Process Grammar Model
Immediate Grammar and Adjustive Grammar
Digest Version

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1 Introduction

Immediate grammar is a grammar that corresponds to the situation where utterances are intuitively selected and promptly realized. Adjustive grammar is a grammar used for utterances with appropriate judgment and adjustive. As a framework for describing language use with two extremes, one that must be spoken immediately and one that is spoken after careful consideration and adjustive, we propose a process grammar model. Immediate grammar is not just about speaking anything right away, but there are strict rules for this. Adjustive grammar is important to choose the right words and use the right grammar, but depending on the degree of adjustive (or the degree of revision), there are several ways of expression, and there is a state of over-adjustment. This model, which considers the time axis of expression, is not something completely different from all previous grammar studies, but a framework for further developing previous grammar studies.

The feature of this model is to describe the dynamic characteristics of grammar in language considering the time axis. Language is operated through physical resources (cognitive processes of the brain, speech, symbol manipulation, etc.), making it possible to describe it mathematically. However, language is not just a physical system, and each part that describes matter has different properties from the physical quantities described in physics, making mathematical descriptions difficult. Physical systems (thermodynamics, electromagnetism, etc.) usually follow deterministic laws. On the other hand, language contains non-deterministic elements such as "immediate grammar" and "adjustment grammar." In particular, language includes context dependency, semantic structure, and cognitive process influences, which cannot be fully explained by simple mathematical models. Therefore, a mathematical description of language must consider dynamic changes and decision-making processes while being based on physical resources. For example, real-time generation of speech (immediate grammar) is difficult to predict completely with deterministic laws, so it should be relatively understood and always show pairs to be compared like a binary opposition. For example, semantic ambiguity (e.g., "She has a daughter" is it my daughter or a girl?) and context dependency (e.g., "She met him" is it she met him or he met her?) are difficult to resolve mathematically. These problems cannot be ignored, nor can they be simply addressed by statistical probability theory. However, a mathematical model of language that considers the time axis may offer a new approach to these unresolved issues. For example, if it is immediate grammar, considering the real-time generation of speech, the problem of my daughter or a girl is resolved by the relationship before and after the speech. Also, if it falls under adjustment grammar, considering context dependency, the problem of ambiguity between she met him and he met her is resolved by adding words during the adjustment process.

2 Theoretical Background

2.1 Relation to Dual Process Theory

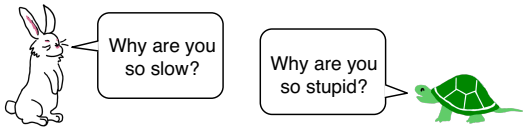

FIG. 1: Dual processing theory based on the presentation from "System 1 and System 2 Thinking"

The Process Grammar Model is similar to the framework of "System 1 (fast thinking) and System 2 (slow thinking)" refered as the Dual Process Theory. However, this model has a unique perspective focusing on immediacy and adjustability, rather than being a mere application.(Evans 2008; Kahneman 2011; Squire and Kandel 2009)

2.2 Limitation of "spoken language" and "written language"

In traditional linguistics, it has been said that "spoken language has high immediacy and written language is revisable." However, in SNS and live streaming, the situation of "speaking while writing" is increasing, and it cannot be explained by a simple binary opposition. This study proposes the name "Process Grammar Model" as a framework to explain the mechanism of language use, rather than calling surface acts as language forms, to organize such phenomena.

3 Immediate Grammar and Adjustive Grammar

TABLE 1: Comparison of Immediate Grammar and Adjustive Grammar

	Immediate Grammar	Adjustive Grammar
Nouns, noun phrases only	Just now, curry udon, done.	The curry udon has just been completed.
	So to speak, like music notation.	This corresponds to music notation.
Omitting "wa" particle	How about my explanation?	Is my explanation being conveyed properly?
Adverbs only	Certainly.	Certainly, that point is valid.
Demonstratives only	This becomes like this.	This element changes like this.

Immediate grammar is short and has high real-time characteristics. It is established in the smallest unit. Traditionally, it has not been considered as a sentence, but such forms are more prominent and widely used in SNS and live streaming. Adjustive grammar has a clear sentence structure and is a grammar that can be revised.

To confirm the existence of immediate grammar, it is generally necessary to shorten what is commonly called a sentence and capture the form when it can be spoken briefly to the person in front of you, classifying it with names such as "noun stop" and "adverbs only" to reveal its characteristic rules. Here, to succinctly show the characteristics of immediate grammar and adjustive grammar, the comparison of the two is shown in Table 1.

3.1 Immediate Grammar

Characteristics: Instantaneous speech, frequent omissions, context-dependent, real-time processing
Examples: "How's the taste?," "Look!," "Watch out!," "Ordinary is the best"
Application: Everyday conversation, interjections, emergency speech

3.2 Adjustive Grammar

Characteristics: Careful selection, grammatically correct structure, revision
Examples: "Based on the results of this study...," "Thank you very much"
Application: Formal speeches, papers, official documents

3.3 Strict Definition

It is important to emphasize the basic definitions and characteristics of immediate grammar and adjustive grammar, and to approach them from different perspectives. For example, if immediate grammar is understood as "a process in which speech is generated reactively on the spot" and adjustive grammar is understood as "a process of linguistic adaptation and correction," it is easy to understand that the focus is different. The characteristic of immediate grammar is "immediate and reflexive selection," and the characteristic of adjustive grammar is "intentional correction and confirmation," and there are logically distinguishable aspects between the two.

4 Concept Diagram

Here, we show a concept diagram that shows the relationship between immediate grammar and adjustive grammar while looking at the entire Process Grammar Model (Figure 2).

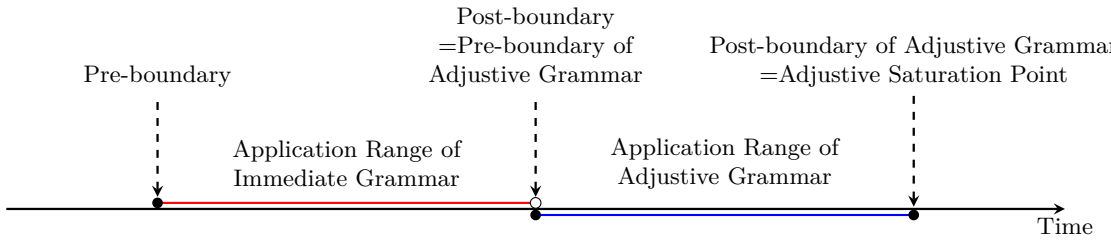

Fig. 2: Boundary between Immediate Grammar and Adjustive Grammar

4.1 Definition of Pre-boundary and Post-boundary of Immediate Grammar

The Pre-boundary is the point at which the application of immediate grammar begins, indicating the start of speech. The application range of immediate grammar is the interval from the Pre-boundary to the Post-boundary.

The Post-boundary indicates the end of the application range of immediate grammar, coinciding with the Pre-boundary of adjustive grammar. Beyond this point, speech or text is processed not by immediate grammar but within the framework of adjustive grammar.

4.2 Application Range of Adjustive Grammar and Adjustive Saturation Point

The Pre-boundary of adjustive grammar indicates the point at which the application of adjustive grammar begins. Adjustive grammar is applied when a certain amount of time is spent revising and correcting speech or text.

The Post-boundary of adjustive grammar indicates the point at which further improvement is no longer expected after a certain amount of adjustment. This point is called the adjustive saturation point, indicating the end of the application range of adjustive grammar.

4.3 Boundary between Immediate Grammar and Adjustive Grammar

There is a boundary between immediate grammar and adjustive grammar, but there is no fixed boundary. Speech is "skilled" by going through processes such as rehearsing adjusted things many times, memorizing them, and fixing them as manuals. "Skilled" expressions are sometimes spoken immediately. This shows the continuous relationship between immediate grammar and adjustive grammar. Immediate grammar (System 1) and adjustive grammar (System 2) are not fixedly separated, but are set as a "continuum" because they mutually influence each other through "skill" or "experience." In this way, speech may transition between immediate grammar and adjustive grammar.

In the Process Grammar Model, "immediate grammar" deals with intuitive and instantaneous speech, and "adjustive grammar" deals with conscious and analytical speech, but by mastering it, elements of adjustive grammar transition to the domain of immediate grammar. This is an example of the Process Grammar Model being a "dynamic model." The phenomenon of the processing of System 2 transitioning to System 1 can be seen as part of a process that changes over time. This shows that it is a model of "process" rather than a fixed grammar.

4.4 Continuum of Immediate Grammar and Adjustive Grammar

Immediate grammar and adjustive grammar form a "continuum" that can transition depending on the situation and experience, rather than a simple binary opposition. For example, in language learning, when beginners create sentences, they use adjustive grammar (System 2), but with training, patterns that are frequently used can be output immediately, transitioning to immediate grammar (System 1). Through such a process of mastery, the roles of processing change between System 1 and System 2. Therefore, the roles of processing that each of System 1 and System 2 should be responsible for are automated, and sometimes the processing of System 2 functions as the processing of System 1. This phenomenon is the essence of the "continuum" in the Process Grammar Model, showing the complementary and inseparable relationship between immediate grammar and adjustive grammar.

However, the formats of immediate grammar and adjustive grammar are different, with them being at opposite poles. In actual language use, it is meaningful to consider them as a continuum because they often interact. In particular, immediate responses (e.g., the selection of utterances made instantaneously in the flow of conversation) and the subsequent adjustment (e.g., the correction of utterances and the confirmation of information) are often interrelated. While immediate grammar focuses on the instantaneous aspects of language use, adjustive grammar focuses on the adaptive aspects of language and the adjustment process. By preparing a format that treats these uniformly, it seems possible to more clearly show the dynamics of language use. However, this may ultimately shake the conceptual definitions of immediate grammar and adjustive grammar, so it is necessary to equip a preventive logic to ensure that they do not become too similar.

Fast processing is considered to be the use of System 1 rather than the process of System 2, but it is not derived from System 1, and the techniques developed by System 2 through experience and various heuristics can mature and be reborn as fast processing.(Evans 2008) Even for problems that should be carefully considered, it is often seen that processing by System 1 is used through experience of training and repeated playback. For example, in language learning, if you get used to constructing sentences that you cannot do immediately, you will be able to use them immediately. In such cases, it is considered that System 1 is used after mastery. On the other hand, when explaining new words or complex procedures, System 2 is likely to be used to eliminate misunderstandings.

5 Description Method

5.1 Design of Appropriate Format

When linking immediate grammar and adjustive grammar, design a format that reflects the roles they play. In this format, clearly show the "flow of processes" that indicates when and how each process is

triggered. For example, in immediate grammar, clearly indicate the timing of the occurrence of "reactive speech," and by indicating the timing of "correction" and "confirmation" to be applied later, it is possible to visually express the complementarity of the two while maintaining different formats.

5.2 Consideration at the Meta-level of Distinction

Although immediate grammar and adjustive grammar may seem to be connected at first glance, they actually have different cognitive and social functions. It is a challenge to observe whether they function under different situations and cognitive loads. For example, if immediate grammar reflects "cognitive immediate responses" and adjustive grammar reflects "cognitive processes involving complex language adjustments," the logic to distinguish between the two theoretical frameworks will naturally be established.

5.3 Confirmation of Distinction by Empirical Data

The purpose of collecting data to empirically support the theory is to build a system from specific speech examples in different contexts and usage situations of immediate grammar and adjustive grammar. By pinning down the characteristics of both immediate grammar and adjustive grammar on a map divided into dimensions with actual examples, it is possible to show that both poles exist and that the process grammar lies on top of them. By analyzing actual conversations and language data, it is possible to confirm whether the distinction between immediate responses and time-consuming adjustments, or the timing of these, makes the two poles ambiguous, and to organize them concretely.

One approach is to propose a method of linking the "reactive elements" in the format of immediate grammar with the "adjustment process" in the format of adjustive grammar. By positioning actual data that mediates both poles as a model, it is possible to specify the parameters of a model in which "immediacy" and "adjustability" in language use interact, and to create a model of a continuum of relative speech and expressions.

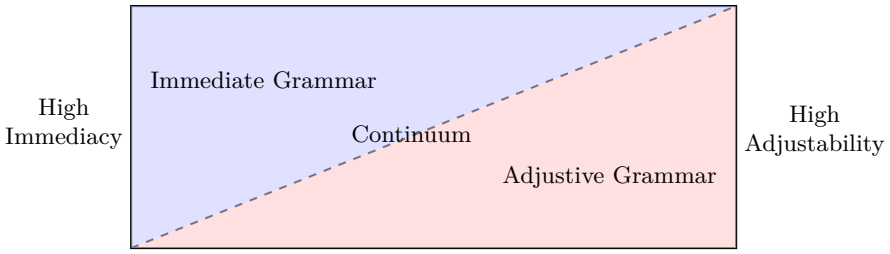

FIG. 3: Process grammar model of actual language use

6 Future Directions

6.1 Research Questions

- The boundary between Immediate Grammar and Adjustive Grammar and its formalization (formulation of pre-boundary and post-boundary)
- Collection and analysis of empirical data (comparison of conversation data and written data)

6.2 Update Policy

Organizing and adding rules Application to language education and AI (natural language processing) Consideration of analysis targeting waka and historical literature.

Table 2: Characteristics of immediate and adjustment grammars

Item	Immediate Grammar	Adjustive Grammar
Characteristics	Grammar applied instantaneously on the spot. Little consideration or modification of form.	Grammar that considers the appropriateness of linguistic forms and makes adjustments as needed.
Time Span	Milliseconds to seconds. Processed in real-time.	Seconds to years. Adjustments may take a long time.
Examples	Reflexive responses, spontaneous conversations.	Press conference responses (with adjustments), speeches, editing of legal documents.
Adjustive Elements	Minimal or unconscious adjustments only.	Conscious adjustments to linguistic forms.
Purpose	Immediate information delivery.	Preventing misunderstandings and ensuring accuracy and appropriateness.

7 Conclusion

In this digest, we have outlined the Process Grammar Model, compared Immediate Grammar and Adjustive Grammar, and discussed the theoretical background. In future updates, we will expand the rule base and data analysis to further develop the model.

References

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