological shortcomings specifically related to the nature of the instructional treatment, which was referred to as the input-based treatment. The treatment adopted by the authors did not correspond to the structured input practice, as it was not designed to push the L2 learners away from their natural processing strategies, and the structured input activity guidelines were not followed. The participants in the experimental group did not have to make any form-meaning connections through their language practice. A similar case was seen in Salaberry (1997), where the instruction did not correspond to the structured input practice. It was clear from the description of the treatment that the structured input guidelines had not been adhered to. The structured input activities used in Allen (2000) were also problematic, because they were not designed to ensure that the L2 learners focused on form to obtain meaning. The structured input activities used in Allen's study did not push learners to make a distinction between causative and non-causative sentences with faire. It is possible that the participants were being led to memorize a pattern with these activities, rather than rely on the sentence structure for meaning. When VanPatten and Wong (2004) replicated Allen's study with appropriate structured input activities that pushed learners to process the sentence structure to obtain the meaning, they obtained different results. When these activities are properly structured to push learners to make the necessary form-meaning connections, they do successfully alter learners' inefficient processing strategies.

2.2. Assessment Used to Measure the Effects of Structured Input Activities Is Not Always Appropriate

In structured input research, rules are not tested (e.g., grammaticality judgement tasks and fill-in-the-gap tasks, etc.), but the ability to process and interpret the linguistic features in an input is. Any measurements of rules are inappropriate. This was the case in Marsden and Chen (2011). This study, in measuring the effects of structured input activities on the acquisition of the past tense morpheme *-ed*, used non-processing assessments such as grammaticality judgments, fill-in-the-gap tasks, and semi-structured conversation. In addition, the participants in this study were asked to self-report on the knowledge they used. All of these assessments were designed to test the knowledge of a rule. However, structured input activities do not foster the internalisation of rules, as their main aim is to help L2 learners to process morphological and syntactic features, which largely involves the development of the internal representation of language. Structured input practice aims at affecting underlying knowledge that is implicit knowledge. As argued by VanPatten (2015b) "classic rules are illusory from contemporary theoretical perspectives, and so in a study such as Marsden and Chen's, we are asking learners to report on something we think exists in their heads when it is not at all clear that it actually does".

2.3. Main Findings of Genuine Structured Input Research

2.3.1. Offline Studies

VanPatten and Oikennon (1996) originally investigated the effects of structured inputs alone on the acquisition of Spanish object pronouns. The results of this study indicated that structured practice is the causative factor in explaining the positive results of instruction.

Sanz (2004) replicated this study to provide evidence for the effects of structured input activities on interpretation- and discourse-level production tasks. Benati (2004a, 2004b), Farley (2004), Wong (2004), and Benati and Farhat (2021) replicated this original study and obtained similar findings on the acquisition of Italian future tense forms, Italian adjective agreement, Spanish subjective, French negative and indefinite articles, and Arabic gender agreement. Lee and Benati (2007) established that structured input activities are an effective treatment in the acquisition of Japanese past tense markers and Italian adjective agreement. The main findings of the two studies indicated that enhanced and unenhanced structured input activities proved to be equally effective in promoting grammatical gains. Similar results were obtained by Agiasophiti (2013), who measured the effects of enhanced and unenhanced structured input practice on the acquisition of case marking in German. Benati and Batziou (2017, 2019) explored the discourse and long-term effects of structured input and output practice, when delivered in isolation or in combination with the acquisition of English causative forms. The results of both studies were similar and showed that L2 learners who received the structured input instructional training benefited more than L2 learners receiving structured output instructional training. In both studies, structured input practice alone was sufficient to improve the learners' performances in both interpretation and production discourse tests containing English causative forms.

2.3.2. Online Studies

Wong and Ito (2018) compared the changes in the processing patterns between L2 learners receiving structured inputs and traditional instruction on the acquisition of the French causative. A dichotomous scene selection eye-tracking task was used to measure the eye-movement patterns and accuracy in a picture selection while the learners were processing auditory sentences. The results from this study indicated that the structured input group gained higher scores for accuracy than the traditional instruction group. A change in eye movement was also observed for the learners after the processing instruction training, but not after the traditional instruction training. Benati (2020a) contrasted the effects of structured inputs and traditional instruction on the acquisition of English causative passive forms. The eye-tracking task used in this study measured the online effects of the two treatments. The main results of this study indicated that the structured input group was more accurate than the traditional group in accurately processing the target forms. The structured input training did have a positive effect on the learners' eye movement patterns. The examination of the gaze patterns suggested that the structured input training changed the participants' processing mechanisms for the target structure. Benati (2020b) measured the effects of the same two instructional treatments on the acquisition of English passive forms. Their results echoed the previous ones, in that the structured input group outperformed the traditional instruction group in accurately processing the passive English constructions. The structured input training was also successful in causing a positive and relevant change in the participants' eye-movement patterns. These effects led to an immediate change in the learners' incremental sentence comprehension patterns. Chiuchiu and Benati (2020) measured the relative effects of structured inputs and textual enhancement on the acquisition of the Italian subjunctive of doubt. A self-paced reading test was used to measure the learners' sensitivity to violations and accuracy in sentence interpretations of text containing subjunctive forms. The results from this online study showed that only the structured input group improved from the pre-tests to the post-tests for both behaviours observed. Benati (2022) further investigated the online effects of structured inputs and outputs on the acquisition of English passive constructions. The self-paced reading test used in this study is a more reliable measurement of the accuracy of the response and reading time. The main findings from this experimental study confirmed the positive effects of structured inputs in facilitating the correct processing of the target feature. Two recent structured input studies have measured the possible individual differences and factors in the results generated by structured input activities using self-paced reading tests. Benati (2023a) investigated the possible effects of motivation on the acquisition of English

causative passive forms. The results from this study indicated that motivation was not a factor influencing the positive results generated by structured inputs. There was also no difference (Benati 2023b) between the low- and high-working memory capacity groups, and structured inputs were proved to be equally effective for L2 learners' ability to process inputs (interpret a sentence containing the target feature) and to produce English causative forms. The effects of these structured inputs were retained over four weeks.

2.3.3. Overall Views about Structured Input Research

Overall, the main findings from the research measuring the offline and online effects of structured input activities on the interpretation and processing of target forms or structures reveal that they are an effective pedagogical intervention when compared to other pedagogical interventions, such as input enhancement, traditional instruction, and output-based meaning instruction. Structured input activities are effective at solving the processing problems (e.g., word order, lexical preference, redundancy, and location) that L2 learners encounter in processing/parsing certain features in real time and facilitating language development (Benati 2019, 2021). Structured input activities can help learners of any L2 to apply appropriate word-order strategies. Structured input activities can help learners of any L2 to process a form of any language to determine the appropriate semantic interpretation of a sentence. Structured input activities yield a significant improvement in sentence- and discourse-level interpretation tasks and online tests such as self-paced reading and eye-tracking. The effects of structured input activities are consistent, durative, and measurable for different languages and processing problems. Learners with different L1s seem to benefit equally from processing instructions. Structured input activities are effective at instilling the appropriate processing strategies, no matter the L1 of the learner. Learners with different backgrounds make consistent gains in interpretation and production tests at both the sentence and discourse levels. Structured input activities produce positive results with children, adolescents, and adults. Structured input activities have long-term durative effects on perceptual and semantic processing problems.

Structured input activities, in successfully altering the way that L2 learners process inputs, have an additional effect on L2 learners' developing system and, subsequently, on what these learners could access for production. Findings from structured input research indicate that L2 learners from different populations and L1s who receive structured input practice that attempts to alter their input processing receive a double bonus: a better processing of inputs and knowledge that is also available for production. This view is further supported by the results from the production discourse-level tasks, where learners had to produce the target form in a less controlled situation (Benati and Batziou 2019). The production tasks used in genuine structured input studies are not used as a measure of skill. The main purpose of these production tasks is to see if L2 learners can access newly developed knowledge.

Overall, the research on the effectiveness of structured input practice indicates:

- Structured input practice is an effective pedagogical intervention designed to alter processing problems such as the First Noun Principle.
- Structured input practice is effective in developing learners' ability to process inputs, but also has an impact on L2 learners' developing systems, so that they can access a linguistic feature in written production tasks under less controlled situations.
- Structured input practice alters the way learners process inputs and assists with the development of underlying knowledge that can be tapped during the development of skills.
- Structured input practice has short-term and long-term effects. The effects of structured inputs have been measured over a period of 3 weeks (short-term effects) and 6 months (long-term effects). The effects of SIs are both durative (3 weeks after instruction) and longitudinal (6 months after instruction).

Structured input findings lend support to several hypotheses formulated within this research framework. The positive results obtained from structured input practice

lend support to the so-called "Age Hypothesis" (Benati and Lee 2008). Structured input is just as effective an intervention with young learners as it is with older learners. In addition, structured input supports the so-called "Native Language Hypothesis" (Benati and Lee 2008). Structured input is effective for instilling target-language-specific processing strategies, no matter the native language of the learners.

3. Why Should We Continue Research on the Effects of Structured Input Activities?

Empirical research measuring the effects of structured input activities must take into consideration the nature and role of this pedagogical intervention. Structured inputs can only be used if the focus is the acquisition of a feature affected by a processing problem. For example, in the case of the acquisition of passive constructions, L2 learners might fail to determine which is the subject and which is the object in a sentence containing this syntactic structure. In the sentence *the cow was kicked by the horse*, our processing mechanisms will make the best guess at the grammatical relationships among the individual words. The word *cow* will be assigned the role of the subject and, subsequently, the word *horse* one of the objects. In this case, where the order in which learners encounter sentence elements is a powerful factor in assigning the grammatical relations amongst sentence elements, L2 learners would be misinterpreting the meaning of the sentence. Delays in correct interpretation cause delays in the processing and acquisition of a syntactic feature, such as a passive construction. If we know what L2 learners are incorrect at the level of input processing, structured input practice is a pedagogical intervention that is comprehension-based and pushes L2 learners away from non-optimal processing.

Structured input activities must be developed following the guidelines provided by VanPatten and Sanz (1995) to the letter. Structured input practice must address a processing problem and isolate or privilege a linguistic feature to promote appropriate processing while focusing on meaning. Structured input activities should aim at allowing L2 learners to process the target form/structure (in a sentence or discourse) in the input (oral and written types), not to produce it.

Structured input must be measured using appropriate tests such as interpretation tests and not assessment tasks such as judgement grammatical tasks. We must test the ability to process and interpret inputs accurately, not induce the knowledge of a rule. Structured input activities are about facilitating the development of language and not about rule learning. Structured input practice is about processing and not noticing (becoming aware of something at the input level). The empirical research in this field must be clear about what we measure. We also need to consider new methodologies for assessing how the language (implicit) system develops in our mind and whether or not it might be affected by input manipulations, such as the one implemented during structured input practice. Structured input has been proven effective when measured using sentence- and discourse-level interpretation tasks. Structured input activities significantly improve the processing and interpretation of the target features affected by processing problems. Structured input activities change eye-movement patterns in real-time input processing.

Structured input research has enjoyed a fairly robust research agenda (Lee 2015). It is a more effective practice than other pedagogical interventions, such as traditional instruction, input enhancement, and meaning-output-based instruction, at helping L2 learners correctly process form and feature effects using a variety of processing problems (see Table 1). Basic findings on the effectiveness of structured input activities have been established. New and future empirical research on the effects of these structured input activities would need to focus on the following areas: measuring the secondary effects; measuring the role of individual differences; and measuring the online effects. Based on these areas, several general and specific questions need to be formulated: (i) Would learners who receive training in one type of processing strategy for one specific form transfer the use of that strategy to other forms without further exposure to structured input activities?; (ii) Would any individual or combination of individual factors (e.g., motivation, attitude, and working memory capacity) have measurable effects on the positive results generated by structured

input activities?; and (iii) Would the effects of structured input activities be better measured by online tasks such as self-paced reading and eye-tracking?

Based on the findings of the structured input research, we can provide language teachers with the following advice:

- Consider using structured input activities to circumvent a processing problem
- Use both referential and affective structured input activities
- Develop different types of structured input activities (surveys, matching, binary options, ordering, ranking, and selecting alternatives)
- Do not give L2 learners output practice. Output practice might help with fluency and accuracy in production, but it is not responsible for getting the grammar into learners' heads
- Consider moving from structured input to structured output practice in focusing on a form or structure
- Consider that structured input activities can also be effectively delivered via a computer.

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