Process Grammar Model
Immediate Grammar and Adjustive Grammar

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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

Please refer to **Q1.** as well.

2.1 Relation to Dual Process Theory

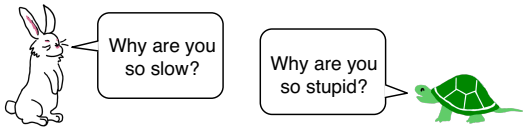

FIG. 1: Dual processing theory based on the presentation from "System 1 and System 2 Thinking"

TABLE 1: Differences in characteristics between System 1 and System 2

System 1	**Example utterance immediate**	**System 2**	**Example utterance deliberate**
Fast	"Whoa, that's hot!"	Slow	"Be careful, it's hot enough to burn you."
Subconscious	"I have a bad feeling about this..."	Conscious	"There are several risk Factors here."
Automatic	"Oh, go ahead!"	Effortful	"Should I say 'please go ahead'...?"
Heuristic	"It's always like this, so it'll be the same this time."	Analytical	"Looking at the past five cases, this one might be different."
Associative	"This smell... reminds me of something."	Rule-based	"This fits the typical pattern according to theory X."
Implicit	"Yeah, kind of like that."	Explicit	"A leads to B, and that causes C."
Emotional	"I can't take this anymore!"	Logical	"There are three problems with that approach."
Intuitive	"Something just feels off."	Rational	"Considering the costs and risks, this option is more reasonable."
Error-prone	"It'll probably be fine!"	Reliable	"I've verified it with multiple sources."

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.

2.3 Clause chaining and additive constructions

"Immediate grammar" is most closely related to the linguistic phenomenon of clause chaining that has been studied to date. Clause chaining has been widely studied as a method to indicate grammatical continuity. By linking multiple clauses while maintaining the structure and meaning of sentences, clause chaining expresses the continuity and relationships of information. Clause chaining is a useful method for explaining the continuum of immediate and adjustment grammars.

Sakakura (1975) expressed the construction of Japanese text as "adding one after another," and Komatsu (2003) stated that it is "constructed by adding one after another," pointing out the characteristics of clause chaining in Japanese poetry and prose. Such expressions emphasize that the construction of sentences is sequential and flexible, suggesting that the relationships between each phrase are not necessarily close. Kondo (2005) also stated that "since it is added, it is difficult to define which is the main clause and which is the subordinate clause in the resulting compound sentence," indicating that the hierarchical structure of clauses is ambiguous. These considerations suggest that language use is based on the natural order in which acts and events are recalled, rather than following syntactic binding rules. They reveal that language utterances are based on flexible adaptations to the flow of the speaker's thoughts and the situation, rather than grammatical adjustments. Therefore, such immediate speech processes are considered to be universally observed features in language development and communication.

2.4 Clause chaining and linking methods of phrases

Clancy (2020) studied the use of clause chaining in Japanese narratives, where 60 children (aged 3-7) and 10 adults retold stories after viewing picture book storytelling and short videos. This study examined the methods of linking phrases, the timing of their completion, and semantic relationships (simultaneity, causality, temporal order) in detail. The timing of phrase completion was confirmed to be related to changes in characters and the end of important story units. Furthermore, the results of comparing children's and adults' stories showed that factors influencing the linking of phrases exist regardless of age.

The responses in children's stories are thought to naturally appear in a form close to immediate grammar. When telling stories, children often repeat responses in short units, and it is noted that the chaining of phrases is not always logically coherent. This is considered to reflect the characteristic of immediate grammar, where sentences are constructed immediately. Children's immediate responses are dominant at a stage where linguistic adjustments are minimal, and they intuitively connect to the next phrase. This immediate response plays an important role in the process of language development and serves as a foundation for learning complex syntax and grammatical adjustments. The flexibility and fluidity that children exhibit when creating sentences are considered to be related to the characteristics of immediate grammar.

3 Immediate Grammar and Adjustive Grammar

Table 2: 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 2.

3.1 Immediate Grammar

Immediate grammar is formalized as a dynamic process of generating language in real-time. This model is described as a system that determines appropriate output immediately based on input (situation and context).

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

3.1.1 Basic Model

In the Process Grammar Model, immediate grammar is defined by the following function in functional notation.

$$f_{\mathrm{IG}} : (C, M, T) \to O$$

Here, C represents the context (situation, background), which includes the relationship between the speaker and listener, the setting of the utterance, and visual information. M refers to linguistic knowledge (vocabulary and grammatical structures), including the immediate grammatical rules possessed by native speakers. T represents temporal constraints (real-time processing), indicating conditions under which utterances are generated without delay. O signifies output (generated language expression), encompassing actual speech or written language. Immediate grammar is a process that determines the optimal language expression O in real-time based on input (C, M, T).

3.1.2 Condition of Immediacy

The core of immediate grammar is "immediacy," defined by the following condition.

$$t_{pr} \leq t_{th}$$

Here, t_{pr} represents the processing time for language generation, and t_{th} is the threshold for immediacy (generally a short duration). If t_{pr} exceeds t_{th}, the process does not belong to immediate grammar.

3.1.3 Dynamic Adaptability

Immediate grammar must adaptively change output in response to changes in input. This dynamic adaptability is expressed as the following optimization problem.

$$\arg\max_{O} U(O \mid C, M, T)$$

Here, $U(O \mid C, M, T)$ is a utility function indicating the appropriateness of output O. The goal is to generate the optimal output O based on context C, linguistic knowledge M, and temporal constraints T.

3.1.4 Representation of Continuity

Immediate grammar is not viewed as discrete generation but as a continuous process. This continuity is expressed as the characteristic that output changes smoothly when the situation changes slightly. This continuity functions as an immediate response to dynamic changes, meaning it adapts in real-time to changes in the environment or context.

$$\frac{\partial O}{\partial C}, \quad \frac{\partial O}{\partial T} \neq 0$$

Here, the lowercase delta (∂) represents partial derivatives, which indicate how output changes when a specific element is slightly varied while multiple elements are influencing it. The fractional form shows how sensitive output O is to small changes in context C and time T, indicating the "rate of change".

The important point is that these partial derivatives are not zero ($\neq 0$). This means that even if there are slight changes in context C or time T, output O will not be unresponsive and will always show some change. If the partial derivatives were zero, it would mean that no matter how much the situation changes, the output would not change. However, immediate grammar always adapts sensitively to external changes. This characteristic is similar to the phenomenon where even a slight change in the facial expression or tone of voice of the conversation partner unconsciously alters the response.

Immediate grammar is a process that responds so quickly to changes in the situation that it does not require conscious adjustments. While the Process Grammar Model is inspired by human behavioral understanding in dual process theory, its core lies in immediacy, and the commonalities with unconscious or automatic processes shown in dual process theory are merely results of immediate responses.

On the other hand, continuity in adjustive grammar appears as continuity at the level of thought (deliberation) rather than immediate responsiveness. This refers to the process where utterance content and form are adjusted over time through conscious judgment and selection. Therefore, while immediate grammar and adjustive grammar have different types of continuity, they play complementary roles in language use.

3.1.5 Overall Expression of Immediate Grammar

We can express immediate grammar in the following form by integrating the above elements.

$$O = f_{\mathrm{IG}}(C, M, T), \quad \text{s.t.} \quad t_{\mathrm{pr}} \leq t_{\mathrm{th}}$$

Here, the output O of immediate grammar is determined by the function f_{IG} based on the situation C, linguistic knowledge M, and temporal constraints T. However, its processing time t_{pr} must not exceed the allowable time threshold t_{th}. The essence of immediate grammar is to generate output O that satisfies the constraints while maximizing real-time adaptability.

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

Adjustive grammar differs from immediate grammar in that there is a conscious adjustment of grammatical forms. The most typical example is formal grammar. It is less likely that subjects and complements are omitted. To limit the content or object, adjectives and adverbs are often placed before nouns. However, in actual sentences, the order of phrases is not absolutely fixed.

3.2.1 Definition of Adjustive Grammar

Adjustive grammar is a process that generates language expressions that are carefully adjusted based on context and purpose, planned with temporal flexibility. To design adjustive grammar, it is necessary to clearly define what adjustment means. Adjustment is understood as the process of adapting and modifying the meaning or form of utterances. For example, it refers to clarifying utterances, correcting information, and aligning intentions with others, including elements such as "clarification of meaning," "correction of misunderstandings," "grammatical corrections," and "maintenance of communication flow." However, when making adjustments such as adding content or persuasion, it is important to be cautious of the adjustment excess point (to be discussed later).

3.2.2 Basic Structure of Adjustive Grammar

The basic structure of adjustive grammar is designed along the following flow: First, regarding the initial utterance, it provides information in the initial utterance (ending with a predicate, providing basic facts, etc.). As the start of adjustment, if there is a change in recognition regarding the meaning or structure intended by the initial utterance, it indicates the beginning of that correction. Adjustive grammar clearly records this timing of "correction" and indicates what has been corrected. Regarding the process of adjustment (reconstruction), if correction is necessary, it records how the adjustment

was made (grammatical reconstruction, addition of information, reordering of utterances, etc.). After adjustment, the final utterance (corrected utterance) indicates what kind of semantic consistency was maintained as a result of the completed utterance after adjustment. By concretely formatting this flow, it becomes clearer how adjustive grammar functions.

3.2.3 Theoretical Background of the Adjustment Process

To theoretically support the format of adjustive grammar, it is necessary to demonstrate what cognitive and social processes adjustment involves. For example, it is important to reflect in language that adjustment is a process that "reduces uncertainty in communication" and that it is an "adaptive correction based on the assumption of the listener's understanding." As a cognitive element, adjustment is a cognitive process that accurately conveys the meaning of utterances to the listener or resolves misunderstandings, making the process dynamic, with the act of adjustment itself being instantaneous. As a social element, adjustment is also a social adaptation in conversation and a collaborative effort with the listener, involving the alignment and confirmation of intentions between interlocutors. As long as these are related to language adjustment, adjustive grammar functions as a format to reflect cognitive and social processes in language expression. However, when it comes to content adjustment, there is a possibility of reaching the adjustment excess point from that moment, so care must be taken in the design of adjustive grammar.

3.2.4 Feedback Loop in Adjustive Grammar

In adjustive grammar, it is also possible to incorporate the concept of a feedback loop. This reflects the process of receiving feedback after utterance and making corrections based on that content. This allows us to show that adjustment is not just a one-time correction but a dynamically evolving process. For example, in a series of flows such as utterance $\rightarrow$ understanding $\rightarrow$ re-confirmation $\rightarrow$ adjustment, we record changes or corrections to utterances at each stage.

3.2.5 Specific Examples of Adjustive Grammar

For example, while there is a simple rule in news scripts that ends with a predicate, in adjustive grammar, there are cases where additional information or corrections are made afterward. In this case, the following structure can be considered in adjustive grammar: The initial utterance states the fact that "an earthquake has occurred." At the start of adjustment, additional information such as "the epicenter is in eastern Japan" is added. The process of adjustment records the clarification of meaning through the addition of information. The adjusted utterance generated afterward is "An earthquake has occurred. The epicenter is in eastern Japan, and the magnitude is predicted to be 6.5."

3.2.6 Rule Design for Adjustive Grammar

As for modification rules, it is important to define the timing and methods for making adjustments (such as adding information, rephrasing, or confirmation questions). Types of changes include semantic corrections, changes in word order, and modifications to grammatical structures. Thus, the format of adjustive grammar is crucial for clearly expressing the process of "adaptive correction" based on theoretical backgrounds, and it is important to uniformly describe specific methods for each stage and the dynamic changes in that process.

3.2.7 Basic Model

Adjustive grammar is defined by the following function.

$$f_{\mathrm{AG}} : (C, M, P, T) \rightarrow O$$

Here, C represents context (situation and background), which includes topics, the listener's background knowledge, and social relationships. M refers to linguistic knowledge (vocabulary, grammatical structures), including syntax and expression choices specific to written language. P signifies planning (purpose and adjustment strategies), encompassing the intention of utterances (persuasion, explanation) and style (formal, casual). T represents temporal flexibility, indicating that the larger it is, the wider

the scope for adjustment. Finally, O signifies output (generated language expression), including refined utterances or polished texts.

3.2.8 Condition of Planning

In adjustive grammar, the utterance plan is an important element. The specificity of the plan is expressed by the following function.

$$P = g(C, M)$$

Here, g is a function that generates plans based on context C and linguistic knowledge M. The generation of plan P enables the production of adjusted language expressions.

3.2.9 Temporal Flexibility

In adjustive grammar, temporal flexibility T functions not as a constraint but as a factor that enhances the quality of generation. Therefore, the processing time t_{pr} must satisfy the following condition.

$$t_{\text{pr}} > t_{\text{th}}$$

Here, t_{th} is the threshold for processing time required for immediate grammar, and the more temporal flexibility there is, the greater the accuracy and depth of adjustment.

3.2.10 Optimization of Adjustment

In adjustive grammar, output O is optimized based on plan P. This optimization can be expressed by the following equation.

$$\arg\max_{O} U(O \mid C, M, P, T)$$

$U(O \mid C, M, P, T)$: Utility function representing the appropriateness or achievement of purpose of output O.

3.2.11 Representation of Continuity

In adjustive grammar, continuous adjustments are made according to context and plan. This continuity is shown by the following differential equations.

$$\frac{\partial O}{\partial C}, \frac{\partial O}{\partial P} \neq 0$$

Here, $\frac{\partial O}{\partial C}$ represents the sensitivity of adjustment to changes in context, and $\frac{\partial O}{\partial P}$ represents the sensitivity of adjustment to changes in plan.

3.2.12 Overall Expression of Adjustive Grammar

The overall expression of adjustive grammar is described as follows.

$$O = f_{\text{AG}}(C, M, P, T) \quad \text{s.t.} \quad t_{\text{pr}} > t_{\text{th}}$$

Here, the purpose of adjustive grammar is to generate refined output O that maximizes temporal flexibility based on plans and context.

3.2.13 Adjustment Excess Point or Convergence of Adjustment

In language use, speakers and writers select appropriate expressions and adjust their utterances or texts. This adjustment process is not merely a correction of utterances but an optimization to maximize the effectiveness of communication. However, there are limits to adjustment, and exceeding a certain threshold does not enhance the effectiveness of communication but rather diminishes it. This threshold is referred to as the **adjustment excess point**. When the adjustment excess point is exceeded, excessive

explanations lead to increased redundancy, and an overload of information results in a distortion of content, ultimately hindering the intended communication.

When considering the optimization of adjustive grammar, we examine a mathematical model that incorporates the adjustment excess point. Here, we construct a model that quantifies the degree of adjustment and uses the adjustment excess point as a threshold.

In adjustive grammar, the utterance or text O is expressed as a function optimized based on situation C, linguistic knowledge M, purpose P, and time T.

$$O = f_{\mathrm{AG}}(C, M, P, T) \tag{1}$$

However, the degree of adjustment c_{adj} must not exceed the adjustment excess point $c_{\max}$.

$$c_{\mathrm{adj}} \leq c_{\max} \tag{2}$$

Here, $f_{\mathrm{AG}}(C, M, T)$ is the optimization function based on situation, linguistic knowledge, and purpose. c_{adj} indicates the degree of adjustment. $c_{\max}$ is the threshold indicating the adjustment excess point (saturation point), beyond which the adjustment alters the content itself. Under this condition, we determine the optimal application range of adjustive grammar.

3.2.14 Specific Examples and Interpretation of Adjustment Excess Point

By exceeding the adjustment excess point, the adjustment of language expression **deviates from "language issues" and becomes "content issues."** Below are specific examples.

Letter from a Mother to Her Daughter

The letter is filled with the mother's feelings, wishes, and concerns. However, if she repeatedly writes about trivial matters, it may become a burden for the daughter, who might even think it better not to read it at all. In this case, it has exceeded appropriate adjustment and reached the adjustment excess point.

Theater Script

The script is written considering the audience's understanding, ease of speech for the actors, and the balance of content delivery. However, if it tries too hard to make it understandable for the audience, it ends up explaining everything in words, which undermines the artistic quality of the theater. Here too, exceeding the adjustment excess point transforms the issue from a language problem to one that pertains to the essence of theater.

Legal Documents

Laws are finely adjusted to avoid interpretative discrepancies, but they still do not lead to a unique interpretation, ultimately being decided through court discussions and judgments. Here, language adjustment alone cannot resolve the issue, and it becomes necessary to rely on another means of legal application. This is a typical example of exceeding the adjustment excess point.

3.2.15 Need for Optimization Considering Adjustment Excess Point

By considering the adjustment excess point when applying adjustive grammar, it is possible to optimize language expression within an appropriate range. If adjustments continue without regard to the adjustment excess point, utterances or texts may deviate from their original purpose and actually undermine the effectiveness of communication. By appropriately setting the adjustment excess point, adjustive grammar can remain within the bounds of "optimization within language" and prevent overstepping into content issues. In this regard, the rules of adjustive grammar should be systematized similarly to immediate grammar.

Adjustive grammar aims to optimize language expression, but exceeding the adjustment excess point deviates from language issues and becomes a content issue. Therefore, when applying adjustive grammar, it is necessary to set the adjustment excess point as a threshold and stop adjustments before reaching

it. By introducing this model, we can clarify the application range of adjustive grammar and optimize language expression within an appropriate scope.

3.2.16 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).

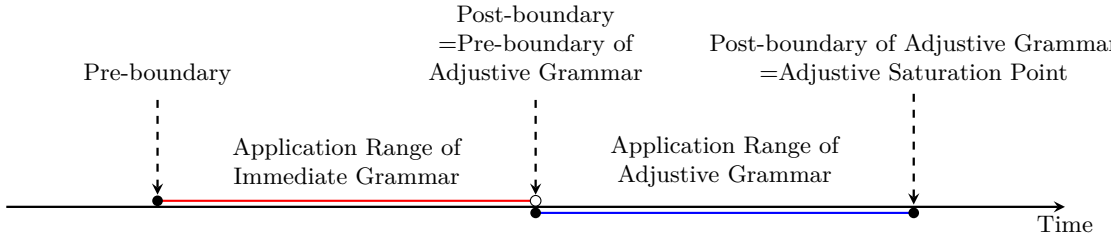

Fig. 2: Boundary between Immediate Grammar and Adjustive Grammar

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 Tasuki-gake/cross-directional Effect

Tasuki-gake effect refers to a stylistic phenomenon where Immediate Grammar and Adjustive Grammar are used in contexts that cross their typical domains of application. When Immediate Grammar appears in a normally Adjustive context (such as a novel or formal speech), it injects liveliness and immediacy. Conversely, when Adjustive Grammar is used in spontaneous utterances, it adds politeness or formality. This interplay between grammatical modes creates a distinctive stylistic depth, referred to as the tasuki-gake effect.

In this model, language use is fundamentally categorized by two temporal types of utterance: Immediate Utterance, which is produced spontaneously in real time, and Adjustive Utterance, which is the result of thoughtful planning and adjustment. Each type of utterance is governed by a distinct grammatical system. Immediate Utterance operates under Immediate Grammar, which facilitates intuitive and

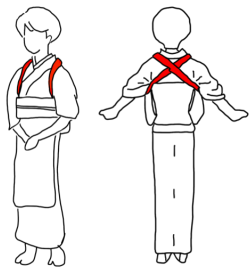

FIG. 3: Tasuki-gake: a method of tying a long cloth strap around the back to pull the sleeves of a kimono together, so that they cross over the back. This is done to prevent the sleeves from getting in the way while working.

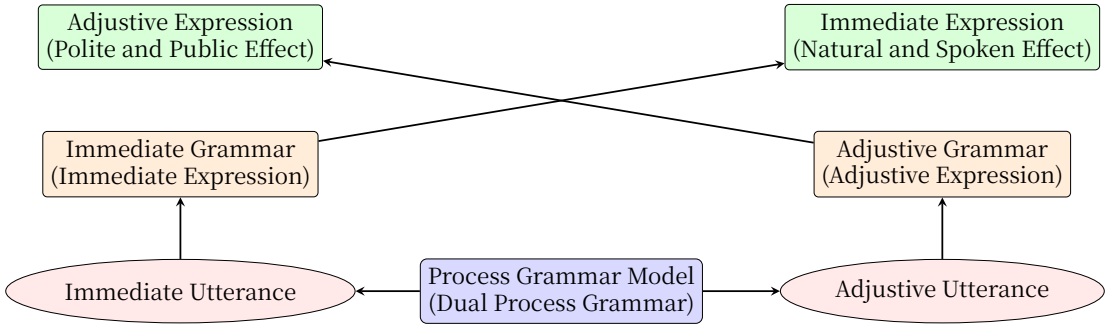

FIG. 4: Tasuki-gake Effect: A Visual Metaphor for Crossed Effects in Process Grammar. The diagram illustrates the traditional way of tying a tasuki sash. Just as the front-left is tied to the back-right, and vice versa, the relationship between utterance types and their perceived effects often crosses over. Immediate utterances can produce polite effects, while adjusted utterances may evoke natural or spontaneous impressions.

real-time chaining of expressions. Adjustive Utterance, in contrast, is governed by Adjustive Grammar, which supports expressions formed through careful deliberation and revision.

The expressions derived from these grammars are referred to as Immediate Expression and Adjustive Expression, respectively. However, a crucial feature of this model is that these expressions can produce cross-directional effects depending on how they are used. When an Adjustive Expression is highly practiced, formulaic, or trained for immediate delivery, it gives rise to the Polite and Public Effect, creating a sense of formality, refinement, or social appropriateness. Conversely, when an Immediate Expression is intentionally employed in written or scripted media—such as novels or interviews... it produces the Natural and Spoken Effect, evoking a vivid, conversational, and lifelike tone.

Thus, there is a crossed (tasuki-gake) relationship between the temporal nature of utterance and the effect of expression. This structure makes visible the richness of expressive function and practical use that goes beyond a simple binary model.(Figure 3 and 4).

6 Description Method

6.1 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.

6.2 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.

6.3 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.

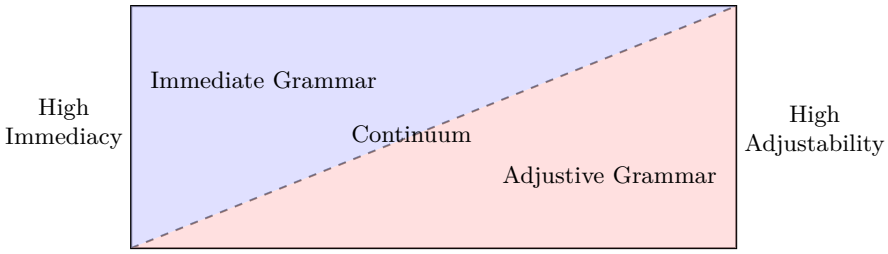

FIG. 5: Process grammar model of actual language use

7 Future Directions

7.1 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)

7.2 Update Policy

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

Table 3: 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.

8 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.

A About the Q&A Section

In this book, we have presented the theoretical model of immediate grammar and explored a new framework for language understanding through examples and applications based on it. However, when introducing such a new theory, it is expected that various questions and points of confirmation will arise from the reader's perspective.

This "Q&A Section" aims to record the author's position and supplementary considerations regarding such questions. Additionally, this section will include questions and discoveries that have emerged during the translation work (for example, "Tosa Nikki" and "Ise Monogatari") and the daily collection of immediate grammar expressions (aead project).

To avoid "subtle discrepancies that arise every time I write" and to maintain the coherence of thought, this section will be used. It is assumed that the integration with the main text will be reconsidered later as needed, and this section is positioned as a flexible space for accumulation and examination.

A.1 Q&A: Immediate Grammar and Its Theoretical Background

Q1. What kind of theory is Immediate Grammar? How is it positioned in relation to existing syntactic theories?

A. Immediate Grammar focuses on the immediate and flexible forms of expression observed in language use and proposes them as structures that can be theoretically explained. This model is not positioned in opposition to syntactic-centered theories like phrase structure grammar but is a hypothetical framework that aims to describe human language behavior from a different perspective.

Q2. In what ways does Immediate Grammar contribute to language description?

A. By introducing the perspective of Immediate Grammar, utterances that have previously been considered "exceptional" or "lacking structure" can be positioned as a systematic form of language use. This can be seen as evidence that Immediate Grammar provides a theoretical "slot for explanation" for such utterances.

B Considerations from Examples and Practice

Q3. Is Immediate Grammar the same as spoken language?

A. Immediate Grammar is often confused with “spoken language,” but theoretically, they are different concepts. Immediate Grammar is a grammatical model based on the timing of psychological processing and structural flexibility, and even in oral expressions, adjusted grammar can be used.

Q4. Why don’t you use corpus-based automatic extraction?

A. In recent language research, methods for extracting syntactic patterns from corpora have been widely used. This is a very effective method for analyzing formal structures (word order, dependency, part-of-speech patterns). However, what Immediate Grammar targets is not just the form of syntax but the ”way of speaking,” ”way of responding,” and ”expressions chosen at that moment,” which cannot be judged solely by syntactic labels or structural information. For example, utterances like ” そうそう、それそれ” (yes, yes, that’s it) or continuous expressions like ” うん、でもさあ” (yeah, but you know) may seem grammatically ambiguous and fragmented, but they have a sophisticated structure based on immediate judgments, emotions, and the flow of responses. Such phenomena, even if present in the corpus, are often overlooked due to reasons like ”not matching search criteria” or ”not recognized as grammatical coherence,” and it is believed that they can be more accurately handled through contextual judgment by human eyes and descriptive work based on experience. Therefore, in this study, we adopt an observational approach based on description and linguistic intuition, not in opposition to existing corpus-based methods but as a complementary one.

Q5. Q&A: Does Immediate Grammar ignore the procedures of recording, transcription, and analysis like conversation analysis or discourse analysis?

A. No, the position of Immediate Grammar in this study shares many commonalities with the ”specificity of utterances” and ”contextual dependence” targeted by discourse analysis and conversation analysis. In particular, the continuity of utterances, such as word choice according to context, timing, backchanneling, and rephrasing, is also an important observation target of Immediate Grammar. However, the analytical methods differ. In conversation analysis and discourse analysis, the procedure of recording audio → transcribing → structural analysis of utterance units is used to describe the interaction between participants. In contrast, the purpose of Immediate Grammar is to describe the patterns observed in such utterances as a model of the structures that speakers instantaneously select and manipulate. Therefore, while this study does not adopt the procedures of recording and transcription, it sufficiently references utterance materials and examples based on them, taking a complementary approach in that the focus of observation is on the ”immediate structures being used.” In short, Immediate Grammar does not contradict the results of discourse analysis or conversation analysis; rather, it aims to function as a structural explanatory model underlying the ”detailed utterance phenomena” they depict.

Q6. How are chaining constructions or chaining grammar related to Immediate Grammar?

A. Chaining constructions or chaining grammar represent a common form used when constructing complex sentences in a dynamic and intuitive way. They are a key manifestation of Immediate Grammar. For instance, sentences formed with expressions like “and then,”“but,”or “so,”which are added successively as one speaks, exemplify the nature of Immediate Grammar, as they are generated without pre-planning the entire sentence. These forms closely correspond to how people construct language in real-time.

Q7. Why is it easier for non-native speakers to use constructions with ”de” or ”te” rather than complex noun phrases with ”no”?

A. Japanese constructions using “no” require stacking modifiers in front of a noun, which demands structural planning and is characteristic of Adjustive Grammar. In contrast, constructions using “de” or “”te” allow for sequential chaining of events or states, enabling spontaneous, step-by-step utterance—hallmarks of Immediate Grammar. For instance, the phrase ”kinō eki de mita akai bōshi no onna no ko” (“the girl in the red hat I saw at the station yesterday”) involves a complex noun phrase with multiple layers of modification. Meanwhile, a sentence like “”Kinō eki ni itte, akai

bōshi o kabutta onna no ko o mita" ("I went to the station yesterday and saw a girl wearing a red hat") follows a chronological flow and allows the speaker to build the sentence incrementally. This is similar in English: "The girl who wore a red hat that I saw at the station yesterday" is structurally demanding, while "I went to the station yesterday and saw a girl. She was wearing a red hat." is easier to produce and understand, especially for language learners.

C Accumulation of Previous Research Supporting the Existence of Immediate Grammar

C.1 Accumulation of Observations Supporting the Existence of Immediate Grammar

In this book, we present the theoretical framework of "Immediate Grammar," which is supported by multiple practical observations and records made by the author. For example, in the process of translating works like "Ise Monogatari" and "Tosa Nikki," many immediate expressions were found that are difficult to explain using conventional syntactic theories. Additionally, in the aead (An expression a day) project, we have been recording expressions with characteristics of immediate grammar in everyday Japanese, tagging them, and adding annotations to highlight the correspondence between language use and immediate grammar.

These tasks are not based on intuitive claims but are the results of observations accumulated over time. Hundreds of examples have been interpreted and described from the perspective of immediate grammar, providing empirical clues that demonstrate the effectiveness of immediate grammar as a descriptive model.

C.2 The Conventional Concepts of "Spoken Language vs. Written Language" and the Position of PGM

Traditionally, the classification of language styles has relied on a binary opposition or a continuum model between "spoken language (orality)" and "written language (literacy)." For example, Biber (1988) statistically analyzed the syntactic and lexical features of multiple text types and demonstrated that spoken and written styles exist across different media. Thus, the definitions of "spoken = spoken language" and "written = written language" have already been revised, leading to the proposal of more refined style models.

However, even in these models, the criteria for determining spoken vs. written language primarily depend on frequency of occurrence and lexical tendencies, and they do not adequately address the questions of "why that form is used" or "how that form is generated." In particular, pre-prepared language, such as dialogue in fiction or speech scripts, can lead to inconsistencies between media and syntactic modes.

In this regard, the Process Grammar Model (PGM) redefines "spoken language" and "written language" not as attributes based on the medium of use, but as syntactic types based on the processing modes during language generation (immediacy vs. adjustability). That is, expressions generated by Immediate Grammar are spoken-like, while those based on Adjustive Grammar are written-like. This framework allows for the theoretical description of "spokenness" that is not spoken and "writtenness" that is not written.

C.3 The Three Layers: Grammar, Expression, and Effect

To describe language use more precisely, the Process Grammar Model adopts a three-layer structure: "Grammar," "Expression," and "Effect." This structure focuses not on surface features but on the generation process, contextual use, and the interpretive effect on the listener or reader.

- **Grammar**: Immediate Grammar (real-time generation) vs. Adjustive Grammar (generated with

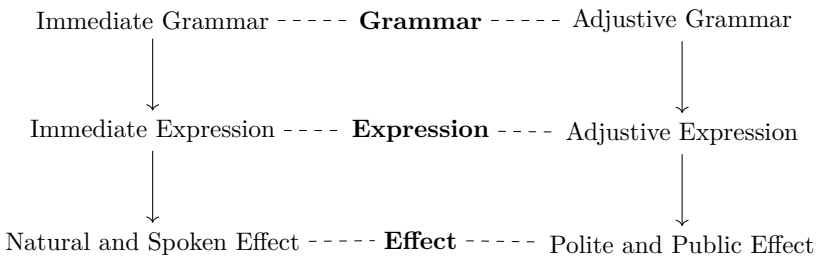

FIG. 6: Three-layer structure in the Process Grammar Model (without intersection)

preparation)

- **Expression**: The actual linguistic form expressed (Immediate vs. Adjustive Expression)
- **Effect**: Depending on the context, expressions evoke either a Natural and Spoken Effect or a Polite and Public Effect

This tripartite structure makes it possible to explain communicative effects even when the grammar and context do not align. For example, Immediate Expressions generated by Immediate Grammar, when used in novels or films, create a vivid and realistic impression (Natural and Spoken Effect). Conversely, Adjustive Expressions, when used in real-time speech such as public addresses, produce a refined and formal impression (Polite and Public Effect).

This cross-contextual usage is termed the "Tasuki-gake Effect," highlighting how immediacy and adjustiveness can be flexibly combined beyond stylistic or media-based constraints.

C.4 Wallace Chafe's Information Structure Model and the Process Grammar Model (PGM)

Chafe (1982) theoretically organized the differences between spoken and written language from the perspectives of "immediacy" and "adjustability," proposing the following four conceptual axes:

- **Idea Units**
  Speech is constructed by the sequential generation of "fragments of thought" as units of meaning, emotion, and rhythm. This forms the basis of the immediacy of spoken language.
- **Integration**
  The degree to which information is compressed and structurally integrated. In written language, integration is enhanced through modification, nominalization, and complex sentence structures.
- **Involvement**
  Indicates how much the speech is constructed based on the speaker's emotions and relationships. The higher the involvement, the more immediate and empathetic the expression becomes.
- **Detachment**
  An abstracted and objective descriptive style. When the narrator's stance moves away from emotional involvement, the language takes on a detached quality, approaching adjustive grammar.

TABLE 4: Comparison of Chafe's Model and PGM. Adapted from Chafe (1982)

Chafe's Concept	Immediate Grammar (IG)	Adjustive Grammar (AG)
Idea Units	Spurt-like chain of speech	Integrated complex sentence structure
Integration	Low (including redundancy in word order and syntax)	High (embedding of modifiers, density of structure)
Involvement	High (emotional expression of the narrator, empathy)	Low (objectivity, depersonalized perspective)
Detachment	Low (specific involvement of the speaker)	High (abstraction, passivation, formality)

This comparison positions the two axes of grammatical use defined by PGM—"immediacy" and "ad-

justability"—within Chafe's four concepts in psychological and discourse dimensions: "Idea Units" (fragmentation of thought), "Integration" (information density), "Involvement" (emotional and interpersonal connections), and "Detachment" (abstraction and depersonalization).

As shown in Table 4, immediate grammar is characterized by fragmented, emotional, and interpersonal language use, with a strong subjective involvement of the speaker. In contrast, adjustive grammar features highly integrated structures and moves toward abstract and objective forms of expression. Chafe's theory plays an important role as an external theory supporting PGM's "continuum model," visualizing the complementary relationship between the two models.

However, Chafe's model also has some limitations. First, his two axes of "integration" and "involvement" place emphasis on psychological and discourse perspectives, which may not sufficiently explain formal constraints in the language structure itself (e.g., word order, particles, structural permissibility of sentences). Second, while his theory of "idea units" is effective in demonstrating the fragmentation of spoken language, it has limited applicability in handling syntactic chains in narrative flow (e.g., anaphora, repetition, and vocative phrases).

In contrast, PGM explicitly describes immediate and adjustive grammar in terms of grammatical forms and generation conditions, providing a framework that adds structural dimensions to Chafe's psychological dimensions. Thus, Chafe's theory serves as an effective reference framework for broadening the descriptive depth of PGM, while PGM can be positioned to complement the structural and grammatical limitations of Chafe's model.

Thus, while Chafe's psychologically grounded model is highly effective in conceptualizing immediacy and adjustability, it remains limited when applied directly to grammatical description. The Process Grammar Model (PGM) inherits this theoretical legacy and extends it by integrating structural and generative dimensions of language.

C.5 Comparison of Halliday's Functional Grammar and Generative Theory, and the Positioning of PGM

C.5.1 Halliday's Basic Attitude Toward Spoken and Written Language and the Necessity of SFL

Halliday (Halliday and Hasan (1994)) views language not merely as a tool for communication but as a "social resource for creating meaning." From this perspective, he particularly focuses on the differences between spoken language and written language, placing the functional distinctions of each at the center of linguistic theory.

Halliday considers spoken language to be a linguistic activity rich in immediacy and involvement, characterized by contextual dependency, rhythm, and improvisation. In contrast, written language possesses a highly integrated structure, allowing for abstract and generalized expressions of meaning.

This functional distinction between spoken and written language led Halliday to develop Systemic Functional Linguistics (SFL). In SFL, language is not merely a collection of syntactic units but is viewed as a process that simultaneously fulfills three meta-functions: ideational (representing ideas), interpersonal (interacting with others), and textual (organizing text).

In particular, Halliday characterizes written language as "grammatically intricate" and spoken language as "lexically dense but structurally simple," theorizing the differences in meaning functions that cannot be captured by traditional syntax-centered models. This serves as the starting point for his development of Systemic Functional Linguistics (SFL), providing a foundation for describing the choices of language that are contextually relevant to social situations.

C.5.2 Differences in the Purpose of Theoretical Construction

Halliday's Systemic Functional Linguistics (SFL) and Chomsky's Generative Theory (Chomsky (1965)) fundamentally differ in their basic understanding of language and the purpose of theoretical construction. Generative theory views language as an innate ability of humans, aiming to mathematically clarify its internal structure and syntactic rules. In this framework, an idealized speaker-listener is assumed, and sentences are primarily analyzed based on syntactic units such as NP (noun phrase) and VP (verb phrase). The focus is on constructing a universal grammar (UG) based on principles of economy and

minimalism. In contrast, Halliday's functional grammar views language as a resource for social action, aiming to clarify the meaning functions of language used in actual contexts. Here, the focus is not on an ideal speaker but on real writers and speakers, with clauses (not phrases) being the central unit of analysis. It is rooted in the actual use of meaning, emphasizing functional validity in context rather than syntactic correctness.

Thus, Chomsky focuses on the "internal structure" of grammar, while Halliday emphasizes the "social function" of grammar, with each theory attempting to address different questions. Each theory addresses different dimensions of linguistic questions and holds its own significance. Generative theory provides deep insights into the universal structure of language ability and its mathematical description, contributing significantly to the formal refinement of grammatical theory. On the other hand, SFL reflects the diversity of language use in social contexts and offers an important theoretical foundation in practical fields such as education, language acquisition, and media studies by viewing grammar as a means of meaning generation.

C.5.3 Halliday's Strengths and Differences from Generative Theory

Halliday's functional grammar possesses several strengths that differ from generative theory. First, Halliday approaches language from the perspective of use, making everyday grammatical usage—such as imperatives, desideratives, and evaluative expressions—the starting point of his theory. Second, he describes the structure of sentences not in terms of syntactic frameworks like subjects and predicates but in terms of semantic units such as actions, participants, and situations. Third, he assumes that language use always occurs within a social context, treating it as inseparable from social conditions such as style (register) and genre. Fourth, he emphasizes that a single sentence can simultaneously realize three meta-functions: ideational (representing ideas), interpersonal (interacting with others), and textual (organizing text). This layered structure is what makes SFL theoretically distinctive and demonstrates the integration of multifunctionality that has not been adequately addressed by other grammatical theories.

Critiques from the generative side have been directed at SFL (Newmeyer 1998; Pullum 2010). First, the system of rules in SFL lacks formally rigorous grammatical generation rules, which is criticized as a "lack of formal definition." Second, while the relationship between syntax and meaning in SFL is close, it is seen as incompatible with the generative principle of "distinguishing syntax from semantics," leading to perceptions of ambiguity. Third, SFL's structural descriptions are considered insufficient in terms of mathematical consistency and reproducibility, making it difficult to model them as formal grammars.

This way, the flexible and meaning-oriented framework of SFL and the clarity and formal rigor sought by generative theory are both important for elucidating linguistic facts, and it is believed that an integrated framework should leverage these strengths.

C.5.4 PGM's Contribution to the Description of Social Functions in Grammar

The Process Grammar Model (PGM) functions as a supplementary framework that retains the social function perspective emphasized by SFL while making it more explicitly connected to grammatical structures. In particular, PGM focuses on the "conditions of use" under which linguistic expressions emerge, paying attention to whether speech is generated immediately or based on pre-adjusted syntax. This axis of "immediacy/adjustability" is deeply connected to Halliday's interpersonal and textual functions, allowing for the description of the factors behind syntactic choices in actual language use.

Additionally, the concept of the "Effect Layer" introduced by PGM serves as an effective means to describe not only how syntactic forms carry meaning but also what pragmatic effects they produce (e.g., familiarity, respect, emphasis, immediacy). While this partially overlaps with Halliday's interpersonal function of grammar, PGM treats these effects as dynamically arising within the process of speech generation, providing an extended supplement to functional grammar.

Thus, PGM has the potential to reconceptualize the correspondence between syntax and function not as a static system but as a variable and selective phenomenon within the process of generation, thereby connecting the network of social meanings depicted by SFL to a more actionable level of grammatical description.

D Grammar and Performance: The Structure of Narration and Immediate Grammar

In traditional linguistics, the perspective that the "performance effect" of narration is directly supported by grammatical structure has not been systematically addressed. Generative grammar has focused on meaning and structure, while pragmatics has concentrated on the speaker's intention. However, there has been only partial mention of how the choice of syntax in narration can generate immediate performance effects (surprise, reveal, buildup).

In the Process Grammar Model (PGM), grammar is not merely a framework for meaning construction but functions as a "structure of performance" that allows the narrator to control the listener's attention, emotions, and predictions. In particular, in immediate grammar, when the narrator presents information in the order they think of it on the spot, structures such as subject delay, preposing of locative phrases, and insertion of action phrases often occur. These structures have a performative effect of "setting the stage → drum-roll → focus disclosure" in cognitive processing, and the syntax itself supports that effect.

For example, the narration "From the mountains, here come the sheep!" follows the order "locative → verb phrase → subject," structurally matching English Locative Inversion (From the box came a bird.). However, this word order is part of an immediately generated narrative flow and is not an effect of immediate use of adjusted expressions; it is an intrinsic syntax of immediate grammar.

In such examples, the performance does not depend on grammar; rather, grammar itself becomes the framework that enables the performance. Therefore, in PGM, the relationship between "grammar and performance" needs to clarify that the motivation for syntactic choice lies not only in "meaning" but also in "effect."

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