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昨年、この巻頭の辞で生成 AI の広範な利用を予測しました。あれから 1 年が経過し、もはや生成 AI は日常生活に溶け込み、身近にあることが当然になっているようです。機械学習の速度と効率性は飛躍的に進歩し、自然な言語表現のやりとりが可能になっているのみならず、生成 AI と人間が疑似恋愛に発展する事象さえ報道されるようになっていきます。もはや言語は人間と人間の意思疎通のためだけでなく、人間と人工知能の交流にも機能しているようです。これまでも文字、電話、録音機器、インターネットといった発明と技術の発展はコミュニケーションのあり方を変化させてきましたが、今後は人工知能が言語と人間の間を左右する主役となっていくのかもしれませんが。

さて、上記のように言語を取り巻く社会的な変動がさまざま起こる中、日本機能言語学会では 2024 年の秋期大会を対面とオンラインを併用したハイブリッド形式にて開催しました。その研究発表の成果をこうして発行できますことは、学会を代表する者として大きな喜びであります。ここに、会員諸氏の研究活動と学会活動へのご尽力にあらためて感謝を表します。

今回発行されました **Proceedings of JASFL Vol. 19 2025** は、昨年 10 月 12 日から 13 日まで杏林大学井の頭キャンパスで行われた日本機能言語学会第 32 回秋期大会の研究発表内容を論文に改定した論文集です。昨年は研究発表に加えて、慶應義塾大学教授の井上逸兵氏をお招きし、「現代社会のコミュニケーションと機能言語学」という演題で、特別講演をいただきました。井上先生の機智に富むお話では、現代は字義通りに解釈を行い、言語外のコンテキストが左右する意味を理解しない人が増えて、その結果意思疎通に支障が生じていることが報告されました。そして社会言語学や機能言語学を学ぶ者が言語使用の実践者として、このような事象に対して言語学から得られる知見を社会に還元するべきであるとのご提言がなされました。

さて、本論文集には、4 編の論文が収録されています。生成 AI によって作成されたアカデミックライティングを分析したもの、小学校教育における英文法の説明に SFL を応用するよう提言するもの、科学論文のテキスト形成的メタ機能に焦点を当てるもの、そして、談話における休止について SFL の観点から機能的モデルを提唱するものと、いずれも力作です。

様々な社会変化の中でも研究活動の歩みを止めず、言語機能の探求が記された **Proceedings of JASFL Vol. 19 2025** が会員諸氏にとって今後の SFL 研究の一助になれば、本学会を代表する者として、これに勝る喜びはありません。

日本機能言語学会会長
佐々木 真

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Towards a Systemic Modelling of Pauses

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Abstract

In psycholinguistics, pauses in spontaneous speech are generally treated as disfluencies indicating that cognitive processing is underway (Butterworth, 1975; Goldman-Eisler, 1961). Overly long pauses may be interpreted as signs of linguistic incompetence (by language learners) (Götz, 1996; Willian, 2020) or even cognitive decline (Gayraud, Lee, & Barkat-Defradas, 2010). In contrast, systemic functional linguistic (SFL) studies have shown that pauses are an important part of fluent speech that reflect the speaker's emotions and attitude or contribute to the organization of the message in various ways (Egins and Slade, 2004; Halliday, 1975). While meaningful pausing in discourse has been recognised as an integral part of speech (Hawkins, 1971; Maclay and Osgood, 1959; Mukherjee, 2001), there is not yet any model of the range of discourse functions that may be fulfilled by pauses. Drawing on some of the literature that has discussed pauses (Jaworski, 1993; Kosmala, 2019; Swerts, 1998) in relation to an analysis of two video texts (Campenaerts, 2023; 2024), this paper proposes a preliminary framework based on SFL accounts of the organization of meaning in language for modelling pauses as a resource in spoken discourse (Halliday and Hasan, 1976; Halliday and Matthiessen, 2014) and multimodal accounts which consider the semiotic contributions of other modalities (Kress, 2010). It argues that pauses fulfill a variety of functions including the speech chunking for comprehension, a shift to emphasize other modalities such as gesture, facial expression, or features of the context, as well as creating emotional or interpersonal meanings.

1. Introduction

The word “pause” in English implies an interruption of some kind and when applied to speech means that the speaker has temporarily stopped speaking. The Oxford Dictionary of English gives the example “she paused, at a loss for words” (ODE, 2025). This example implies that a pause in the flow of words halts the semantic flow of information. However, just as images use space to highlight form, and momentary stops or silences in music create rhythm, pauses in speech are an integral resource for meaning making. Indeed, “being at a loss for words” itself may imply an emotional state such as shock or surprise or be indicative of thoughts that the speaker does not want to express publicly such as a response to an implied insult. The interpretation of pauses and, more generally, silence are also notoriously culturally relative (Silber-Varod et al. 2023). This paper takes the perspective that pauses have meaning which, while easily overlooked, is worth understanding and exploring.

2. Exploring pauses and meaning

The idea that pauses are meaningful may be counter intuitive as, in fields such as language teaching and psycholinguistics, pauses are used as indicators of a lack of fluency or a sign that cognitive activity may have disrupted the flow of speech. In language teaching, both frequency and length of pauses are used in monitoring fluency with more and longer pauses designated as indicators of disfluency (Kahng, 2018; Tavakoli and Wright, 2020). Indeed, relying on such measurable and countable features as pauses is considered as both an objective way to measure spoken fluency and, together with measuring the rate of word production, a way of enabling AI systems to evaluate how fluent a speaker is (Handley & Wang, 2024). A speaker who can speak without pauses or repetition on a given topic for one or two minutes, producing many words, is likely to be considered skilled and fluent (as the contestants on the BBC Radio Four program *Just a Minute* demonstrate (BBC, 2025)). Tests of spoken English such as IELTS include similar monologue challenges. However, such tasks are unnatural, and pauses are an important part of normal fluent speech (Bóna, 2016; Bosker et al. 2012; McCarthy, 2010 pp.3-4).

2.1 Psycholinguistics and pauses

Psycholinguistics considers pauses as indicators of cognitive load to better understand the cognitive processes of speech production. For example, psycholinguists have observed that extended stretches of uninterrupted narrative are often immediately preceded by hesitations that appear to enable planning of the speech that follows (Butterworth, 1975). This focus on examining pauses has led psycholinguists to come up with some guidelines on evaluating the relationship between pauses and cognitive load (Warren, 2013, pp. 17-23). Four important categories are considered: (1) articulatory pauses; (2) delimitative pauses; (3) physiological pauses; and (4) filled pauses. First, articulatory pauses are short pauses in the flow of speech that constitute the sounds of a language. For example, a plosive stopping of air by the lips during enunciation of the letter “p” in the word “space”. The visual representation of sound on spectrograms shows a pause (represented by a flat line) in the wave pattern during a plosive. Like articulatory pauses, delimitative pauses are also considered integral to language but for the purpose of lexico-grammatical or discourse organisation. The existence of this category is an acknowledgement that pauses are potentially meaningful. The third category of pauses is physiological ones such as those needed for breathing. However, the pauses needed for normal breathing are usually coordinated to coincide with delimitative pauses. Finally, filled pauses refers to the use of expressions, such as “uh,” “um,” “well,” or even “let me see,” which are not pauses but mark cognitive activity. In practice fillers are followed by actual pauses, the length of which may be indicated by the choice of filler (Clark & Fox Tree, 2002). Fillers also have pragmatic discourse purposes such as to hold or pass a turn as well as other meanings (Beeching, 2016; Schiffrin, 1987; Swerts, 1998).

Pause meaning is dependent on context, so the literature on pauses is intertwined with many aspects of language and communication from discourse to gesture studies.

2.2 Discourse accounts of pauses

Discourse accounts that mention pauses can be found in Multimodality, Conversation

Analysis, and Gesture Studies but they are of particular interest to those concerned with public speaking. Some researchers have undertaken studies of novice presenters highlighting a need for reducing both filled pauses and pauses attributed to nervousness or lack of preparation and overall fluency (Mancuso & Miltenberger, 2016). This negative treatment of pauses and pause-fillers contrasts with observations of the pragmatic effectiveness of pause usage in polylogues (Sokoreva & Shevchenko, 2022). Tracy (2015) proposed that pauses in monologues can, conversely, convey confidence and manipulate audience attention. He provided two examples: one is what he calls the “dramatic pause” which consists of either deliberately stopping so that as he puts it: the audience “mentally trip and fall into the silence you have created” and creating a pause before and after important points to frame them and enable time for absorption. This strategy has parallels with what Reynolds (2019 pp.161-2) recommends for visuals: using white space, to create expectation, highlight the information, and allow the message to breathe.

Other literature that has dealt with pauses includes the delimitative pauses of tone unit boundaries. Models of intonation in SFL include pauses as a structural feature of intonation units playing a role similar to punctuation but chunking speech in a way more suited to the ongoing stream of speech than the structure of writing (Brazil, 1997; Halliday, 1967; Halliday & Greaves, 2008; Kadooka, 2024; O’Grady, 2017). Unfortunately, none of these models consider any meaning potential for pauses themselves, beyond this chunking function.

There are also several studies that focus on the pragmatic functions of discourse markers used within filled pauses (see Swerts, 1998; Kosmala, 2019). Such studies highlight the covering of pauses to hold a speaking turn and buy time for consideration, but also for organizing narrative or larger stretches of discourse. Models of spoken discourse (Sinclair & Coulthard, 1992) and conversation analysis (Eggins & Slade, 2004) highlight the role pauses in turn-taking within multi-party talk, and contributions to the emotional expression. Conversation analysis transcriptions record pause-length in seconds, making them integral to the analysis (Jefferson, 2004).

Sociolinguistic accounts of pause patterns across cultures have shown that the length of time that constitutes an acceptable pause, for example, preceding a turn change is not fixed (Sidnell, 2001; Tannen & Saville-Troike, 1984). Nevertheless, while variability in timing and pause length may lead to miscommunication across cultures the tendency to manage pauses to avoid overlap and extended periods of silence seems widespread (Stivers et al. 2009). It has also been proposed that individual variations in pause length may be explained using allometry (Gildens & Mezaraups, 2022). Conversely silence may take on overlapping cultural associations in disparate contexts such as “Finnish quietude” or “Japanese tranquillity” (Pekova, 2015). Silence may also have specific cultural roles such as faculty meetings in my university where the meaning of silence as closure is used to mean consent in place of a show of hands, clapping, or saying “ay” as may be done elsewhere.

Another field where pauses have been an integral focus is multimodal accounts of speech, particularly those that include an account of gesture (e.g. Knight, 2012; Zappavigna et al, 2010). Unlike conversational analysis which may include paralinguistic features as contextual information in its description, multimodality

extends Halliday's notion of language modes (written/oral) to treat gesture or other paralinguistic features as separate semiotic modes that complement the verbal channel in various ways. Although gestures typically accompany speech, pauses enable an emphatic focus on the gesture itself (Beattie & Aboudan, 1994).

Finally, there are some studies such as van Leeuwen's (2012; 2022) work on rhythm in speech, which underline the importance of patterns of sound and silence. According to van Leeuwen, the rhythms of language and music grow out of the rhythmical nature of our body's fundamental patterns of breathing heart rates and so forth. For this reason, just as the patterns of pauses shape slower and faster tempos creating calmness or excitement, and irregularities in rhythm evoke interest, pauses take on contextual meanings. Sudden inhaling of breath may be due to the body needing increased oxygen during exercise or an expression of shock.

While the exploration of pauses in speech is diverse, spanning a range of disciplines, a Hallidean Systemic Functional approach offers a broad framework suitable for describing pauses. In particular, the three metafunctions: *textual*, *interpersonal*, and *ideational* refer to three dimensions of communication that enable the classification of the meaningful use of pauses in communication. Although the metafunctions were developed through Halliday's analysis of functional grammar (Halliday & Matthiessen, 2014), they have proved equally productive for describing the non-verbal semiotics in multimodal analysis (Kress, 2010). Textual meaning refers to the semiotics of structure. We would therefore hope to include the use of pauses to organise discourse within the *textual metafunction*. *Interpersonal* meaning is the use of language to shape relationships with others and the world around us. It is therefore concerned with the expression of emotion and evaluation. *Ideational* is concerned with describing or reflecting the world in some way. These three metafunctions provide resources for functional analysis of texts so the development of a model must also begin with texts.

3. Texts used for analysis

This section describes the texts used for formulating the analytical model. Two video texts were analysed which featured the Belgian professional cyclist, Victor Campenaerts. The first is a post-race interview after winning a stage of the 2024 Tour de France. The video is the footage from the Eurosport channel that was broadcast live to viewers of the race within a few minutes of his crossing the finish line. The win was his greatest career achievement and, coming at the late age of 32, a highly emotional one. The second video was a video from Campenaerts' YouTube channel in which he explained how to clean a bicycle and lubricate a bicycle chain using wax (an alternative to bicycle oil). The video was shot at Campenaerts' home by a friend whose voice can also be heard on the video. The reason for using the first video is that the pauses in the speech seem to be highly emotional and charged with interpersonal meaning. In contrast, the second video is a multimodal text in which the various actions Campenaerts performs while cleaning the bike demonstrate his specific technique for bike washing. Pauses in speech are therefore a way of highlighting his actions.

Below is an extract from the first text. This was Campenaert's initial response to the interviewer, where he explained his reaction and the background to his win. Pauses are marked with slash marks (/=short pause, //= longer pause).

Extract 1

1 VC: Yeah// uh // // right // as a real professional /you have to/ride the Tour de
France/finish the Tour de France //and // winning // winning a stage in/the Tour de
France is // is // everybody's dream //And // uh/ I'm not a //I'm not a neo-pro / I've
been//dreaming about this/for //for a very long time // hu // After the classics //
5 opening classic // Flanders classic // I had a very difficult time // Um //I had a verbal
agreement with the team / about extending the contract //and uh // I got ignored for
/ a long time /and uh // it was very difficult // I was on a long altitude camp//but my
girlfriend was there //she supported me // every // every day// highly pregnant //And
I was struggling to finish my training schedules[most days?] // but //phew //I
10 changed my mind //I talk to // I have a bright future now /in // still in cycling// I
became a father and was like //[gesture1] blue skies // [gesture1] only blue skies // I
started to feel very good on the bike //and coming to this Tour de France with a super
motivated team// we have a super good atmosphere in the team // um // and / uh //
this is just the //you know // [gesture2]the summit // of // of this atmosphere in
15 the team //And uh // we gonna // we're going to celebrate / tonight. // // //

Many of the pauses are emotional, as he holds back tears. The story he tells is an emotional one too. He explained how distress at lack of success after years as a professional with few wins, suffering at a training camp at altitude were transformed by his girlfriend's faith in him and the birth of his son which caused him to shift to a more positive mindset, leading to his greatest victory as a professional. The shift in his narrative was expressed by "blue skies," representing his shift to a positive mindset, emphasized through emphatic pauses, before and after, exactly as Tracy (2015) recommended in his video on public speaking. The expression and sweeping gesture that he used to accompany "blue skies" was repeated, followed by a second emphatic gesture around the word "summit" also surrounded by pauses (see Figure 1 and 2).



Figure 1: "blue skies" gesture



Figure 2: "the summit" gesture



Text 2 is a "showing and telling" video where Campenaerts explains how he cleans his bike. Figure 3 shows a selective montage of screenshots from the video. The location shifts between his bike which is on a stand in his garden and his kitchen where

he puts his chain into the wax and fills a bucket with soapy water to clean the bike. The video appears on Campenaerts' YouTube channel (Campenaerts, 2023). Whereas the Eurosport video interview was primarily verbal, in this video there was an interplay between the physical visual demonstration of cleaning the bike and the verbal explanation. The relationship between these two communicative modes was carefully coordinated with pauses in the speech used to highlight actions and pauses in the action also used to focus on the verbal explanation. These different kinds of text provided a range of pause types that served as a basis for developing the model.



Figure 3: screenshots from the video illustrating the process of chain waxing

4. Pauses as textual resources

The use of pauses to segment and organise talk is a recurring theme throughout the literature. Pauses are markers of tone units, transition points in narratives, and turn passes in dialogue or multi-party talk. Pauses are also an effective means for emphasis, creating space to highlight specific verbal expressions, display physical emotion or otherwise shift attention to other modalities. Pauses as textual resources can therefore be divided into three categories of *Emphatic*, *Deictic*, and *Structural* pauses.

4.1 Emphatic pauses

Emphatic pauses are those used to highlight specific parts of ongoing talk. They draw attention to what is most important. It is a strategy recommended for public speaking as discussed above in relation to Tracy (2015) but is also prevalent in natural talk. Emphatic pauses also cooccur with repetition which is another strategy used for emphasis. Hence, near the beginning of the interview (Extract 1 line 3) the utterance “I’m not a neo-pro” (meaning not a young rider) is spoken as “And//uh/ I’m not a/I’m not a neo-pro...” In this case, the pause after “and” and filled pause “uh” create an emphatic space for what follows. Moreover, “I’m not a” is repeated further preparing the listener to focus on the word “neo-pro” which follows. This emphasis is significant because what follows is effectively an elaboration of this point as his narrative highlights the significance of this win at a difficult late stage in his career. Hence, considered as textual resources, it makes sense to classify these pauses as *emphatic*

highlights in a prefacing position (i.e. “*pre*”) where *pre* and *post* (pauses after) would represent separate sub-categories. The first mention of “blue skies” at line 11 is sandwiched between *pre* and *post* pauses for emphasis and “tonight” at line 15 has a *post* pause, though this is also extended to create a turn pass. In addition to the use of emphatic pauses to highlight significant words, these empathic pauses can also be used to separate quoted material. Although there were no examples in the two texts used for preparing the model, elsewhere I found speakers who quote other speakers use similar kinds of pauses constituting a separate sub-category of *emphatics*. Quotations cooccur with other distinctive features such as changes in pitch, voicing or even mimicry of the spoken phrase being quoted.

4.2 Deictic pauses

A deictic is a textual resource that is dependent on context for its understanding. Hence the pronoun “this” points to something in the verbal, physical, or conceptual context. Deixis may be accompanied by gestures to identify what “this” refers to or indicate a shift in the modality. So, when a speaker says “like this” it may be followed by a physical demonstration. A deliberate pause following a deictic phrase such as “like this” makes space for the embodied illustration. Such pauses may also point to ongoing action in the context outside of the speaker’s control (such as at a sporting event). Such pauses are different from *emphatic pauses* and classified as *deictic pauses* because they implicitly shift the focus from the verbal to something in the context. Moreover, it seems reasonable to subdivide *deictic pauses* into those which shift modality and those which point to something in the context. Hence, when showing how to wash the bike Campenaerts said, “ first/ I do like this//(*cleans top of the tire with sponge*) //then I do like this// //(*cleans side of the tire and wheel with sponge*)//”. The parenthetical phrases in italics indicate the speaker’s action used during the pause and are part of the speaker’s multimodal message. Such pauses are classified as *deictic-modality shift*. On the other hand, when he pauses after “I have this wax pot standing here” the cameraman obediently focused the camera on the pot as the listener is intended to do. Such pauses only draw attention to something in the context and so are classified as *deictic-contextual*. Similarly, when the cameraman says “this is Victor’s car” even though he also points the camera at the car himself, this would still be classified as *deictic-contextual*. This case is arguably a marginal one as the camera is being controlled and one could imagine a case where a video recording is being stopped and started by the speaker as substitute for a demonstration that one might prefer to classify as *deictic-modality shift* if there appeared to be a high degree of control over what was being shown. A third category of deictics is needed for contextual interpersonal pauses that are not as explicit as demonstrations or demonstrative gestures but highlight more subtle features of body language such as facial expressions (a smile or a wink) where the modality shift is to an implicit gesture. This category of pauses constitutes a third sub-category of deictic pauses: *deictic-interpersonal*. To summarize, deictic pauses are sub-divided into three types depending on what the pause is used for. If it is to highlight a facial expression such as a wink or some other interpersonal subtlety it is *deictic-interpersonal*, pauses for more explicit demonstrative actions that contribute to the ongoing discourse are *deictic-modality shift*, and pauses to indicate context outside the speaker’s direct

control are *deictic-contextual*.

4.3 Structural pauses

In addition to using pauses for emphasis (*emphatic pauses*) or to highlight something in the context or shift to another modality (*deictic pauses*), pauses are also used to segment talk within a monologue or mark the point for a turn pass in dialogic or multi-party talk. As mentioned in Section 2.2, such pauses have been extensively described in spoken discourse accounts such as those in conversation analysis (e.g. Sacks, 1995).

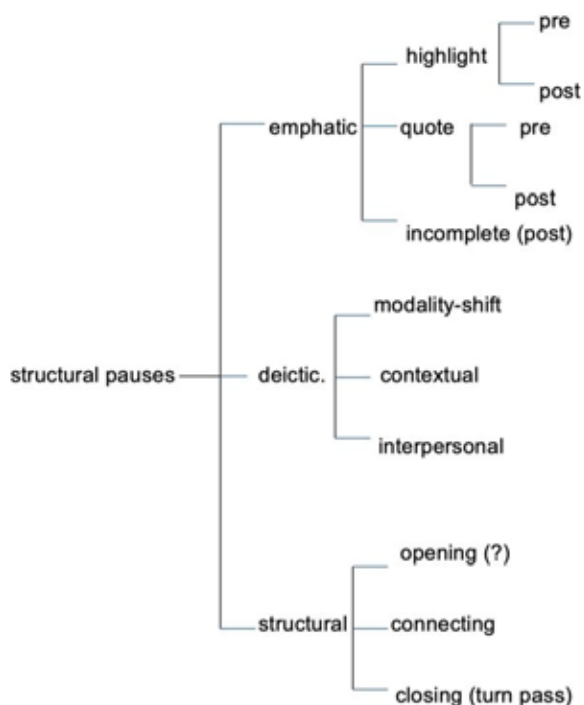


Figure 4: A framework for pauses as textual resources

Since the most prevalent use of pauses as structural markers is to divide topics it would seem logical to have subdivisions of *opening*, *connecting*, and *closing*. In practice, pauses or filled pauses followed by a pause are common markers of topic shift during monologues and pauses at the end of a speaking turn are used (or taken up as) turn passes. The case for opening pauses is not as clear since speakers typically speak into silence. However, an initial pause may both signal preparation time as psycholinguists have observed or prepare the listener to focus on what will be said. In line one of Extract 1, the speaker begins with “Yeah” as an endorsement of the interviewer’s comment (that he must be pleased with a long-awaited victory) then pauses before elaborating. Nevertheless, this might equally be classified as a *connecting* pause as it joins his initial response to the elaboration. It is similar to the extended pause at line 13 where he shifts from the main narrative of events leading to his victory to the evaluation of his experience and the victory: “// um // and / uh /?”. As will be discussed

below, the length of this pause also reflects emotional content but as a textual resource it provides a structural indication of the shift from one topic to the next. Finally, at the end of the turn (Line 15 in Extract 1) there is a pause after his final word to mark a turn pass, showing that he has completed his response to the interviewer's question. The overall framework for textual resources is summarized in Figure 4.

5. Pauses as interpersonal resources

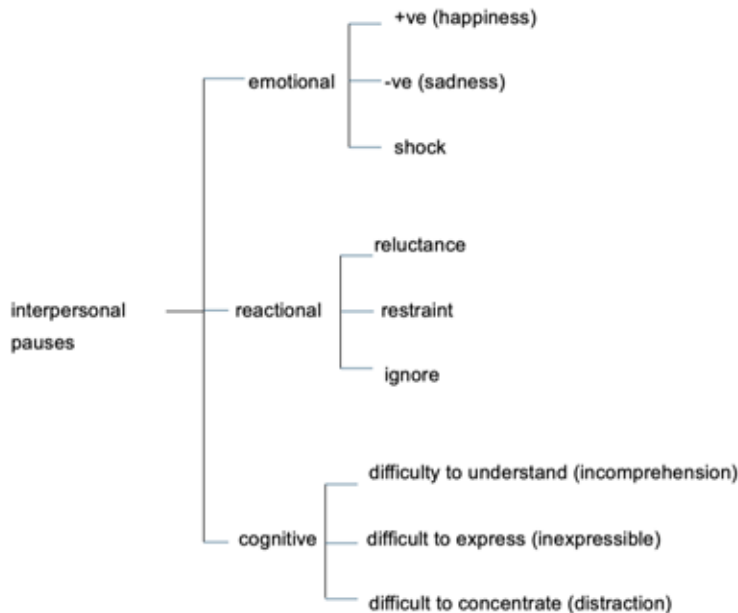


Figure 5: A framework for pauses as interpersonal resources

In addition to serving as markers to organise texts as introduced above, pauses may also be considered as interpersonal resources. Pauses in talk can be used to reveal emotions or convey a range of attitudinal responses. One thing that was particularly striking about the interview with the cyclist after his late career win was the high level of emotion that shaped the tone of his voice but also his pauses. One commonly associated emotion with a pause would be “shock”—being at a loss for words. Nevertheless, both overwhelming sadness and happiness can also lead to a kind of choking which fragments the speech conveying the emotional state albeit spontaneously and perhaps even involuntarily. Still, such emotions are an important part of interpersonal communication. At lines 3-4 in Extract 1, “dreaming about this/for a very long time//hu//” ends with an emotional interruption that shows his emotion as it appears he is trying to hold back his tears of joy. Given his overall emotional state during the interview, one might expect that from an interpersonal perspective this emotion may account for all interpersonal pauses. Yet, there are other kinds of pauses that convey *reactional* and *cognitive* meanings.

A *reactional pause* is illustrated by his response to the interviewer's comment on his partner's role in supporting his win “This is a victory for you wife.” While the

interviewer's comment was intended to echo the rider's narrative of the importance of the win, he makes a mistaken assumption in referring to his "wife" which the rider corrects but only after leaving a pause to show (out of politeness) that he is hesitant to make the correction: "// // the is // is my girlfriend/ is not my wife//yet." Here, the pause shows restraint in making the correction, just as adding "yet" at the end helps to soften the correction, implying that it is not an unreasonable assumption. Reactional pauses are those used to indicate *reluctance* to say something that the speaker may not want to reveal (such as admitting to a misdeed or something embarrassing). Such pauses imply self-preservation rather than consideration of the face of other and so have the separate sub-category of *reluctance*. A third variety of *reactional pause* is pauses that precede an utterance that does not engage with what the previous speaker said and instead moves to a new topic or continue without acknowledging what has been said by the previous speaker. Such pauses signal that what has been said is being ignored (hence classified as *ignore*). Using a pause to ignore an utterance might be a pragmatically inflammatory strategy but could also be used to pass off an insult.

Cognitive pause refers to the use of pauses to convey perceived problems with the communication channel itself. These difficulties may be subdivided into difficulties of understanding (*incomprehension*), difficulties with finding an appropriate expression (*inexpressible*), and signaling that the participant is distracted (*distraction*) such as by something happening in the context or something internal such as bodily strain, or a shift in mental focus away from the ongoing talk. During the interview the Eurosport reporter follows up the previously quoted idea of the win celebrating the efforts of his partner with "it's also a victory of//experience" this metaphorical use of personification seems to have temporarily confused the interviewee who responded: "Um// //" using a filled pause expression and a pause that prompted the interviewer to rephrase as "You had to be the smartest out there//". This paraphrase served as an effective repair that was then acknowledged and responded to confirming that the pause had implied *incomprehension* rather than problems with finding a suitable response (*inexpressible*) or *distraction*. Interpersonal pauses can thus be summarized as shown in Figure 5.

6. Ideational resources

Because pause are the gaps in communication that make space for contextual and other meanings, considering pauses as ideational resources may appear a tenuous undertaking. Many texts, including the ones considered here include few examples of pauses that are readily interpretable in terms of ideational meaning. Nevertheless, Figure 6 offers a tentative outline of a framework that could be used to describe the meaning of pauses as referencing some phenomena in accordance with the Hallidayan *ideational metafunction* (see Halliday & Matthiessen, 2014). First, literally a pause could be used to represent *silence* for example in a narrative that included a silence as a feature of the story (such as a class of students confounded by an open question to the class). Similarly, pauses can be used to signify something metaphorically associated with silence such as space, emptiness, or nothingness. In addition, since pauses can be used interpersonally to express shock or other emotions, pauses could likewise be used to represent such emotions when reporting on displays of these emotions in narratives. Similarly, but instead piggybacking on the notion of

pauses as the space in which non-verbal modalities take over the message as described in the discussion of *textual* resources, pauses could be treated as creating the space for non-verbal meanings. The verbal pause that is filled with a facial expression, would therefore be treated for analytical purposes as synonymous with the meaning attributed to the smile, or wink, for example. Following the principles used for the systemic modelling of textual resources *ideational multimodal resources* could therefore be split into three broad categories of *gesture*, *facial expression*, and *contextual meanings*. Further data and analysis using a range of texts would be needed to confirm this model but doing so would also enable extension of the model to further degrees of delicacy, albeit likely overlapping considerably with multimodal analysis of gesture and the non-verbal resources of spoken interaction. Figure 6 summarises this provisional sketch of pauses as an ideational resource.

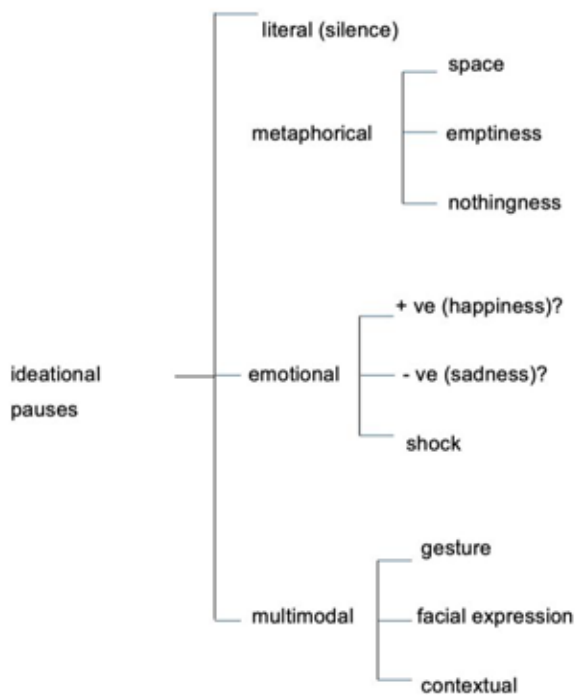


Figure 6: A framework for pauses as ideational resources

7. Conclusion

This paper has proposed that pauses in talk are not simply gaps in the communicative message caused by the need for cognitive processing or the physiological needs such as breathing but an integral part of the communicative resources of spoken discourse. Just as architects or painters use space as a meaningful resource or musicians create rhythm by breaking up sound with spaces between notes, so speakers use pauses in speech as a meaningful resource. Here textual resources were considered first as pauses most obviously play a role in the segmentation and organisation of talk. While this role has previously been implicit in conversation analysis and other approaches

to describing spoken discourse, focusing on modelling pauses here has helped elucidate the scope of these meanings. While the focus of spoken discourse models such as the Sinclair-Coulthard (1992) model includes the pauses used to enable turn-taking (*structural-structural*), those classified as *emphatic* or *deictic* have been mainly explored in the separate fields of public speaking and gesture studies respectively, even though all are concerned with structural features of talk. Similarly, while the starting point of interpersonal resources here was the expression of emotion through pauses, the examples used to illustrate the model show how pauses may be used for a broad range of evaluative meanings. Finally, the description of ideational meanings here has been left short and somewhat vague due to a dearth of examples in the texts used to formulate the model. The meaning potential of pauses as ideational resources seems the least obvious and most slippery to define. Nevertheless, as a starting point, I have tried to indicate how an ideational framework for pauses in conjunction with the proposed frameworks for textual and interpersonal resources might be developed given sufficient time and resources. As I mentioned in the introduction, one of the motivations for undertaking this study was the limited classification of pauses within psycholinguistics. While I would like to think that the approach here might provide a more nuanced understanding of pauses than the four categories discussed by Warren (2013), it may also somewhat complicate things. Like opening the proverbial “can of worms” or “Pandora’s box”, once you recognise pauses as a meaningful resource, it may become almost impossible to distinguish a meaningful pause from one indicating cognitive load. Currently pauses, whether in social media flows or televised interviews with presidential candidates, are potentially evaluated negatively, so it is important that systemic functional linguists have suitable frameworks for describing them. The model outlined here is intended as a step towards such a framework.

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児童に分かりやすい英語の問かけとは： SFL の枠組みで文法特徴を記述する

“Simple” English Questions for Elementary School Pupils: Describe the Grammatical Features in Systemic Functional Linguistics

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Abstract

When reading aloud English picture books in elementary school English classes, it is crucial for teachers to ask pupils “simple” questions about the story to bring out their English comments and develop their communicative skills. Characteristic features of such “simple” utterances are indicated in several research on CDS (Child-Directed Speech), including Ward (2004: 39) pointing out “use short simple sentences, which are very tuneful,” and “use lots of repetition.” These descriptions, however, contain very few grammatical descriptions.

This paper restates the features in the schematic framework of Systemic Functional Linguistics (hereafter SFL) by analyzing grammatical selections frequently made when trying to speak simply to children. Listed below are some examples:

- Experientially, more delicate options are selected in the systems of PROCESS TYPE and THING TYPE
- Interpersonally, yes/no interrogative, not wh- interrogative, is selected in MOOD: INTERROGATIVE TYPE system
- Textually, many elements are elided to make questions shorter except for the prominent element(s) which correspond to the supposed answer which is elided with ELLIPSIS: elemental.

Describing specific grammatical resources help teachers to produce “simple” questions using those resources, to promote interaction during picture book read-aloud, and to ultimately improve the quality of elementary English education.

1. はじめに

小学校における英語絵本読み聞かせでは、教師が、本文朗読の合間に児童の英語発話を引き出すような問かけを挟むことが重要である。この点に関し早川（2022）は、教師が「何を問かければよいか」を知るヒントとなる

よう、選択体系機能理論 (Systemic Functional Linguistics; 以下 SFL) の各メタ機能に関わる談話のパターンを絵本本文中に見つけ、その続きを児童に問うことを提案した。続く早川 (2024) では、その問いかけの英語が難しすぎて児童に理解されない場合、よりやさしく問い直す方策を、Child-Directed Speech (大人や年長者が子どもに語りかける話し方; 以下 CDS) を参考に提案した。本発表は一連の研究の続きにあたり、「児童に分かりやすい」問いかけとは具体的にどのようなものかを、SFL の文法理論の枠組みから記述し直すものである。

子どもに分かりやすいとされる CDS の特徴はさまざまな文献で提示されており、一例として Ward (2004: 39) は、“use short simple sentences, which are very tuneful,” “use lots of repetition.” などとしているが、具体的に、文法のどのような選択肢を用いると simple なのか、といった文法的記述はほとんど見られない。

そこで本発表は、読み聞かせ時の問いをより短く単純に言い直した場合、SFL の枠組みによる文法システム上のどの選択肢が使用されがちなかを記述し、その傾向をまとめる。頻繁に活用される文法資源例は以下の通りである：

- Experiential には、PROCESS TYPE, THING TYPE System の選択の細密度 (delicacy) が上がる
- Interpersonal には、MOOD System 中の INTERROGATIVE TYPE System で、wh-ではなく yes/no が選択される
- Textual には、問いかけ文のさまざまな要素が省略されて文が短くなるが、省略されずに残るのは、想定される返答に ELLIPSIS: elemental な選択が起ころうとも省略されない部分に対応する部分である

このように具体的な文法資源が明示されれば、教師はそれらの資源を活用して「やさしい」問い方を行うことができる。それにより、読み聞かせ時のやり取りを促進し、結果的に小学校英語教育の質を向上させることが期待できる。

以下、第 2 節で研究全体の概要とここまでの進捗を振り返ることで、本稿の課題を明確にする。第 3-5 節では、上にまとめた「やさしく」話す際の文法的特徴を、3 つのメタ機能、Experiential、Interpersonal、Textual な方策の順に見ていく。第 6 節はまとめに代えて、「やさしい」話し方の文法的特徴を明示的に記述することの意義を、小学校教師を目指す学生の教育の観点から考える。

2. 問題の所在：「やさしい」話し方とは

本稿は、小学校英語教育 (特に絵本読み聞かせ活動) における教師の発話技術向上を目指す研究の一環である。絵本読み聞かせ活動で教師に求められるのは、単に本文を朗読するだけでなく、適切な「問いかけ」を挟むことで、児童により絵本に興味をもたせ、英語によるやりとりの技術を身につけさせ

ることである。ここで教師に必要な技術は、1. 「問いかけ」によって児童の返答を引き出すことと、2. 児童が答えられない場合、より理解しやすく返答しやすいよう「問い直す」ことの2点である。

こうした「問いかけ方」と「問い直し方」を教える教師用教材を、SFL、CDS等の理論を利用して提案するのが研究全体の概要であり、最終的には、どのような発話がもっとも効果的に児童の返答を引き出すか、小学校および大学小免課程の現場での実践検証を経て教材を完成させ、大学の小免課程現場で活用することが目標である。

ここまでの進捗として、早川 (2022, 2024) は、絵本読み聞かせで教師が直面する課題を「何を問いかけるべきか」「どう問いかけるべきか」の2つの側面に分け、それぞれに解決法を提案した。まず、教師の側の抱える課題として、教師あるいは教師を目指す小免課程学生は、絵本の読み聞かせに慣れておらず、本文を朗読する以外に何を尋ねればよいのか分からないことが多い。これが「何を問いかけるべきか」という課題である。これに対し早川 (2022) は、SFLの理論枠組みを利用し、絵本の中に Experiential、Interpersonal、Textual の3種類の談話パターンを見つけることで、そのパターンの「つづき」を児童に予想させる技術を提案した。

また、児童の側の抱える問題として、いくら教師が児童の英語力を高めようと英語で問いかけても、児童は、教師の英語が理解できず黙り込んでしまうことが多いという現実がある。これが、児童が理解でき答えやすいように、教師が「どう問いかけるか」という課題である。これに対し早川 (2024) は、CDSの理論を利用し、児童が答えられない時に、分かりやすく問い直す技術を提案した。具体的には、教師の英語による問いかけが分からずに子どもが返答できない場合、問い直すための3ステップとして、① 同じ内容を、ゆっくりと繰り返して問いかける、② 同じ内容を、構文を単純化して問いかける、③ 同じ内容を、児童が答えやすい問いに置き換える、という方策を提案し、小学校教育現場で頻繁に用いられる、Eric Carl の *The Very Hungry Caterpillar* を用いた読み聞かせ台本（仮）を制作した。

これを、筆者が担当する大学小免課程の「外国語の指導法」の授業（筆者の所属大学における「外国語科指導法（英語）」）で実際に用いたところ、受講生の反応は、「構文を単純化する」や「児童が答えやすい問い」というのが「具体的にどのようなものなのか」が分からないというものであった。

確かに、CDSの先行研究（伊藤, 2005; Ward, 2004 など）を見ても、子どもに分かりやすい話し方の特徴としては、「声のピッチが高く、抑揚が大きい」「ゆっくり発話し、繰り返しが多い」「1文1文が短い」「子どもが答えやすい、単純な文法構造で問う」のように記述されるのみで、具体的に「どのような文法を使うか」の記述は少ない。

しかし、明示的な文法記述がなければ、「どのように話すか」を人に教育したり、自分で訓練することは難しい。そこで本稿は、「やさしい」「分かりやすい」とは何かを、少なくともその一端のみでも明示化することを課題とし、どの文法システムのどの選択肢を用いるか、SFLの文法枠組みを用いて記述

する。具体的には、早川 (2024) で発表した、*The Very Hungry Caterpillar* を用いた読み聞かせ台本 (仮) を用い、そこでの発話が実際にどのような文法資源を用いているかの傾向を明らかにしていく。

3. Experiential な方策 : delicacy を上げる

まず SFL の 3 つのメタ機能のうち、Experiential な側面から見る。Experiential な方策とはこの場合、「動き」「もの」などをどのように表現するかを選択に関わる。児童に理解しやすい話し方の特徴としては、PROCESS TYPE, THING TYPE System (Matthiessen, 1995: 672) の細密度 (delicacy) が上がる傾向がある。delicacy が上がるとは、システムのより一般的 (more general) な選択から、より特定の (more specific) な選択に進むことを指す (Matthiessen, 1995: 14-15)。言い換えれば具体化のことであり、別の見方をすれば、COHESION: CO-EXTENSIVE: HYPONYM (Halliday & Hasan, 1985: 80) の関係性であるとも言える。

実例を挙げると、*The Very Hungry Caterpillar* を読みながら、What day comes next? と尋ねても、児童が答えられなかったとする (当該絵本は、物語が日曜から始まり、月曜、火曜…と進むにつれて、主人公の青虫が違うものを食べる構成になっている)。

この場合、day という抽象的な名詞は、図 1 に示した THING TYPE System では nominal: non-conscious: simple: abstractions に相当する選択肢だが、このシステムの細密度をもっと上げていくと、図 2 のように、最終的には Sunday、Monday、Tuesday... という具体的な曜日にたどり着く。

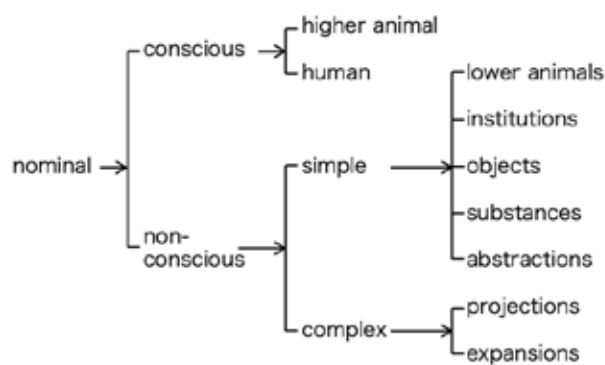


図 1 : THING TYPE System (Matthiessen, 1995: 672 Fig.7-20 より)

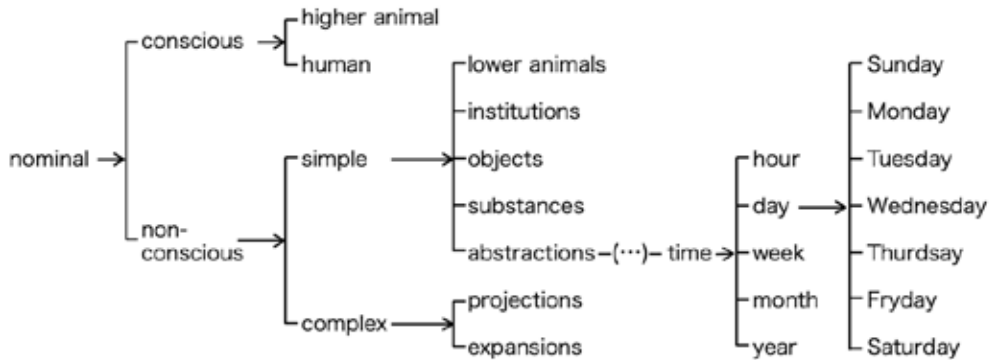


図 2：THING TYPE System (早川による拡充)

この「具体的」というのが、子どもの理解を促す 1 つのキーワードであり、**What day comes next?**という抽象的な聞き方で分からなければ、教師は（指を折って数えながら）**Sunday, Monday, Tuesday… and? What day?**のように、**day**を**Sunday, Monday, Tuesday**と具体化して問い直すことができる。それにより、最初の**What day comes next?**が理解できなかったとしても、子どもは「曜日の話をしている」ということが理解でき、かつ教師が「具体例」として示した**Sunday, Monday, Tuesday**の続きを予想して、**Wednesday**などと答えることができる。その際、教師はすかさず、**Yes, Wednesday comes next!**のように発話することで、**Wednesday**という返答が正しいという承認を与えるとともに、**Wednesday comes next.**という理想的な返答を聞かせて、さりげなく正しい英文のインプットを増やすことができる。

同じことは、**How many plums did he eat?**のような問かけの「問い直し」にも利用することができる。**how many**すなわち**number**という細密度の低い抽象概念を、**one, two…**という細密度の高い具体的な表現に置き換えることで、次のようにやり取りを促すことが考えられる。

教師：How many plums did he eat?

子ども：[沈黙]

教師：（指を折って数えながら）One apple, two pears, …and? How many?

子ども：Three.

教師：Yes, he ate through three plums!

この場合、第 5 節に述べる Textual な方策も同時に起こることに注意が必要である。1 つのメタ機能上の方策は単独で起こることは少なく、他のメタ機能上の選択にも影響を与えることは、第 5 節に改めて指摘する。

4. Interpersonal な方策：Wh-から yes/no へ

次に、Interpersonal な側面から見る。Interpersonal な方策とはこの場合、相

手に情報や行為を求めるために「どう」ことばを使うかという選択に関わる。児童に理解しやすい話し方の特徴としては、MOOD System 中の INTERROGATIVE TYPE System (Matthiessen 1995: 392)の選択肢が wh-から yes/no へ切り替わるという傾向がある。図3に示したように、wh-question と yes/no question はどちらも、INTERROGATIVE TYPE System の1つ下位の選択肢であり、wh-question が yes/no question に切り替わるのは、細密度の問題ではなく、同じ細密度での並行的な選択である。

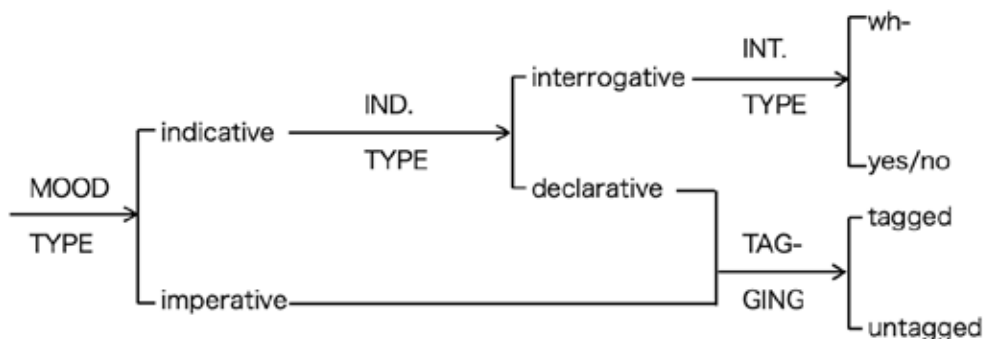


図3：MOOD System (Matthiessen 1995: 392 Fig.5-5 より)

Yes/no question の最大の特徴は、子どもが英語を発しなくてもやり取りができるということである。例えば、前節と同じく *What day comes next?* という問いかけに子どもが答えられなかったとする。これは問いかけ自体が難しく理解できなかった可能性もあるが、同時に、問いかけは理解できていても、*Monday.*や *Wednesday.*という「答え方」がわからずに黙っているという可能性もある。その場合教師は、*(Is it) Friday? No? (Is it) Monday? No? (Is it)...**Thursday?*と、順に yes/no question で順に問い直していくことができる（発話の最後をあげ調子のイントネーションにすれば、*Is it* の部分は不要である）。子どもは、自分が正しいと思う *(Is it) Thursday?* の直後に *Yes.*と発話することもできるが、また別の選択肢としては、頷いてみせるだけで自分の考えを教師に伝えることもできる。そこで教師が、*Yes, it's Thursday!* と発話して、承認と正しい英文のインプットを与えるのが重要なのは前節と同様である。

同じことは、*What fruit did he eat next day?* のような問いかけの「問い直し」にも利用することができる。まず wh-question で問いかけた後、子どもが答えられなければ yes/no question に置き換えることで、次のようにやり取りを促すことができる。

教師：What fruit did he eat next day?

子ども：[沈黙]

教師：[絵本の果物の絵を指さしながら] What are they? Are they

strawberries? No? Oranges? No? Are they...plums?

子ども：[頷く]

教師：Yes, he ate through three plums!

この場合、3 節に述べた Experiential な方策も同時に起こることに注意が必要である。つまり、What day...?や What fruit...? のような wh- question は、必然的に「中身の分からない」抽象的な疑問詞を伴うが、yes/no question は、「A か、B か、それとも C か？」と具体的な場合を挙げて「それが正しいか」を問う質問であるため、必然的に delicacy の高い表現を伴うこととなる。

それにより、最初の What fruit did he eat next day? が理解できなかったとしても、子どもは、strawberries、oranges といった具体的な「果物例」の含まれた問い直しを聞くことで、「果物の話をしている」ということを理解し、かつ教師が「具体例」として示した strawberries、oranges…の「仲間」を探して、Plums.などと答えることができる。

5. Textual な方策：ELLIPSIS を利用し簡略化

最後に、Textual な側面から教師の方策を見る。Textual な方策とは、情報をどのようにまとめ、構成して相手に使えるかという選択に関わる。Textual な選択肢には、Theme (文頭に何をもって来るか) の選択や、Cohesion (情報にどう意味的まとまりをもたせるか) などに関わる選択もあるが、ここでは、発話の一部を省略して簡略化する ELLIPSIS の選択を取り上げる。

教師の問かけが長すぎると、児童にとっては聞き取るべき情報量が多すぎ、かつどこがその質問の最も重要な部分かを判断することが難しくなる。児童に理解しやすく問い直すには、教師は自らの問かけの不可欠な部分のみを繰り返して、あとは省略する方策も必要となってくる。

Matthiessen (1995: 609) は、“With elemental ellipsis, everything can be elided, except for the prominent element(s).”と述べて、ELLIPSIS: elemental が起こると返答が簡略化されることを指摘した。例えば、Who’s out there?という問いに対する返答は、文法的に正確には、My friend and the man of the house are out there.となるが、通常 are out there の部分は発話されずに省略されることが多い。同様に、以下のやり取りでは全て、[] で示した部分は発話されないことが多い。

Why are you down here?—[I’m down here for] a short holiday.

What’s your name?—[My name is] Webber.

上記は全て、問かけに対する返答が簡略化される例だが、逆に教師の問かけを簡略化して、児童に理解しやすくするにはどうすればよいのだろうか。本稿では、この「問いの簡略化の仕方」を、

想定する返答で省略されない the prominent element(s)に対応する質問部

だけが不可欠な要素であり、あとは省略可能

と定義したい。

本稿が、このように一見複雑な定義を用いるには理由がある。より単純に考えると、問いかけの発話においては、「WH-から始まる要素以外は省略可」だと考えることもできる。実際、Halliday and Matthiessen (2004: 566) は、“In a WH-sequence the entire clause is usually omitted except for the WH- element itself” と述べて、WH-から始まる要素以外は省略されることが多いと指摘している。しかし、Who’s out there?や、Why are you down here?のような発話においては、Who? や Why?といった省略的な問いかけは確かに会話として成立するが、What’s your name?—[My name is] Webber. における問いかけを省略して What? になると、そもそも何を尋ねているのか不明である。この場合はやはり、Webber. という the prominent element に対応した your name を用い、Your name is? のような聞き方が簡略的な問い方となるだろう。

Textual な方策の実例として、Experiential な実例として既に第3節にみた会話例を再掲する：

教師：What day comes next?

子ども：[沈黙]

教師：(指を折って数えながら) Sunday, Monday, Tuesday… and? What day?

子ども：Wednesday.

教師：Yes, Wednesday comes next!

教師：How many plums did he eat?

子ども：[沈黙]

教師：(指を折って数えながら) One apple, two pears, …and? How many?

子ども：Three.

教師：Yes, he ate through three plums!

上記の例の中では、day→ Sunday、Monday、Tuesday…や、how many (number) → one、two、three…という細密度の上昇という方策が用いられているだけではない。それらの発話で「曜日の話である」「数を聞いている」ということを理解させたのちに、改めて What day? / How many? という簡略的な言い方で問いかけが繰り返されている。

これらの簡略的な問い直しは、最初の What day comes next? / How many plums did he eat? と同じようで、根本的に異なっている。それは、問いの長さが短いことにより、「要するに聞いていることは何か」「最も大事なことは何か」が子どもに分かりやすいということである。子どもに対する発話になるべく短くし、重要な単語やフレーズを繰り返すことの重要性は、Ward (2004: 96)も、以下のような「shoe という単語を子どもに理解させるための話し方」

という例を用いて指摘している：

If we were to use sentences such as ‘We’re going to the park, so we need to get our boots and coats on’, how in the world would the baby know which of those many words refer to the things we put on our feet? On the other hand, if we say something like ‘Here’s your shoe. Johnny’s shoe. Shoe on. On it goes’, he has a much better chance of understanding what ‘shoe’ means.

本稿の提案する方策は、まず長くても正確な英文で問かけをし、その後 Experiential な方策も用いつつ子どもに問かけの内容を理解させ、最後に Textual に簡略的な問い直しをすることで、再び答える機会を提供するという手順である。Experiential な言い直しはもちろん効果的であるが、Sunday, Monday, Tuesday…という語の列挙だけでは「問い」にならず、子どもはどこで何を答えれば良いのかの合図を得られない。教師が簡略的な質問によって「ここでこれを答えてほしい」という合図を送ることで、「問かけと返答」というやりとりのパターンに慣れさせるのは、子どもの英語力を磨くのに有効な方策となりうる。

6. おわりに：言語理論の教育への応用

ここまでの提案は、言語理論を用いて、大学の小免課程授業の質向上を目指すものである。最後に、本稿の提案を用いて、小学校教師を目指す学生たちに「分かりやすさ」を教えるための教材（ワークシート）例を提案する。

絵本読み聞かせ中の問かけを、より「やさしく」する方法を学ぶためのワークシート（例）

What day comes next? と聞いても子どもが答えられなかったら、どう問い直すか考えてみよう。

ポイント1：単語をもっと具体的にしてみよう。day をより具体的に言う？ (Experiential)

〔想定される学生の回答〕 Sunday, Monday, Tuesday…

ポイント2：質問をなるべく短くしてみよう。「最低限答えて欲しいこと」は何か？ (Textual)

〔想定される学生の回答〕 What day?

ポイント3：Yes/No 疑問文で聞いてみよう (Interpersonal)

〔想定される学生の回答〕 (Is it) Sunday? (Is it) Monday? (Is it) Thursday?

ポイント4：子どもが Thursday の部分で頷いたら、褒めて正しい英文を聞かせよう。どのようにフィードバックすると良いかな？

〔想定される学生の回答〕 Yes, it's Thursday. / Thursday comes next.

このようなワークを互いに相談し合いながら進めていくことが、学生たちにとって、「子どもに分かりやすい」とはどういう話し方か、具体事例を通して身につけていく一助になるだろう。

もちろん、今回示した方策が、「発話を簡単に・分かりやすく」する方策の全てではない。しかし、本稿が提案したように、具体的な文法資源が明示されれば、教師（や小免課程で学ぶ学生）はそれらの資源を活用して「やさしい」話し方を訓練することができる。それにより、将来の小学校教師の英語指導力が向上し、読み聞かせ時のやり取りが促進され、結果的に小学校英語教育の質を向上させることを期待する。

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Evaluating AI-Generated Academic Writing: A Systemic Functional Linguistics Approach to ChatGPT in Academic Classrooms

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Abstract

Given the rapid development of AI technologies, ChatGPT is becoming ubiquitous in classroom settings. However, many challenges concerning the use of ChatGPT in classrooms remain unaddressed in language teaching research and practice. In the context of academic literacy, because the discipline functions as a specialized genre (Swales, 1990), there are clearly definable discourse constraints that educators commonly teach (Hyland, 2002). However, the extent to which ChatGPT can create writing that successfully utilizes the discourse constraints of academic literacy is under-researched. In this presentation, I suggest that the systemic functional linguistics (SFL) model outlined by Halliday and Matthiessen (2004) can be used to evaluate ChatGPT-created writing to determine the extent to which it meets the discourse requirements of academic writing. First, I will illustrate how ChatGPT can be used to create a five-paragraph academic-style essay appropriate for the B1 English level in the Common European Framework for Languages. Second, I will discuss how the SFL model can be used to evaluate the extent to which the essay meets the requirements of academic literacy. Third, I will suggest that while the ChatGPT essay does display many of the discourse elements associated with academic literacy, it lacks the key rhetorical devices and argumentative strategies typically taught in academic classrooms. I conclude that an SFL-based analysis of a ChatGPT text can accurately illustrate the underlying communicative functionality of the text in a way that is useful for educators because it can reveal differences between AI-produced and human-produced texts that may not be immediately apparent. This is an important area of research that needs to be developed.

1. Introduction

This preliminary study recognizes the constraints of AI-generated writing as being crucial because excessive dependence on such content may result in texts that lack important communicative elements found in human writing. Consequently, this failure could negatively impact language learning and influence broader aspects of English communication. Indeed, George Orwell (2021), in his influential essay “Politics and the English Language” first published in 1946, points out that the mechanical use of set phrases and overly familiar metaphors to replace well-thought-out sentences—where writers express their own ideas—can lead not only to a decline in the language itself but also to a reduction in human thinking. This decline in English, due to the machine-like nature of modern texts, can only worsen with the

advent of artificial intelligence (AI) unless, as Orwell might put it, those who care about language mount a defense against its “debasement”.

The use of AI in language learning is growing, particularly with tools such as ChatGPT, which educators have been using to help develop materials for English as a Second Language (ESL) classrooms (Amin, 2023; Yuan et al., 2024). However, I note that this research also highlights challenges in integrating ChatGPT in the classroom, emphasizing the need for both students and teachers to critically assess its role in education. SFL is a communicative model for text analysis that can support language teaching (Butt, et al., 2000), and in this paper I propose that the SFL model can be used to critically assess ChatGPT-produced texts. SFL provides a framework for analyzing texts based on three functions—textual, experiential, and interpersonal—which can reveal how well a text fulfills its communicative purpose (Halliday & Matthiessen, 2004). Unlike purely grammatical models, SFL assesses texts based on their effectiveness in communication.

In the field of academic literacy, the communicative effectiveness of academic texts can be critically assessed by using a genre-based model of writing. In this model, educators commonly teach academic texts as a series of structured discourse moves and rhetorical choices that follow specific discourse conventions (Swales, 1990; Hyland, 2002). For example, in research papers, the introduction consists of three moves: establishing a research territory, identifying a niche, and occupying that niche (Swales, 1990). Similarly, in academic reading and writing classrooms, five-paragraph essays follow a structured format, with an introduction, body, and conclusion, each containing specific steps such as thesis statements and supporting ideas (Blass & Vargo, 2022; see Table 2 in the Appendix for a summary). These rhetorical structures help define academic writing, but second language learners often struggle to grasp their intricacies (Hyland, 2002).

However, academic writing, when viewed as a series of moves and steps, should not be seen as a rigid or fixed structure. Instead, the genre-based approach presents writing as a series of choices (Swales, 1990). Coulthard (2001) further emphasizes the importance of critically analyzing and evaluating rhetorical choices and of suggesting alternative “textualizations” to enhance a text’s communicative effectiveness. This principle guides my analysis in this paper. While a completely objective evaluation is not possible—since ChatGPT-created texts adhere, to some extent, to the discourse moves and constraints of academic writing—I can still assess these texts as a set of choices that may be improved by considering alternative textualizations. In this paper I suggest that SFL can be used to evaluate ChatGPT-created academic essays and can support writers in making alternative textualizations aligned with discourse norms.

2. SFL Analysis of the ChatGPT-Generated Essay

For the purposes of this paper, I asked ChatGPT to create an essay with the following prompt:

Write a five-paragraph academic-style essay appropriate for the B1 English level in the Common European Framework for Languages. The students are studying an academic writing course. The essay should be an argumentative essay. It should

contain an argument and a counterargument. The essay should have an introduction, a main body, and a conclusion.

The essay question is:

Do you agree or disagree with the following statement?

“Overall, the widespread use of the internet has a mostly positive effect on life in today's world.”

As shown in Table 2, the essay created by ChatGPT, “The Internet’s Mostly Positive Impact on Modern Life,” follows the standard discourse norms of the five-paragraph essay taught in academic reading and writing classrooms. The language is appropriate for English learners at the B1 level. The essay has a clear structure—introduction, body, and conclusion.

Moreover, one feature of the five-paragraph essay genre taught in academic classrooms is to create coherence between the thesis statement in move 1 and the topic or controlling ideas in steps 1, 2, 3, and 4. The ChatGPT-authored text achieves this structure, in which move 1, clauses 3 to 7 (Table 2, Appendix), introduces the topic and the controlling ideas of the essay—the argument that the internet overall has a positive effect on society and the counter-argument that it also has noticeable negative effects. This thesis statement is linked to body paragraphs 1 and 2 through the noun phrases “One of the main positive effects” (Clause 8) and “Another advantage of the internet” (Clause 15), which introduce the main argument, and the conjunction “However” (Clause 20), which signals the counterargument. Moreover, each body paragraph uses cohesive signals to indicate supporting steps, such as “In the past” (Clause 9), “today” (Clause 10), “In addition” (Clause 22), and so on.

Also, the conclusion clearly restates the thesis (clause 25), summarizes the main arguments (clause 26), and ends with a relevant and meaningful summarizing opinion (clause 27). Overall, the ChatGPT essay creates effective coherence between moves 1 and moves 2, 3, and 4 (Table 2, Appendix), and the essay makes clear logical arguments. Thus, to a large extent it adheres to many of the established norms used in academic reading and writing classes.

However, a closer SFL analysis demonstrates that it is lacking the key rhetorical devices and argumentative strategies typically taught in academic classrooms. One feature of the essay is that it defaults to standardized structures for presenting arguments, which can make its writing feel more mechanistic and less nuanced compared to human writing. This is illustrated by a theme/rheme analysis of the clauses in the text. The ChatGPT text relies on a very repetitive theme/rheme structure. Thus, clauses 10 and 11 in body paragraph 1, clauses 16 and 17 in body paragraph 3, and clauses 18 and 19 in body paragraph 4 all adopt the same theme/rheme structure (Table 2).

In clause 10, the theme (“Today, with just a few clicks”) and the rheme (“anyone can access a wealth of knowledge on almost any topic”) are summarized through the reference “This” in theme position in clause 11. The rheme (“has made education more accessible, especially for those who cannot afford traditional schooling”) explains the positive results of the changes described in clause 10. This pattern is continued in clauses 16 and 17, where the theme “This” in clause 17 summarizes clause 16, and the rheme (“has made the world feel more connected and

has improved relationships”) explains the result. Similarly, in clauses 18 and 19, “This” in the theme position summarizes clause 18, and the rheme of clause 19 gives details of the positive results of the change.

Rutherford (1999) argues that increasing students’ awareness of different theme/rheme options throughout a text can enhance their understanding of discourse, and that it may be beneficial to point out this repetitive theme/rheme structure to students and ask them to suggest alternative textualizations. While repetition can enhance cohesion by using related vocabulary and consistent references to reinforce meaning and aid comprehension, a common linguistic strategy (Halliday & Matthiessen, 2004), in the case of AI-generated text this repetition may indicate a reliance on automated structures, giving the text a mechanical quality.

This reliance on automated structures may also be apparent in the choice of process. As shown in Table 3, the number of relational and material processes used in the essay is high (16 and 22, respectively). The relational and material processes are being used to present broad statements and facts. But mental and verbal processes are comparatively low (7 and 5), reflecting the lack of opinions and individual perspectives in the essay. More research needs to be done in this area to explore the extent to which ChatGPT-produced writing relies on material and relational processes. To this reader, the ChatGPT essay has a generic, repetitive, and linear feel to the writing, which may be the result of the process choices made in the essay. Human-authored texts may use more mental and abstract processes to produce reflection, doubt, and emotion, making their argumentative position in an essay more nuanced and engaging than an AI-produced essay. If these differences can be shown through SFL research, that would have a positive impact on how AI texts can be used in classroom settings.

One of the key features of text analysis is not just to examine what is in the text but also to examine what is left out. The ChatGPT-generated essay has no citations, specific references, statistics, or personal anecdotes, and this contributes to the lack of emotional resonance and persuasiveness in its arguments. As Table 4 shows, the participants in the essay are mostly non-human entities, and the internet is the dominant participant, making the text technology-centered rather than human-centered. It is possible to hypothesize that, compared to a human-authored essay, the AI-generated essay tends to favor abstract, impersonal participants, such as *the internet*, *access to information*, and *misinformation*. In contrast, a human-authored essay might include more personal references (e.g., *I*, *we*, *students*, *teachers*), making it feel more engaging and relatable. In this essay, as suggested in the analysis of the process above, the AI frames problems in general terms, while a human writer may illustrate them with personal anecdotes (e.g., *I once read false information online*). Moreover, a human writer might introduce more diverse participants, such as governments, businesses, journalists, and employers, making the discussion feel more socially grounded. More SFL based research needs to be done in this area. If it can be shown that AI-produced texts consistently lack these key rhetorical devices and argumentative strategies, that would be an important finding that could have a positive influence on how AI-produced texts are used in the classroom. For example, having students compare AI-generated texts with human-written ones with the goal of

assessing the differences between the texts may foster critical thinking and enhance the analytical skills necessary for effective academic reading and writing.

Indeed, one area of research that needs to be developed is a comparative appraisal analysis of human-generated essays with AI-generated essays. Appraisal is an important part of any interpersonal analysis (Thompson, 2004: 75). As stated above, Table 4 suggests that the ChatGPT essay relies on technology-centered participants rather than human ones. Appraisal studies could be done to investigate potential differences in the diversity of participants in AI-produced essays and human-authored essays to assess to what extent the differences in the essays contribute to the engagement resources in the essay. Appraisal theory suggests that through the attribute category in the engagement framework, writers can broaden the dialogic space by distancing the writer from the reader and presenting alternative viewpoints (Martin and White, 2005: 134). Thus, appraisal analysis can be used to investigate how human-authored texts may incorporate external voices and diverse viewpoints and to what extent the use of these external voices and viewpoints results in a more emotionally engaged, varied, and nuanced text than those generated by AI-authored texts.

3. Limitations to the Study

During the question-and-answer session, the audience pointed out the main limitation of the study: I gave only one prompt to ChatGPT to write the essay, and ChatGPT would have been able to deal with some of the limitations of the five-paragraph essay that I have suggested if more prompts had been given. For example, if ChatGPT were asked to add citations and references or facts and statistics to the essay, it would have been able to do so because it can easily pull this type of information from the internet. This would improve the argumentative stance and the interpersonal engagement of the essay because ChatGPT would not be relying solely on AI-generated opinions and observations. This ability of ChatGPT to respond to feedback and improve its output is a key feature of ChatGPT-produced texts, which needs to be included in future research.

The audience cited another area that would benefit from future research: the use of nominalization in ChatGPT texts. It was suggested that ChatGPT texts may rely on and perhaps overuse the feature of turning adjectives, verbs, and other parts of speech into noun phrases. This may be another feature of ChatGPT output that can make its texts seem automated, linear, and repetitive. To investigate the extent to which this is true would be a fruitful area for future research.

Finally, the audience pointed out that ChatGPT's ability to quickly and efficiently produce a five-paragraph argumentative essay that is suitable for submission to a B1 level academic reading and writing class has serious implications for the issue of plagiarism in English language education. The ease with which students can access English texts, which can be used as an answer to teacher assignments, may have negative effects not only on individual students' linguistic development but also on English language teaching as a whole. Educators and researchers need to find ways to address these challenges.

SFL research can make an important contribution to this area. This study suggests that SFL analysis of AI-authored texts may be able to identify areas of

difference between human-authored texts and AI-produced texts, such as repetitive and predictable theme/rheme structures, reliance on relational and material processes, and inability to use engagement strategies effectively. If this can be shown consistently with more data-based research, the findings may help teachers identify plagiarism. On a more positive note, the findings from SFL research, by highlighting and identifying common weaknesses in ChatGPT-produced texts, may help teachers design courses that would allow ChatGPT to be used as a learning tool that can be used by students to improve their English.

4. Conclusion

Analyzing the ChatGPT-generated text within the framework of the five-paragraph essay model (see Table 1) reveals that it generally follows the structural moves and steps of this genre. The ChatGPT-generated text maintains logical flow, and its argumentative stance is well balanced. The essay has strong cohesive links between the thesis statement and the main ideas presented in the body paragraphs. This cohesion supports the overall clarity and coherence of the essay, and an initial analysis indicates that the AI-generated text can align reasonably well with academic-genre conventions.

However, a deeper SFL-based analysis highlights significant weaknesses suggesting that the ChatGPT-generated text does not fully conform to the discourse expectations typically emphasized in B1-level academic writing instruction. While the ChatGPT text appears to create paragraph unity and logical connections between ideas, it frequently relies on repetitive sentence structures to do so, which contributes to a mechanical style. This issue becomes evident when analyzing the theme/rheme patterns within the text. The ChatGPT-generated essay frequently repeats the same theme/rheme structure. While repetition can contribute to cohesion in AI-generated writing, it may signal a dependence on automated structures, resulting in a mechanical and less engaging style.

The tendency to rely on automated structures may also be reflected in the selection of process types. The essay contains a high number of relational and material processes, which are mainly used to present general statements and facts. In contrast, mental and verbal processes, which indicate opinions and personal perspectives, are used less frequently. This imbalance may contribute to the essay's generic, repetitive, and linear feel. Further research is needed to determine the extent to which ChatGPT-generated writing depends on repetitive theme/rheme patterns and material and relational processes. Understanding these differences through SFL analysis could provide valuable insights into how AI-generated texts should be integrated into classroom instruction.

Moreover, the main participants referenced in the text are predominantly non-human, with the internet serving as the primary subject, resulting in a focus on technology rather than people. This paper suggests that, in contrast to human-authored essays, AI-generated writing may tend to prioritize abstract and impersonal participants, which may make the text less engaging and more difficult to relate to than human-authored texts. One area that requires further exploration is a comparative appraisal analysis of AI-generated essays versus human-authored ones. Appraisal studies could examine differences in participant diversity between AI-generated and

human-written texts and assess how these distinctions impact reader engagement in the writing.

As this study is very small in scope, more research is required to further explore the differences between AI-generated and human-authored texts. Understanding the limitations of AI-produced writing is essential, as overreliance on these materials could lead to texts that lack key communicative features present in human writing. This, in turn, may negatively affect language learning and impact broader aspects of communication in English and, as Orwell points out, human thought.

However, by applying the SFL model, AI-generated texts can be systematically broken down to reveal their communicative characteristics. This approach can offer valuable insights into both the strengths and weaknesses of AI-produced texts. These findings can help integrate AI-generated materials in a complementary role, promoting a deeper understanding of linguistic variation. As AI continues to develop and become more prominent in education, SFL analysis can assist educators in making informed decisions about the selection and integration of different types of texts in the classroom.

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Appendix

Table 1. Moves and Steps in the Five-Paragraph Essay

Move 1	Introduction
Step 1	Hook and/or
Step 2	Opening statements and/or
Step 3	Thesis statement (topic/controlling ideas)
Move 2	Body Paragraph 1
Step 1	Topic/controlling idea
Step 2 A	Support 1 and
Step 2 B	Support 2 and/or concluding statement
Step 2 C	Support 3 and/or concluding statement
Move 3	Body Paragraph 2
Step 1	Topic/controlling idea
Step 2 A	Support 1 and
Step 2 B	Support 2 and/or concluding statement
Step 2 C	Support 3 and/or concluding statement
Move 4	Body Paragraph 3
Step 1	Topic/controlling idea
Step 2 A	Support 1 and
Step 2 B	Support 2 and/or concluding statement
Step 2 C	Support 3 and/or concluding statement
Move 5	Conclusion
Step 1	Restate the thesis using different words
Step 2	Summarize main points
Step 3	Final thought

(Adapted by the author, based on Blass and Vargo, 2022; Lee, 2022a; Swales, 1990)

Table 2. ChatGPT Essay

Clause	Moves	
	1	Introduction
1	Opening statements	The internet has become an essential part of daily life.
2	Opening statements	Changing the way we communicate, work, and access information.
3	Thesis	Many people believe that the widespread use of the internet has had a mostly positive effect on life in today's world.
4	Thesis	While there are certainly some challenges associated with the internet,
5	Thesis	its overall impact is largely beneficial.
6	Thesis	This essay will argue that the advantages of the internet, such as improved access to information, enhanced communication, and new job opportunities, outweigh its disadvantages,

7	Thesis	such as privacy concerns and the spread of misinformation.
	2	Body Paragraph 1
8	Topic/controlling idea	One of the main positive effects of the internet is its ability to provide quick and easy access to information.
9	Support 1	In the past, people had to rely on books or experts to find answers to their questions.
10	Support 2	Today, with just a few clicks, anyone can access a wealth of knowledge on almost any topic.
11	Support 3	This has made education more accessible,
12	Support	especially for those who cannot afford traditional schooling.
13	Support 2	The internet also provides access to online courses, tutorials, and educational platforms,
14	Support 2	allowing people to learn new skills and improve their knowledge at any time.
	3	Body Paragraph 2
15	Topic/controlling idea	Another advantage of the internet is how it has transformed communication.
16	Support 1	Thanks to email, social media, and messaging apps, it is now easier than ever to stay in touch with family, friends, and colleagues, regardless of geographic distance.
17	Support 1	This has made the world feel more connected and has improved relationships.
18	Support 2	Moreover, the internet allows people to work remotely, attend virtual meetings, and collaborate with others across the globe.
19	Support 3	This has led to the rise of remote work and new job opportunities that were not possible before.
	4	Body Paragraph 3
20	Topic/controlling idea	However, the internet also has its downsides, particularly in the areas of privacy and misinformation.
21	Support 1	Many users are concerned about their personal data being collected and misused by companies or even hackers.
22	Support 2	In addition, the spread of fake news and false information on social media has become a serious problem,
23	Support 2	as it can influence public opinion and lead to misunderstandings.

24	Concluding Sentence	These issues highlight the need for better online security and media literacy to ensure that people use the internet safely and responsibly.
	5	Conclusion
25	Restate the thesis and summary	In conclusion, while there are valid concerns about privacy and misinformation, the overall impact of the internet on modern life is mostly positive.
26	Summary	Its benefits, such as improved access to information, enhanced communication, and the creation of new job opportunities, outweigh the challenges it presents.
27	Final Thought	As long as people remain aware of the potential risks and take steps to protect themselves online, the internet will continue to have a largely beneficial effect on our daily lives.

Table 3. Processes in the ChatGPT Essay

Process Type	Number	Key Words that Indicate the Process
Material	22	become (1), changing (1), access (3), provide (2), allow (2), improve (2), outweigh (1), collect (1), spread (1), transform (1), afford (1), attend (1), create (1), learn (2), work (2)
Mental	7	believe (1), argue (2), concern (1), aware (1), think (1), misunderstand (1)
Relational	16	is (5), are (3), has (4), was (1), were (1), be (1), feel (1)
Verbal	5	argue (2), communicate (1), discuss (1), influence (1)
Behavioral	4	use (2), experience (1), rely on (1)
Existential	3	there is (1), there are (2)

Table 4. Participants in the Chat GPT Essay

Participant	Count	Participant	Count
The internet	12	Companies	3
People	7	Risks	2
Information	6	Email	2
Communication	5	Messaging apps	2
Access to information	4	Technology	2
Education	4	Job opportunities	2
Misinformation	4	Users	2
Privacy concerns	3	Experts	2
Online courses	3	Hackers	2
Knowledge	3	News	2

Social media	3	Security	2
Remote work	3	Skills	2
The public	1	Public opinion	1
Individuals	1	Digital threats	1
Concerns	1	Online threats	1

「科学論文」の読解を困難にしているもの ーテキスト形成的メタ機能を中心にー

Problems in Reading ‘Scientific Papers’: An approach from the Textual Metafunction

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Abstract

This present paper discusses the lexicogrammatical resources that may cause difficulty in reading ‘scientific papers’ from a Systemic Functional perspective. Its focus is on the textual metafunction and its aim is to help Japanese students read ‘scientific papers.’ After defining ‘scientific papers’ using the approaches of Genre agnation (Martin, 1992) and Genre family (Martin and Rose, 2008), this paper introduces SFL researchers’ discussions on problems of scientific text (e.g., Halliday, 1993; Halliday, 2004b; Martin and Veal, 1998). Then, it discusses the difficulties when reading ‘scientific papers’ from the perspective of the textual metafunction. The discussion includes unmarked/marked Theme, thematic equative, multiple Theme, Theme-Rheme development, reference, ellipsis, substitute, conjunction and lexical cohesion. By reading two sample texts, this paper shows that Theme-Rheme development, reference and lexical cohesion are used in ‘scientific papers’; and that understanding Theme-Rheme development, reference and lexical cohesion in ‘scientific papers’ requires special knowledge of the field in question.

1. はじめに

日本の大学の専門教育科目には、いわゆる外書講読があることが少なくない。多くの場合、外書講読を受講する学生は担当教員の専門分野の論文や専門書を読むことになる。筆者が確認できた範囲では、学生の英語読解の能力に関わらず、学修の中心は担当教員の解説による内容理解であり、読解のアプローチを体系的に身につける機会が十分にあるとは言えない。体系的な読解法を指導するには、使用頻度の高い、あるいは読解を困難にしている語彙-文法的資源の理解が必要となる。

そこで、本稿では、選択体系機能言語学 (Systemic Functional Linguistics) の理論枠組みを用いて、英語で書かれた、いわゆる科学論文を読解する際に、問題となりうる語彙-文法的要素を議論する。特に、本稿では、テキスト形成的メタ機能に焦点を当てる。発表の目的は、日本語を母語とする学生が「科

学論文」を読む際の「英語の難しさ」を緩和する一助となることにある。

本稿では、第一に、「科学論文」が何を指すのかについて、類縁するジャンル (Martin, 1992) と同族にあるジャンル (Martin & Rose, 2008) の視点から議論する。次いで、これまで選択体系機能言語学の研究者によって議論されてきた、科学テキストをめぐる諸問題 (例えば、Halliday, 1993; Halliday, 2004; Martin and Veel, 1998) について概観する。そして、実際の「科学論文」をテキスト分析することで、テキスト形成的メタ機能の観点から見た「科学論文」の「難しさ」を議論する。

テキスト分析では、「科学論文」に利用されているテキスト形成的な語彙-文法的資源が一部の資源に偏っており、中にはほとんど利用されないものもあることを示す。そして、「科学論文」で頻繁に利用されるテキスト形成的な語彙-文法的意味資源の中で、「科学論文」を読む際に問題となりうる要素には、主題-題述展開、照応、語彙的結束性が含まれ、これらの要素が名詞化や因果関係の多様な表示といった他の「難しさ」と絡まり合うことで一層「難しさ」を増していることを議論する。

なお、本稿における選択体系機能言語学の術語の日本語訳は山口・寛 (訳) (2001) に準拠する。

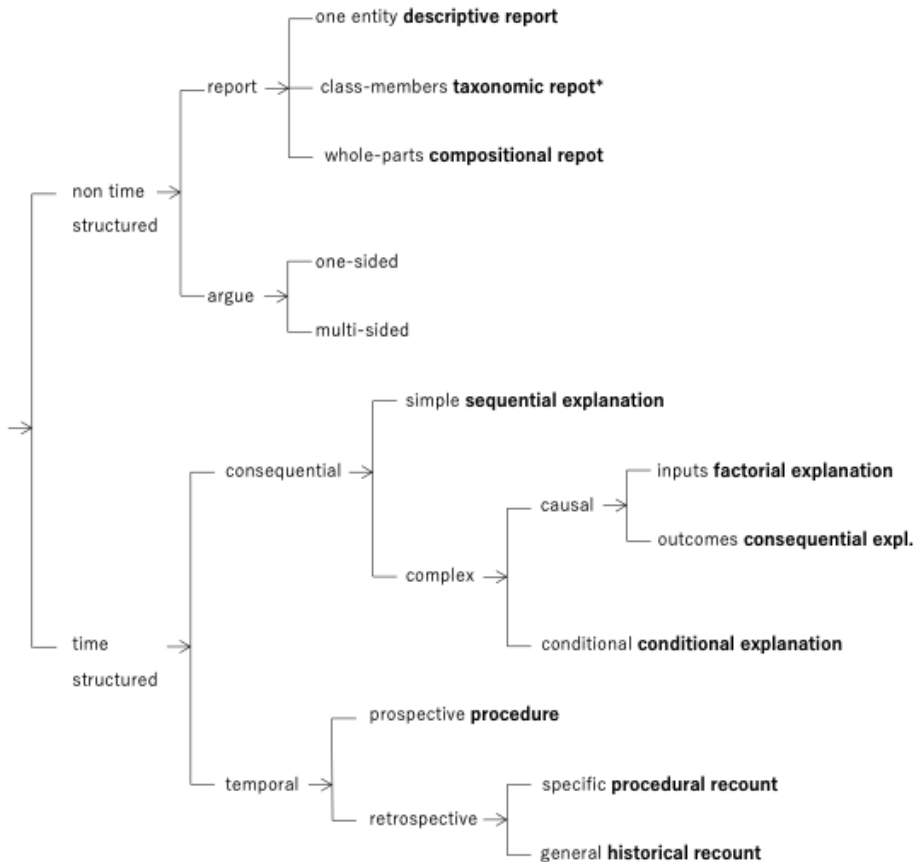
2. 本稿における「科学論文」

「科学論文」は、ごく粗雑に捉えれば、自然科学分野の発見を記述したものと言える。本節では、状況のコンテキスト (あるいは言語使用域) の観点から「科学論文」のありようを整理する。まず、「科学論文」は、自然科学における発見、とりわけ、特定の一度きりの事象ではなく、一般的な事象に関する発見を記述している (活動領域)。次いで、それは専門的知識を持った者が専門的知識を持った者に向けて発信している (役割関)。最後に、「科学論文」は時系列に沿って展開しておらず、言語が構成的な役割を果たしており、いわゆる書き言葉で書かれている (伝達様式)。

以上の特徴をもとに、次は類縁するジャンル (Genre Agnation) (Martin, 1992: 560-571) から「科学論文」を位置づける。類縁するジャンルとは、活動領域、役割関係、伝達様式の組み合わせで類縁するジャンルを分類する考え方である。例えば、活動の連続体を取り扱うか否か (活動領域) で、ジャンルを大きく2つに分けることができる。例えば、活動の連続体を取り扱うジャンルは、物語 (narrative)、レシピ (recipe)、マニュアル (manual) で、活動の連続体を取り扱わないジャンルは、記述 (description) や説明 (exposition) である。また、活動の連続体を取り扱うテキストは、普通でない、何か都合の悪いことが起こるか否かで大きく分けられる。都合の悪いことが起こるテキストは例えば、物語であり、普通でないことが特に起こらないテキストはリカウント (recount) と呼ばれる。

類縁するジャンルの考え方をもとに、学校教育で身につけるべき書き言葉のジャンルを類型化したものが同族にあるジャンル (Genre Family) (Martin & Rose, 2008) である。この研究の中で、科学分野における、ジャンルどうしの

典型的な見方が図1のように示されている (Martin & Rose, 2008: 167)。



*原文ママ

図1：科学分野における、ジャンルどうしの典型的な見方
(Martin & Rose, 2008: 167 より)

この分類に従って、「科学論文」が持つ複数の特徴を確認する。まず、時間軸に沿わない構成(non-time structured)の中では、物や現象を記述するが、役割関係が専門家どうしであるが故に、物や現象の上位下位関係と全体部分関係は説明しないという特徴が見られる (report – descriptive report)。また、議論の際には、複数の視点から議論する (argue – multi-sided) という特徴がある。一方で、時間軸に沿った構成(time structured)の点からは、実際の時系列よりもむしろ、因果関係(原因、波及効果、条件付け)をもとに議論する (consequential – complex) という特徴が見られる。したがって、「科学論文」は、これらの特徴を備える、いわば、複合的ジャンルと言える。

以上の議論をもとに、「科学論文」の予備的分類を図2のように行った。第一に、「科学論文」は自然現象の説明をするので、この点で「科学論文」と科学論文以外の論文に大きく分けることができる。さらに、上位下位関係と全体部分関係の説明をしない／する、すなわち専門的知識を持ち合わせた者に向けたテキストなのか、あるいは専門的知識を必ずしも持ち合わせていない者に向けたテキストなのかで「論文」と「読み物」に分けることができる。また、議論を因果関係によって進めるか、時系列によって進めるかによっても「論文」と「読み物」に分けることができる。

	－上位下位関係 と全体部分関係 の説明	＋上位下位関係 と全体部分関係 の説明	－因果関係 (＋時系列)
＋自然現象の説明	科学論文	科学読み物	科学読み物
－自然現象の説明	人文社会系の論文	人文社会系の読み物	人文社会系の読み物

図2：「科学論文」の予備的分類

したがって、「科学論文」とは、活動領域の点では、自然現象の説明を因果関係で説明するテキスト、役割関係の点では、専門科から専門科に向けられた（上位下位関係と全体部分関係の説明はしない）テキスト、さらに、伝達様式の観点を加えると、言語が構成的な役割を果たす、モノローグの、書かれたテキストと説明することができる。

3. 科学テキストの諸問題

科学テキストが内包する諸問題については、これまで多くの選択体系機能言語学の観点からの研究がなされている。本節では、これまでなされてきたSFLの研究の中から、主要なものを取り上げる。

Halliday and Martin (1993) は、近代科学がいかにして記号的に解釈構築されているかを議論している。Halliday and Martin (1993) を受けて、Martin and Rose (1998) では、科学テキストについて、さらに多方面からの議論がなされている。同著の議論は、1) 様々な科学テキストを分析することにより Halliday and Martin (1993) を位置付けしなおす、2) 科学テキストを意味生成の歴史の視点から見る、3) 科学テキストをジャンル、言語使用域、具現化の視点から見る、4) 科学テキストを社会を変える／維持する力として見る、という4つの視点から整理することができる。

とりわけ Halliday (1993) は、科学テキストの語彙-文法的問題を以下の7つの点で整理している点で重要である。

- 1 専門用語の定義が他の専門用語によってなされていること (interlocking definitions)

- 2 専門的な概念はタクソノミーの中に位置付けられてこそ機能するにも関わらず、タクソノミーの形成方法や分類の基準が複雑で、かつ明示的でないこと (technical taxonomies)
- 3 数学の表現に独自の「文法」が使われていること (special expressions)
- 4 語彙密度(特定の文法単位、例えば、節における内容語の数)が高いこと (lexical density)
- 5 ある要素が原因として示されているのか証拠として示されているのか、また、どちらの要素が原因でどちらの要素が結果であるのかが不明瞭であること (syntactic ambiguity)
- 6 文法的比喩 (grammatical metaphor)
- 7 ある現象から結論が導かれる過程に、飛躍があること (semantic discontinuity)

本稿は、「科学テキスト」の一部である「科学論文」をテキスト形成的機能から分析することにより、これまでの研究であまり議論されてこなかった、科学テキストにおけるテキスト形成的機能に関わる語彙-文法的な問題の一端を明らかにする。

4. テキスト分析

本節では、実際の科学論文を主題の無標／有標、主題題述等価構造、多重主題といった節の主題、また、主題題述展開 (構造的結束性)、照応、省略、代用、接続、語彙的結束性といった結束性の観点から分析する。分析に使用したテキストは、Cosgrove et al. (2016) と Gan et al. (2018) の梗概部分である。

「科学論文」には、梗概を含めて多くのセクションが含まれるが、セクションごとの語彙-文法資源の使用頻度に大きな差は見られない。また、教育的観点から、論文の全体像を確認してから論文本体の読解に入ることは有益であると考えられる。

4.1 Cosgrove et al. (2016) のテキスト分析

まずは、Cosgrove et al. (2016) を節ごとに分け、節の主題を確認する。節の主題には、有標の主題、主題題述等価構造、多重主題といった複雑なものは確認できなかった。

次いで、主題-題術展開構造を実線矢印で示しながら分析する。分析結果を図3に示す。論文タイトルである 1) が全体のマクロ主題として機能している。次に、2) の題述部分が、these cues としてまとめられ、次の節である 3) の主題となっている。同じように、6) の題述が 7) の主題として、7) の題述が 8) の主題として展開している。最後に、8) の題述がマクロ新情報として機能している。最初に示される要素がマクロ主題、最後に示される要素がマクロ新情報というテキスト展開、ならびに、前の節の題述部分が次の節の主題になるという主題題述展開構造は、書き言葉のテキストに典型的に見られるもので、特に複雑なものではないが、題述が次の節の主題になる際に、専門用語を利

用した名詞化でまとめられているため、理解に専門的知識を要する。

1) N-cadherin adhesive interactions modulate matrix mechanosensing and fate commitment of mesenchymal stem cells	マクロ主題
2) ③ During mesenchymal development , the microenvironment gradually transitions from one [that is rich in cell-cell interactions] to one [that is dominated by cell-ECM (extracellular matrix) interactions].	2)題述→3)主題
3) Because <u>these cues</u> cannot readily be decoupled in vitro or in vivo,	
4) [how <u>they</u> converge to regulate ② mesenchymal stem cell (MSC) mechanosensing] is not fully understood.	
5) Here, we show that	
6) a hyaluronic acid hydrogel system enables, across a physiological range of ECM stiffness, the independent copresentation of the HAVDI adhesive motif from the EC1 domain of N-cadherin and the RGD adhesive motif from fibronectin.	6)題述→7)主題
7) Decoupled presentation of <u>these cues</u> revealed [that ① HAVDI ligation (at constant RGD ligation) reduced the contractile state and thereby nuclear YAP/TAZ localization in MSCs , resulting in ② altered interpretation of ECM stiffness and ③ subsequent changes in downstream cell proliferation and differentiation].	7)題述→8)主題
8) <u>Our findings</u> reveal [that, in <u>an evolving developmental context</u> , ① HAVDI/N-cadherin interactions can alter ② stem cell perception of the stiffening extracellular microenvironment].	マクロ新情報

図 3 : Brian et al. (2016) のテキスト形成的メタ機能分析

次に、テキスト内の照応関係を波線で示しつつ確認する。4)における they

は直前の節である 3) の *these cues* を照応している。しかしながら、この *these cues* が何を照応しているかは判然としない (ただし、主題-題述展開構造で確認したとおり、2) の題述を圧縮していることは確認できる)。一方で、7) における *these cues* は、6) の *the HAVDI adhesive motif from the EC1 domain of N-cadherin* と *the RGD adhesive motif from fibronectin* を照応している。以上のように、照応関係を追っていく際にも、専門的知識がないと確認が難しいことがわかる。

さらに、7) を出発点に、テキスト内の語彙的結束性 (同義関係) をゴシックで示しつつ、議論する。7) では、名詞化された現象が様々な因果関係の表示によって関係づけられていることが確認できる。すなわち、*Decoupled presentation of these cues* が *that* 以下を明らかにした (*revealed*): *HAVDI ligation (at constant RGD ligation)* が *the contractile state* を弱め (*reduced*)、それによって (*thereby*)、*nuclear YAP/TAZ localization in MSCs* が起こる。その結果 (*resulting in*)、*altered interpretation of ECM stiffness* が起こり、それに続く (*subsequent*) *changes in downstream cell proliferation and differentiation* が起こる。

このうち、3 つの名詞化表現は、テキスト内に同義関係のものが存在する。① *HAVDI ligation (at constant RGD ligation)* は、8) の *HAVDI/N-cadherin interactions* と同義関係にある。② *altered interpretation of ECM stiffness* は 4) の *mesenchymal stem cell (MSC) mechanosensing*、さらに 8) の *stem cell perception of the stiffening extracellular microenvironment* と同義関係にある。③ *subsequent changes in downstream cell proliferation and differentiation* は 2) の *During mesenchymal development* と同義関係にある。いずれの同義関係にある名詞群も名詞化によって意味が圧縮されており、かつ専門性が高いため、名詞化の解きほぐしには専門的知識が不可欠となる。

最後に、8) の *an evolving developmental context* は、2) を圧縮して名詞化しているとも、研究分野そのものを照応しているとも解釈可能であり、曖昧さが残る。

なお、省略、代用、接続については、使用が確認できなかった。

以上の分析をまとめると次ようになる。

- ・ 主題-題術展開構造はシンプルだが、理解に専門的な知識を要する。
- ・ 照応対象の理解が困難である。
- ・ 語彙的結束性(同義関係)の理解に専門的な知識を要する。
- ・ 名詞化、語彙密度の高さ、多様な因果関係の表示が、これらの理解をさらに困難にしている。

4.2 Gan et al. (2018) のテキスト分析

同様に、Gan et al. (2018) も節ごとに分け、テキスト形成的メタ機能からの分析を行う。

まずは、主題-題術展開構造を分析する。論文タイトルである 1) が全体のマクロ主題として機能している。次に、2) の題述が名詞化されて 3) の主題とし

て機能している。さらに 6)の題述が 7)の主題として機能している。最後に、11)がマクロ新情報として機能している。マクロ主題、マクロ新情報の構成、ならびに主題-題術展開構造は、4.1 の分析結果と同じと言える。

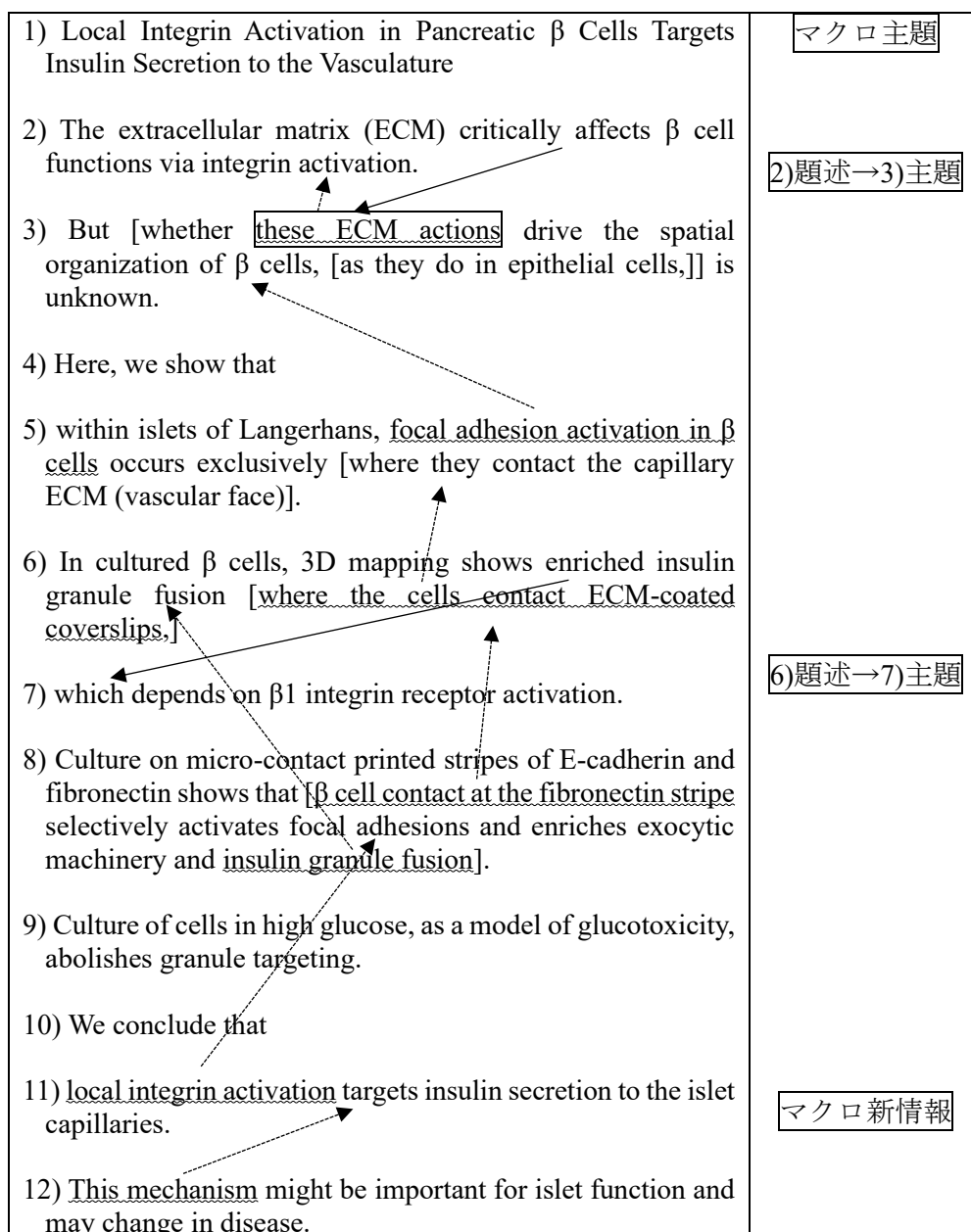


図 4 : Gan et al. (2018) のテキスト形式的メタ機能からの分析

次いで、同義関係と照応関係を確認する。3)の *these ECM actions* は前の節である 2)が名詞化されたものである。ただし、2)における因果関係の理解に

は専門的知識を要するため、同様に action の理解にも専門的知識を要する。5)の focal adhesion activation in β cells は 3)の the special organization of β cells と同義関係にある。6)の where the cells contact ECM-coated coverslips は 5)の where they contact the capillary ECM (vascular face) と同義関係にある。8)の β cell contact at the fibronectin stripe は 6)の where the cells contact ECM-coated coverslips と同義関係にある。また、8)の insulin granule fusion は 6)の enriched insulin granule fusion と同義関係にある。11)の local integrin activation は 8)の focal adhesions と同義関係にある。最後に、12)の This mechanism は 11)を名詞化して照応したものである。ただし、targets の使用法が独特であるため、this mechanism の理解にも専門的知識を要する。4.1 の分析結果と同様、いずれの同義関係、照応関係の確認にも、専門的知識が欠かせない。

また、4.1 での分析と同じように、主題の無標／有標、主題題述等価構造、多重主題といった節の主題、省略、代用、接続については、使用が確認できなかった。

以上の分析をまとめると、次のようになる。

- ・ 主題-題術展開構造はシンプルだが、理解に専門的な知識を要する。
- ・ 照応対象の理解が困難である。
- ・ 語彙的結束性(同義関係)の理解に専門的な知識を要する。
- ・ 名詞化、語彙密度の高さ、多様な因果関係の表示が、これらの理解をさらに困難にしている。

5. まとめと展望

本稿では、「科学論文」をテキスト形成的メタ機能から分析した。節の主題については、有標の主題、主題題述等価構造、多重主題の使用は確認できなかった。一方で、結束性の面からは、主題-題術展開、語彙的結束性(同義関係)、照応の理解に専門的知識が必要であることがわかった。また、省略、代用、接続の使用は確認できなかった。したがって、テキスト形成的メタ機能から見ると、テキストの構成自体には複雑さが少ないことがわかる。しかしながら、テキストの構成を理解するには、専門的知識が不可欠であることもわかった。

「科学論文」読解の指導法は本稿の目的ではないため、存じ付く範囲で書き連ねるにとどめるが、「科学論文」のテキスト展開構造を理解することで、学生は、専門教育を行う教員に対して、例えば、照応関係や同義関係にある名詞群の確認などの、内容理解に役立つ質問をすることができ、一方で教員は、専門的な知識を用いて主題-題術展開構造の解説や照応、同義関係の説明がより適切にできるであろう。

今後の展望は、引き続き学生の支援にある。難しさの質(専門性の難しさと言語の難しさ)を切り離し、文法家として英語の難しさを解きほぐす研究を進めたい。

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分析テキスト

- Cosgrove, B. D., et al. (2016). N-cadherin adhesive interactions modulate matrix mechanosensing and fate commitment of mesenchymal stem cells. *Nature Materials, Vol. 15*, 1297-1307.
- Gan, W. J., et al. (2018). Local integrin activation in pancreatic β cells targets insulin secretion to the vasculature. *Cell Reports, 24*, 2819-2826.

ⁱ 本稿は、2024 年 10 月 12 日(土)から 13 日(日)にかけて開催された日本機能言語学会 2024 年度秋期大会で発表した内容に、一部加筆修正を加えたものである。

第 32 回日本機能言語学会秋期大会プログラム

会期：2024 年 10 月 12 日（土）～ 10 月 13 日（日）

会場：杏林大学 井の頭キャンパス D 棟 105 講義室

<http://www.kyorin-u.ac.jp/univ/student/campus/inokashira/>

オンライン: Zoom ミーティング (詳細はメーリングリストからのお知らせ参照)

参加費：【会員】無料

【非会員】1,000 円（学生は 500 円）

キャンパスマップ <http://www.kyorin-u.ac.jp/univ/student/campus/inokashira/>

アクセス情報 <http://www.kyorin-u.ac.jp/univ/access/inokashira.html>

・ JR 吉祥寺駅から

南口 5 番バス乗り場から「吉 1 3 杏林大学井の頭キャンパス行」に乗車（約 15 分）、終点で下車

時刻表：<http://transfer.navitime.biz/odakyubus/pc/diagram/BusDiagram?orvCode=00070027&course=0001500579&stopNo=1>

・ JR 三鷹駅から

南口 8 番バス乗り場から「鷹 6 3 杏林大学井の頭キャンパス行」に乗車（約 15 分）、終点で下車

時刻表：<http://transfer.navitime.biz/odakyubus/pc/diagram/BusDiagram?orvCode=00070148&course=0001500576&stopNo=1>

※その他、京王線調布駅北口、千歳鳥山駅北口、仙川駅からのバスも利用可能です。上記アクセス情報のサイトをご覧ください。その際は「**野村病院**」バス停での下車となります。「杏林大学病院前」バス停では降りないようご注意ください。

※学内に昼食を購入できる施設はございません。最寄りのコンビニエンスストアまでは徒歩 5 分程度ですが、バス乗車前に購入されることをお勧めします。

10 月 12 日（土）

12:30 - 13:15 受付 (D105 講義質前)

13:15 - 13:25 開会の辞

D105 講義室 日本機能言語学会会長 佐々木 真（愛知学院大学）

13:30 - 14:10 研究発表 1

D105 講義室

司会: Virginia Peng（立命館大学）

Kiernan, Patrick（明治大学）

[発表言語: 英語]

‘Towards a Systemic Modelling of Pauses’

14:15 - 14:55 研究発表 2

D105 講義室

司会: 水澤 祐美子（成城大学）

早川 知江（名古屋芸術大学）

[発表言語: 日本語]

「児童に分かりやすい英語の問いかけとは: SFL の枠組みで文法特徴を記述する」

14:55 – 15:10 休憩

15:10 – 16:10 ワークショップ（特別企画）

D105 講義室

司会：三宅 英文（安田女子大学）

佐々木 真（愛知学院大学）

[発表言語：日本語]

「選択体系機能言語学と研究上の困難点」

16:10 – 16:20 休憩

16:20 – 17:20 総会

D105 講義室

司会：岩本 和良（杏林大学）

18:30 – 21:00 「ROBATA 二代目 心」（参加費 6,000 円）

〒181-0013 東京都三鷹市下連雀 3-12-2

JR 三鷹駅より徒歩約 5 分

URL: <https://tabelog.com/tokyo/A1320/A132002/13033755/>

10 月 15 日（日）

10:00 – 10:30 受付（D105 講義室前）

10:30 – 11:10 研究発表 1

D105 講義室

司会：Sonya Chik（神奈川大学）

McDonald, Peter（桜美林大学）

[発表言語：英語]

‘Evaluating AI-Generated Academic Writing: A Systemic Functional Linguistics Approach to ChatGPT in Academic Classrooms’

11:15 – 11:55 研究発表 2

D105 講義室

司会：阿部 聡（新潟国際情報大学）

鷲嶽 正道（愛知学院大学）

[発表言語：日本語]

「「科学論文」の読解を困難にしているもの-テキスト形成的メタ機能を中心に-」

11:55 – 13:00 昼食

16:00 – 17:20 特別講演

D105 講義室

司会：佐々木 真（愛知学院大学）

井上 逸平（慶応義塾大学教授）

[発表言語：日本語]

「現代社会のコミュニケーションと機能言語学」

14:45 – 14:55 閉会の辞

D105 講義室

日本機能言語学会副会長 **Patrick Kiernan（明治大学）**

The Program of JASFL 2024

Dates: October 12 (Sat) and 13 (Sun) 2024

Venue: Kyorin University, Inokashira Campus, Building D

<http://www.kyorin-u.ac.jp/univ/student/campus/inokashira/>

Online: Zoom meeting (see the email from JASFL mailing list)

Participation Fee: [Members] Free [Non-members] 1,000 yen (students 500 yen)

Campus map: <http://www.kyorin-u.ac.jp/univ/student/campus/inokashira/>

Access: Access to Inokashira Campus | Access | Kyorin University ([www.kyorin-u.ac-jp.translate.google.com](http://www.kyorin-u.ac.jp.translate.google.com))

From JR Kichijoji Station

Take Odakyu bus (“吉 13 Kyorin University, Inokashira Campus”) from the South Exit bus depot (No.5), and get off at the terminal.

From JR Mitaka Station (East Gate)

Take Odakyu bus (“鷹 63 Kyorin University, Inokashira Campus”) from the South Exit bus depot (No.8), and get off at the terminal.

*Buses from Keio Chofu Stat. (North Exit), Chitosekarasuyama Stat. (North Exit), and Senkawa Stat. are also available. See the access information site above. Note that if you come from one of these stations, please get off at the stop “**Nomura Hospital**,” which is a few stops after “Kyorin University Hospital.”

*The cafeteria and store on campus are **CLOSED** on Saturday and Sunday. The nearest convenience store is about 5 minutes’ walk, but we would advise you to buy your lunch before you get on the bus.

October 12 (Saturday)

12:30 – 13:15 Registration (Building D, Room 105)

13:15 – 13:25 Opening Remarks

Room D105 President of JASFL **Sasaki, Makoto (Aichi Gakuin University)**

13:30 – 14:10 Paper Session 1

Room D105 Chair: Peng, Virginia (Ritsumeikan University)

Kiernan, Patrick (Meiji University) [To be presented in English]

‘Towards a Systemic Modelling of Pauses’

14:15 – 14:55 Paper Session 2

Room D105 Chair: Mizusawa, Yumiko (Seijo University)

Hayakawa, Chie (Nagoya University of the Arts) [To be presented in Japanese]

“‘Simple’ English questions for Elementary School Pupils: Describe the Grammatical Features in Systemic Functional Linguistics’

14:55 – 15:10 Coffee Break

15:10 – 16:10 Workshop (Speacial Program)
Room D105 Chair: Miyake, Hidefumi (Yasuda Women's University)
Sasaki, Makoto (Aichi Gakuin University) [To be presented in Japanese]
'On Research Problems of Systemic Functional Linguists'

16:10 – 16:20 Coffee Break

16:20 – 17:20 AGM
Room D105 Chair: Iwamoto, Kazuyoshi (Kyorin University)

18:30 – 21:00 Reception 「ROBATA 二代目 心」 (Participation Fee: 6,000 yen)
3-12-2 Shimorenjyaku, Mitaka, Tokyo 181-0013
5 minutes' walk from JR Mitaka Station
URL: <https://tabelog.com/tokyo/A1320/A132002/13033755/>

October 13 (Sunday)

10:00 – 10:30 Registration (Building D, Room 105)

10:30 – 11:10 Paper Session 1
Room D105 Chair: Chik, Sonya (Kanagawa University)
McDonald, Peter (J.F. Oberlin University) [To be presented in English]
'Evaluating AI-Generated Academic Writing: A Systemic Functional Linguistics Approach to ChatGPT in Academic Classrooms'

11:10 – 11:50 Paper Session 2
Room D105 Chair: Abe, Satoshi
(Niigata University of International and Information Studies)
Washitake, Masamichi (Aichi Gakuin University) [To be presented in Japanese]
'Problems in Reading 'Scientific Papers': An Approach from the Textual Metafunction'

11:55 – 13:00 Lunch

13:00 – 14:20 Special Lecture
Room D105 Chair: Sasaki, Makoto (Aichi Gakuin University)
Inoue, Ippei (Professor at Keio University) [To be presented in Japanese]
「現代社会のコミュニケーションと機能言語学」

14:20 – 14:30 Closing Remarks
Room D105 Vice President of JASFL **Kiernan, Patrick (Meiji University)**

PROCEEDINGS OF JASFL

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