

Cognitive Dynamics of Sequencing Procedural Expressions: Distinctiveness of Procedures

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Cognitive Dynamics of Sequencing Procedural Expressions*: Distinctiveness of Procedures

Takahiro OTSU

1. Introduction

Discourse markers (henceforth, DMs) can be viewed as a group of linguistic expressions that transcend syntactic categories, including fillers, interjections, or particles, and have the function of linkage in pragmatic meaning (Fraser 1990: 388-389; Fraser 1999: 943). Although DMs are not involved in the truth conditions of the propositions of utterances, they are pragmatically important linguistic markers because they indicate the route of inferences, the speaker's speech attitude, interpersonal intentions, and concern for the addressees. With the recent increase in research on pragmatics using linguistic corpora, communicative phenomena, like those illustrated in example (1), in which multiple DMs are used adjacently in an utterance, have become an interesting research topic.

- (1) I don't think so no, but you know I mean, for six months if Christopher's living here and having to go back at the weekend, for six months he gets an allowance. (BNC: KE2 s_conv)

It is clear that the sequence of DMs is not a word order encoded by a grammatical system, but one based on pragmatic or cognitive dynamics. Thus, in response to the elucidation of the mechanism of DM sequencing, the question arises as to what pragmatic or cognitive factors determine the order in which DMs occur in an utterance. This question is connected to the detailed objectives of this paper: how the types of DMs relate to the dynamics of order in the sequence and how the linear order of them is cognitively motivated.

This paper takes a relevance-theoretic framework and proposes cognitive dynamics or mechanisms underlying sequencing DMs in terms of the distinctiveness of procedural constraints that distinguish the meaning of DMs in detail. My argument goes as follows: 1) primary discourse markers (PDMs), secondary discourse markers (SDMs), fillers (FLs), and interjections (IJs) encode a distinctive type of procedural constraints, 2) this distinctiveness is responsible for the availability of a sequence among these expressions, and 3) the sequence is geared to the epistemic vigilance being achieved.

2. Previous Studies of Sequences

Diverse frameworks have been proposed for the order or combination of DMs and their related linguistic expressions. The awareness and basic theoretical explanations of sequencing are explicated in Oates (2000) and Fraser (2011, 2015). Oates (2000) classifies DMs into weak and strong in a hierarchical relationship. In the hierarchy, *weak* DMs such as “and,” “but,” and “so,” marking a range of relations, affect the selection and position of the following *strong* DMs, such as “nevertheless,” “therefore,” and “in fact”. Hence the *weak* DMs invariably precede the *strong*. Fraser (2015) classifies DMs into primary DMs (PDMs) and secondary DMs (SDMs). Sequencing of DMs as the continuum from the general (weak) to the specific (strong) has been a helpful step for subsequent discussions, but those discussions still need to make clear whether DMs sequencing from general to specific implies the same thing as intensification or elaboration of the linkage, or, ultimately, what kind of cognitive motivation it depends on.

One of the most systematic explanations has been made from the perspective of grammaticalization. Koops and Lohmann (2013: 120) propose a grammaticalization hypothesis that DMs “deriving from independent sequential moves” (including interjections and vocatives) precede those “deriving from sentence-level structures” (including “and,” “or,” “so,” “I mean,” and “you know”). In this vein, Lohmann and Koops (2016) further propose an “optimal sequencing hierarchy”: oh > well > and > so > or > but > because > then > you know > now > I mean. But the optimality of this hierarchy is not clear. As corpus data indicate, interjections are not always positioned before other linguistic expressions such as “well,” “you know,” or “I mean”. We do not know how much sense it makes to determine a hierarchy between “you know” and “I mean”. From the frequency of the corpus data, there does not seem to be much difference between either combination.

Another systematic account of DM sequencing phenomena has been made in Haselow’s (2019: 6) communicative hypothesis on DM Sequencing: “the sequential order of discourse markers reflects the temporal logics of communicative tasks to be performed at a particular moment in turn production”. In this hypothesis, DMs represent a routinized communicative device to shape the beginning and end of a turn and DM sequences follow a temporal-logical ordering principle (pp.5-6). The linear order of DMs is motivated to reflect the temporal order of the speaker’s communicative task. There is no question about the motivation for the sequence of DMs to accomplish the various tasks of communication at critical moments such as the beginning or end of a turn in the linear generation of speech¹. However, no explanation has been given for the motivation for tendencies and preferences of the sequences. Discussions of these various frameworks seem to give no straightforward explanation for the driving factors of sequencing.

3. A Relevance-Theoretic Account

3.1. Tendency of Sequences

In Relevance Theory, various types of DMs are reinterpreted as “procedural expressions” from a cognitive perspective. These procedural expressions activate the route of inference or procedures to lead the addressee toward the intended interpretation of the utterance including them. Furthermore, it is assumed that procedural accounts clearly differentiate among these expressions in terms of procedural

constraints encoded. Otsu (2021) investigated the frequency of procedural expression sequences, and includes analyses of PDMs (“but” and “so”), SDMs (“however,” “nevertheless,” “in fact,” “on the contrary,” “instead,” “on the other hand,” “therefore,” and “as a result”), FLs (“you know,” “you see,” “I mean,” “like,” and “well”), and IJs (“oh” and “look”). To ensure the validity of the frequency analyses, spoken data for procedural expression sequences was based on three corpora: the British National Corpus (BNC), the Wordbanks corpus (WB), and the Corpus of Contemporary American English (COCA).

Regarding the frequency or preferability of procedural expression sequences, a relatively pronounced tendency (2a-c) has been observed (Otsu 2021).

- (2) a. For PDMs, SDMs, and FLs, the highly frequent sequence is PDM-FL and FL-FL, followed by PDM-SDM.
- b. The sequences of SDMs and other procedural expressions are not preferred, except the PDM-SDM sequences. The exclusivity of SDMs to sequence formation is unique, compared to other procedural expressions. (*SDM-SDM, *SDM-FL, *FL-SDM, *SDM-IJ, and *IJ-SDM are infrequent or unavailable sequences.)
- c. IJs form a sequence with other procedural expressions than SDMs with reasonable frequency.

The Appendix is a re-tabulation of the combinations and frequencies from the corpus of procedural expressions divided into four types (PDMs, SDMs, FLs, and IJs) as used in Otsu (2021), according to the purpose of the current study.

3.2 Distinctiveness of Procedures

There might be a recent tendency of lumping various expressions as DMs — a group of non-truth conditional connective expressions derived from various syntactic categories. Despite the distinction between PDMs, SDMs, FLs, and IJs, by grouping them together into a single group, the argument of sequences has been made less obvious. What explains the difference between them is nothing more than the specific procedures they encode.

The procedural accounts of DMs and their related inferential connective expressions characterize the type of constraints or inferences that these expressions impose on the interpretations of the utterances. Explanation by procedural constraints has the advantage of being able to characterize differences in the detailed meaning of procedural expressions that belong to the same cohesion category (Blakemore 2004: 235). However, that is not to deny that there are distinctive types of procedural constraints and that procedural constraints can be distinguished between these types. In this section, I explain how PDMs, SDMs, FLs, and IJs each encode their own type of procedural constraints.

First of all, PDMs are regarded as a group of DMs that constrain the inference of utterance interpretation and directly encode the type of cognitive effects intended (i.e. strengthening, contradiction and elimination, and derivation of implicated conclusions) (Blakemore 2002: 95). The representative DMs are “but,” “so,” or “after all,” and these indicate the route of inference to determine how relevant contextual assumptions (or implicated propositions) are inferentially combined. Regarding the procedural constraint

encoded by “but,” for instance, Blakemore (2002: 95) proposes “but” has only one procedural meaning of “contradicting and eliminating an assumption”. Consider example (3). (In the examples that follow, the assumptions that procedural expressions use for inference are underlined.)

- (3) Her husband is in hospital **but** she’s seeing other men. (Blakemore 2002: 106)

The procedural constraint encoded by “but” in example (3) is that the proposition in the subsequent clause (She’s seeing other men) contradicts the implicated proposition (She’s not seeing other men) derived from a combination of the preceding clause and a contextual assumption that a wife does not normally see other men when her husband is in hospital, and rejects that implicated proposition. Simply put, “but” activates the inferential process of contradiction and elimination between two propositions.

It is important to note here that there does not have to be two conceptual representations used for inference, nor do the conceptual representations have to be linguistically encoded information, as examples (4) and (5) indicate.

- (4) P There was no point in trying to understand the weather: one had to submit to it. **After all,**
Q there was something to be admired, something good and beautiful in every kind of weather.
 (BNC: CBJ)
- (5) a. [The speaker takes an extremely large slice of cake.]
After all, it is my birthday. (Blakemore 1996: 338)
- b. [The speaker just sees someone arrive home laden with parcels.]
So you’ve spent all your money. (Blakemore 1987: 86)

The procedural constraint encoded by “after all” includes the interaction of three contextual assumptions. The utterance containing “after all” is construed in a context in which some evidence settles a contradiction between some previous assumption and the conclusion (Otsu 2018: 109). In example (4), in contrary to the conclusion (P), “after all” instructs the addressee to evoke a general view of the weather (previous assumption (-P)): e.g., weather is a familiar and personal part of people’s lives, and then presents the evidence (Q) for solving the contradiction of that general view with the conclusion. Conceptual representation is not something that only linguistically encoded utterances possess. The perception of a nonlinguistic context (dotted lines) in examples (5a) and (5b) can also have a conceptual representation. In utterance-initial example (5a), “after all” justifies an unusual behavior (i.e. being the first to grab a larger slice of cake than others) in the nonlinguistic context indicated by the brackets (this non-linguistically communicated information is also a contextual assumption related to the interpretation of the utterance). The use of “after all” here also involves three contextual assumptions available: the unusual behavior (conclusion), anticipated objection to the behavior (previous assumption), and birthday advantage (evidence). In another example (5b), “so” does not follow what has just been said, but some contextual assumption is derived from the observation of the addressee’s having returned home with parcels, and indicates that the subsequent utterance is to be interpreted as a conclusion derived from that assumption. PDMs indicate the route of inference to determine how some contextual assumptions are inferentially

combined. In this respect, PDMs are mostly used as the procedure activator at the beginning of the sequence, if they are used.

SDMs, like PDMs, encode constraints on the inference between implicated propositions of two clauses. However, they contribute to the construction of explicit meaning at a higher level, which is called a higher-level explicature. This is a particular kind of explicit meaning which involves embedding the propositional form of the utterance under a higher-level description such as a speech-act description, a propositional attitude description, or some other comment on the embedded proposition (Carston 2002: 377). The relevance-theoretic description of the meaning of SDMs is suggested in Blakemore's (1996, 2002) analyses of reformulation markers. "In other words" and "that is" encode constituents of higher-level explicatures which communicate the speaker's belief that the propositional form of the utterance they precede (the reformulating utterance) is relevant as a faithful representation of the propositional form of the utterance they follow (the host utterance) (Blakemore 2002: 183).

Consider (6) and (7) for further examples of SDMs.

- (6) You can be proud of the work being done in this area. However, there is always room for improvement. (BNC: J9L S_meeting)
- (7) It's completely sugar-free and contains no artificial colours and flavours. In fact, our Multivitamin Liquid leaves you with hardly anything to worry about at all. (BNC: CFS W_advert)

Regarding "however" and "in fact" in example (6) and (7), the construction of higher-level explicatures can be described, as in (8).

- (8) *P however Q*: the speaker claims that Q is an exception for P
P in fact Q: the speaker claims that Q is a fact overriding the expected objection to P

"However" in the schema "*P however Q*" gives a distinctive instruction to eliminate only the assumption that contradicts Q from all the assumptions derived from P. In example (6), among the various assumptions derived from P (i.e., various aspects of the work that one can be proud of), only the assumption that contradicts Q (i.e., the proud aspect of having no room for improvement) is eliminated. Despite the fact that "however" represents an adverse relation, Q can be interpreted as a supplement to P. This is because Q does not eliminate any assumptions other than the assumption that contradicts Q². On the other hand, "in fact" in the schema "*P in fact Q*" instructs the addressee to interpret Q as a solid fact to override socially expected objections to P. In example (7), because sugar-free and non-use of artificial colours and flavours alone are not sufficient to explain the safety of a product, the fact of the safety of the product itself affirms the preceding clause. These SDMs that communicate the proposition that the following utterance Q is relevant as an addition or a comment to the preceding utterance P can be analyzed as making a contribution to the explicit content of the following utterance³.

FLs also activate inferences on utterance interpretation, but the procedural constraints of FLs are intrinsically different from those of PDMs and SDMs. FLs and encode a heterogeneous type of procedural

constraint among them. I will consider the procedural meaning of “you know” and “you see,” focusing also on the differences between the two. Both “know” and “see” are verbs that express recognition. Therefore, it is possible to capture the meanings of both verbs in the process of recognition (i.e., “knowing X” leads to “understanding Y”) and distinguish the procedures encoded by “you know” and “you see” in the process of recognition. Consider examples (9) and (10).

- (9) Of course we were lucky we had our father and mother. **You know you know** some people they lose them a bit young don't they. (BNC: HF3 S_interview_oral_history)
- (10) But if it was a light repair job it would be a day. **You see,** it was all hand done, **you see?** (BNC: FY2 S_interview_oral_history)

In example (9), sharing information by “you know” activates inferences that lead the addressee to some inference. While the speaker activates inferences that lead to what the speaker wants to communicate, the interpretation of the inferential conclusion of the utterance is left to the addressee (cf. Fox Tree and Schrock 2002: 741). In contrast, “you see” in (10) instructs the addressee to retrospectively search the previous discourse for the assumptions on which the speaker has reached the conclusion. Therefore, it can be summarized that “you know” activates the inference leading to the implicated conclusion by focusing on the premise (underlined), while “you see” focuses on the conclusion (underlined) and activates the access to the implicated premise that led to the conclusion. The major difference from the procedures encoded by PDMs is that the FLs only give instructions in the direction of inference for the assumptions following them.

Finally, let us consider the procedural type of IJs.

- (11) He certainly gets more out of Kelly than Rocastle did. **Look** this is getting silly. (BNS: J1H W_email)
- (12) “**Look, look!**” recites the crowd. “A horse with an arrow in its forehead! It must have been mistaken for a deer.” (BNC: FU6 W_fic_drama)

As SDMs contribute to the construction of higher-level explicatures, IJs also seem to contribute to the conceptualization of the speaker’s emotion or feeling about the following proposition, as (11) represents (13) for instance. However, the paraphrase (13) of (11) is judged as strange because “look” does not contribute to the explicit content of the emotion.

- (13) ? The speaker is wary that this is getting silly.

Considering the fact that “look” is often used alone, as in (12), it is difficult to say that it constructs a higher-level explicature. Wharton (2009: 90) suggests that IJs do not encode a conceptual representation of some emotion or feeling, but merely activate a range of attitudinal descriptions associated with them. In examples (11) and (12), the IJ “look” activates an attitude of attention.

From the above discussion, we can summarize the distinctive types of procedures for procedural ex-

pressions in (14):

(14) Distinctiveness of Procedures:

PDMs: inferential combination of implicated propositions

SDMs: construction of higher-level explicatures between implicated propositions

FLs: instructions in the direction of inference for the implicated proposition they precede

IJs: activation of attitudinal descriptions

4. Procedural Constraints on Sequencing

This section discusses the cognitive reasons for the tendency in (2a-c) for the procedural expression sequences in terms of the distinctiveness of procedures. First of all, regarding the survey result (2a), we can make a theoretical explanation that the distinctiveness of procedural expressions determines the order of the preferable or frequent sequences to some extent. Let us consider the PDM-SDM sequences. This sequence is one of the logical sequences in that PDMs activate a procedure on the direction of inferences involving two contextual assumptions, and SDMs further activate a procedure on constructing a higher-level explicature involving these two assumptions. Consider examples (15) and (16) which include the sequences “but however” and “but in fact”. (Double underlines indicate that the same assumptions are involved twice in the interpretation of the utterance including procedural expressions.)

(15) These documents include invoices, insurance certificates, exchange control documents, but, however, the bill of lading is the most important. (BNC: B1W W_commerce)

(16) Well, the strange thing about China is that if you look at the published statistics from the government, it appears, on the surface, to be one of the most impoverished nations in the world. But, in fact, there’s a substantial amount of private wealth in China particularly in southern China. (WB: NPR_0077)

In example (15), the PDM “but” instructs a subsequent assumption contrary to the contextual assumptions of the preceding clause to be followed. The SDM “however” gives further instruction of eliminating only the assumption that contradicts the subsequent clause (i.e., the bill of lading is the most important) from all contextual assumptions of the preceding clause. In example (16), while the PDM “but” implies an assumption contrary to the assumption of the preceding clause, the SDM “in fact” instructs the addressee to interpret the subsequent clause (significant private assets in southern China) as a fact overriding the expected objection to the preceding clause. In the PDM-SDM sequences, the speaker intends to confirm the implicit communication (constraining implicatures) by explicit communication (explicating the speech attitude of claiming).

On the flip side, this SDM’s distinctive procedure accounts for the difficulty in forming other sequences than PDM-SDM sequences. This would be some answer to the theoretical explanation of survey result (2b). The reason seems obvious: SDMs are used only when implicated propositions are available before and after them. Infrequent sequences of SDMs — such as *SDM-FL, *FL-SDM, *SDM-IJ, and

*IJ-SDM — these sequences lack either of the two implicated propositions required for the use of SDMs. SDMs absolutely differ from other procedural expressions in that the conceptual representation must be accessible before and after SDMs in order to contribute to the construction of higher-level explicatures. Hence, the preferable sequence involving a SDM is only the PDM-SDM sequence.

There is a clear difference in the procedural constraints that PDMs and SDMs impose on the conceptual representations of the preceding and following utterances. The PDM encodes a constraint on the inferential process using both representations, whereas the SDM encodes a constraint on the construction of higher-level explicatures using them. The reason why the *SDM-PDM sequence is cognitively unnatural in contrast to the high-frequency PDM-SDM sequence may be that the PDM reverts to the inferential process, even though the SDM attempts to restrict meaning by constructing higher-level explicatures.

Another frequent sequence in the survey result (2a) is PDM-FL. Consider examples (17) and (18).

(17) A: What was your relationship exactly?

B: Well, it's difficult to explain to a boy. You'll probably laugh, but, well, we thought we could help each other to be good—in a spiritual way I mean. When I realized that Hilda's was more than a normal crush, I should have stopped it I suppose. (BNC: GVT W_fic_prose)

(18) If you think you're going on a cruise liner it's obviously gonna be, you know, fairly well off people. Mm. **So, I mean,** they tip you so they don't pay you as much. (BNC: KP0 S_conv)

In examples (17) and (18), PDMs activate inferences on combining two contextual assumptions, and then FLs activate a fine adjustment of those inferences to the intended interpretation by adding constraints on the subsequent clause. In example (17), the PDM “but” activates a contradiction and elimination procedure between two contextual assumptions connected by “but”. Although the proposition in the preceding clause is eliminated, the FL “well” weakens the nuance of the elimination by communicating that the subsequent utterance guarantees appropriate cognitive effects, as Blakemore (2002: 147) suggests. In example (18), the PDM “so” activates a derivation of an implicated conclusion from the previous utterance, and the FL “I mean” indicates that the implicated conclusion reflects the speaker's thoughts. In this sense, “I mean” adjusts the direction of inference toward a derivation of a conclusion encoded by the PDM “so”. By following PDMs, all the FLs covered in this paper (and probably all FLs in general) work to mitigate the assertiveness of the utterance or the intensity of the speaker's utterance attitude: i.e., “I mean” restates the utterance as a thought, “like” expresses under-organized thoughts or beliefs, “you know” invites a search for an implicated conclusion, “you see” invites a search for an implicated premise, and “well” suggests the expectation that cognitive effects will be achieved. The adjustment of inferences to the intended interpretation of utterances is made until the presumption of relevance is satisfied.

Both PDM and FL encode constraints on the inference process. However, the inferential flow of the sequence *FL-PDM includes a cognitively unnatural inferential process: the PDM retroactively invokes inference including the preceding clause, even though the FL attempts to invoke inference only from the subsequent utterance.

The other frequent sequence shown by the survey result (2a) is FL-FL, which fine-tunes the addressee's mental manipulation involved in the interpretation of the utterances in which they occur.

Consider examples (19) and (20).

(19) I've seen Anne and Nonnie and I don't particularly want to see anybody else. I'm glad Liz is confused because as one of her predecessors I'm also confused. **I mean, you know, we've lived with this planning.** There's always been planning with the people on planning...

(BNC: KS1 s_meeting)

(20) ... you know mum and daddy lived in Edinburgh and I was saying that my daddy was about the fees in erm Gleneagles, my daddy's er, a member of Gleneagles Do I go right here towards this? Yes, and I said, **you know, like it's really, really expensive, my daddy was complaining about how much the fees are, like they're really expens-**, so Margot says och! Well you should have said, she said, because my uncle owns half of Gleneagles!

(BNC: KE1 S_conv)

In example (19), the FL-FL sequence indicates that the speaker is attempting to fine-tune the interpretation of the utterance by stating the reason for the previous clause in a way that is true to the thoughts, and by manipulating the addressee's interpretation in a way that results in guessing the speaker's conclusion from it. In example (20), on the other hand, the speaker directs the addressee to infer what the speaker wants to communicate by using the subsequent clause and then indicates that it is unorganized.

Finally, in response to the survey result (2c) that IJs are frequently sequenced with other procedural expressions, regardless of their order in the sequence, IJ's distinctive procedures would provide some theoretical clues. These procedural expressions do not encode a conceptual representation of emotion or feeling, but activate an attitude related to emotional reactions. IJs activate emotional reactions at any time as the utterance progresses and they are not directly related to inferences pertaining to contextual assumptions.

5. Domain-Specific Procedures and Two Aspects of Epistemic Vigilance

It is interesting to consider what those differences might mean if procedures can be typed in terms of constraints. Sperber (2005: 61) proposes the massive modularity: all levels of cognitive activity, including perceptual and conceptual processes, are modular. He argues that it is worth considering the possibility of activating various modules or their sub-modules involved in mindreading, emotion reading, social cognition, parsing, and speech production. For example, interjections and emotional intonation are considered to have procedural constraints on activating the emotional reading module. Based on Sperber's view, Wilson (2011), incorporating the massive modularity hypothesis (the evolutionary psychology hypothesis that the human mind is made up of modules specialized for specific roles and functions), proposes the idea of activating procedural meaning that procedural expressions activate modules. As Wilson (2011: 26) suggests, procedural expressions not only activate the module of inferential comprehension that is primarily concerned with utterance interpretation, but also other domain-specific (or local) modules, such as mindreading, emotion reading, social cognition, and epistemic vigilance.

I claim that the distinctive procedural expressions (PDMs, SDMs, FLs, and IJs) activate domain-specific procedures. If we apply the activation of these procedures to the types of procedural expressions,

PDMs primarily activate the process of inferential comprehension between contextual assumptions they connect. IJs activate the emotion reading of an utterance. Epistemic vigilance is a cognitive mechanism that verifies the reliability of the speaker and utterances. As suggested by Wilson (2016:15), epistemic vigilance includes “domain-specific mechanisms geared to evaluating the reliability of the communicator, on the one hand, and the communicated information, on the other”. This implies that the process of epistemic vigilance essentially has two directions and this is consistent with the essence of the two procedures: i.e., FLs activate the epistemic vigilance related to evaluating the speaker’s credibility, and SDMs activate the epistemic vigilance related to evaluating the information conveyed by the speaker.

At first glance, SDMs and FLs do not appear to function in the same pragmatic sub-module. From the speaker’s point of view, epistemic vigilance is a set of cognitive mechanisms that preclude the utterance or the speaker’s attitude being misinformed: i.e. confirming with certainty what deserves to be asserted, and moderating the content and manner for what cannot be strongly asserted. The role and function of these two procedural expressions are well aligned with the general communication strategy of confirmation and mitigation of utterances depending on the context. SDMs confirm the validity of argument for the reliable transmission of communicated information. On the other hand, FLs minimize the risk of information being miscommunicated through direct communication and maintain the trustworthiness of the speaker as an utterance attitude. Consider again the frequent sequence types of procedural expressions in examples (21)-(23).

(21) Well, the strange thing about China is that if you look at the published statistics from the government, it appears, on the surface, to be one of the most impoverished nations in the world. **But, in fact**, there’s a substantial amount of private wealth in China particularly in southern China.

(WB: NPR_0077)

(22) If you think you’re going on a cruise liner it’s obviously gonna be, you know, fairly well off people. Mm. **So, I mean**, they tip you so they don’t pay you as much.

(BNC: KP0 S_conv)

(23) I’ve seen Anne and Nonnie and I don’t particularly want to see anybody else. I’m glad Liz is confused because as one of her predecessors I’m also confused. **I mean, you know**, we’ve lived with this planning. There’s always been planning with the people on planning...

(BNC: KS1 s_meeting)

The PDM-SDM sequence in example (21) indicates the epistemic vigilance orientation for confirming the validity of argument in order for communicated information to be reliably transmitted. The epistemic vigilance orientation for the PDM-FL sequence in example (22) directs communication in a way that minimizes the risk of undermining the speaker’s reliability. In example (23), the FL-FL sequence minimizes even more carefully the risk that assurances would undermine the speaker’s reliability.

For the motivation of the DM sequence, Yang and Ueda (2017) focus on the hierarchical relationship of modules between DMs and processing effort required to activate modules. The order restriction found in the sequence of the Japanese DMs *nanka* (FL “something”) and *tadashi* (SDM “however”) is based on a general principle regarding the order of activation of the inferential comprehension module (activated by

tadashi) and the epistemic vigilance module (activated by *nanka*). In their research, the *nanka-tadashi* sequence feels unnatural compared to the *tadashi-nanka* sequence. They explain this as follows: the activation of the less hierarchical epistemic vigilance module (more local domain) preceding the more hierarchical inferential comprehension module (broader domain) requires greater processing effort⁴. However, explanations based on hierarchy and processing effort are reasonable with respect to the PDM-SDM sequences and PDM-FL sequences, but not with respect to the more frequent FL-FL sequences, which have no hierarchical relationship and no difference in the breadth of the scope covered by the module.

I have shown that the order of procedural expressions occurring in a sequence can be explained to some extent by the distinctive types of procedural constraints they encode. A cognitive hypothesis for the procedural expression sequence phenomenon would be that procedural expressions are sequenced in the direction of activation of epistemic vigilance⁵. The appendix shows the sequence and frequency of individual procedural expressions for each corpus; sequences with epistemic vigilance by SDMs and FLs are highlighted. Many of the combinations that occur frequently are those that are followed by procedural expressions that activate epistemic vigilance, such as SDMs and FLs, indicating that the sequences are epistemic vigilance oriented. The sequencing with SDMs, which are highlighted but extremely infrequent, is due to the specificity of the procedural meaning of SDMs, as mentioned earlier. It is also clear that the sequencing of individual procedural expressions is not only determined by the distinctive procedures encoded by the type of procedural expressions, but also by the cognitive affinity between procedural expressions. In spite of the insusceptibility of a procedural meaning to compositional semantic rules, more than one procedural expression points together to the similar interpretation of context or cognitive effects (Rouchota 1998: 116-117).

6. Conclusion

I analyzed the motivation for the sequence of procedural expressions in English based on the distinctiveness of procedural constraints encoded by procedural expression types. The infrequency of the SDMs being sequenced with procedural expressions other than PDMs is ascribed to their distinctive procedures of contributing to the construction of higher-level explicatures, i.e. explicit meaning that is constructed between two conceptual representations. In terms of the activation of pragmatic modules, this investigation showed that epistemic vigilance is activated in the use of SDMs and FLs for different purposes, and that the frequent sequence patterns of procedural expressions (PDM-SDM, PDM-FL, FL-FL) are considered to be epistemic-vigilance oriented. The tentative cognitive hypothesis on the procedural expression sequence is that they are sequenced in the direction of activation of epistemic vigilance. I would like to further this research on the relationship between procedural expressions and pragmatic modules, and strengthen and generalize this hypothesis by analyzing whether it can be applied to languages other than English.

Notes

* This paper is a revised version of a presentation given at the 18th International Pragmatics

Conference held in Brussels on July 9-15, 2023.

- 1 In Haselow (2019: 5), communicative tasks of DM sequences are classified into three domains: interaction, discourse structure, and cognition. Communicative tasks at turn-beginnings are getting/claiming the attention of the addressee, dealing with turn-taking issues; indicating entitlement to take the turn, and responding to prior talk (in interaction domain), indicating the kind of relation to prior talk and initiating a new conversational action (in discourse structure domain), and providing interpretive cues for an upcoming message and indicating how to integrate an upcoming message into the common ground (in cognition domain). Communicative tasks at turn-endings, on the other hand, are facilitating addressee-response, addressing different aspects of the relationship to the addressee, and marking a transition-relevance place and thus legitimizing turn transition (in interaction domain), retrospective integration of a turn into ongoing discourse (in discourse structure domain), and providing a last interpretive cue before potential turn transition and interpretive fine-tuning of a message just produced (in cognition domain).
2. The linkage of two clauses is not acceptable when “however” is replaced by “in addition” or “moreover”.

You can be proud of the work being done in this area. * **In addition/ moreover**, there is always room for improvement.
3. Although SDMs are considered to have formal connotations, they are not only used in conversational and colloquial contexts. Therefore, this paper does not analyze DM combinations in terms of formality and informality. It could be argued that the low affinity of SDMs for procedural expressions other than PDMs is due to their formality. However, I claim that recognition of formality for the SDMs arises from adding the speaker’s attitude in an explicit manner.
4. In terms of the distinctiveness of the modules I am discussing, *tadashi* is the SDM that activates the epistemic vigilance module for confirming the validity of argument.
5. Data show the cases where three or four FLs are sequenced, though they are not frequent (Otsu 2021: 10): “well-I mean-you know,” “well-you know-I mean,” “well-like-you know,” “well-you know-like,” “well-like-I mean,” “I mean-you know-like,” “well-see-like-you know,” etc. These multiple sequences are probably the product of a balance between the thoroughness of epistemic vigilance (cognitive effect) and processing effort involved in their interpretation.

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Appendix

BNC	Wordbanks	COCA
well-I mean 730	oh well 1046	but-you know 4985
but-I mean 482	but-I mean 832	but-I mean 1322
well-you know 412	well-you know 745	so-you know 1253
oh-well 324	you know-I mean 554	oh-well 1244
you know-like 297	I mean-you know 491	I mean-look 588
you know-I mean 284	you know-like 450	so-I mean 476
I mean-you know 234	so-I mean 437	oh-so 471
so-I mean 187	but-you know 404	but-in fact 465
well-you see 186	so you know 377	but-look 458
oh-so 157	well-you see 152	oh-you know 453
but-you see 153	but-you see 134	you know-look 322
but-you know 150	you know-well 140	oh-look 307
so-you know 137	oh-so 119	oh-but 307
oh-look 90	oh-you know 119	like-oh 297
oh-but 90	but-in fact 76	but-you see 290
but-oh 82	so-oh 76	so-therefore 224
oh-you know 79	oh-look 70	well-you know 203
I mean-like 78	oh-but 70	look-you know 197
you know-well 73	you know-oh 69	but-on the other hand 132
oh-you know 71	but-on the other hand 68	like-you know 130
but-like 63	but-oh 64	so-look 130
so-oh 57	so-therefore 63	well-look 107
well-oh 56	I mean-well 59	you know-oh 100
I mean-well 50	so-in fact 49	look-I mean 71
well-like 49	I mean-like 49	but-nevertheless 69
you know-oh 49	but-like 45	like-well 68
well-look 46	look-you know 41	so-well 64
like-I mean 44	so-you see 39	I mean-you know 63
so-therefore 41	you see-I mean 38	but-like 59
like-well 38	well-like 36	I mean-like 59
but-nevertheless 34	well-oh 32	so-you see 58
so-well 34	like-I mean 30	you know-in fact 55
oh-I mean 33	but-nevertheless 28	you know-like 54
well-in fact 32	oh-I mean 27	but-oh 52
but-look 31	well-look 26	so-in fact 50
but-in fact 29	like-well 25	so-like 50
so-you see 29	so-like 22	oh-I mean 49
so-like 29	I mean-you see 22	but-instead 47
so-in fact 26	but-well 21	look-oh 44
you see-well 24	well-in fact 21	well-I mean 41
but-well 23	but-look 20	you know-well 40
you see-I mean 22	so-well 19	well-oh 35
but-on the other hand 21	look-I mean 19	I mean-in fact 34
look-oh 19	you know-look 19	so-as a result 31
I mean-oh 16	you see-oh 16	well-like 29
like-oh 14	like-oh 16	you know-I mean 26
you see-you know 11	I mean-oh 15	in fact-I mean 24

BNC	Wordbanks	COCA
so-look 10	you see-you know 14	you see-you know 22
I mean-in fact 9	but-instead 12	you know-on the other hand 22
I mean-look 9	I mean-look 12	so-instead 19
I mean-you see 8	like-you know 9	oh-like 19
like-you know 8	I mean-in fact 9	you see-like 18
but-instead 7	but-however 8	but-well 17
you see-like 6	you see-well 8	I mean-oh 17
but-however 5	oh-like 7	but-however 16
in fact-you know 5	so-as a result 5	well-on the other hand 15
oh-like 5	you know-in fact 5	so-oh 15
you see-oh 5	in fact-well 5	I mean-you see 12
you know-look 5	look-so 5	like-I mean 12
you know-in fact 4	so-instead 4	in fact-oh 10
like-you see 3	in fact-I mean 4	like look 10
you know-you see 3	in fact-you know 4	well-you see 8
look-you know 3	on the other hand-I mean 4	well-in fact 8
you see-look 3	on the other hand-you know 4	I mean-well 7
so-however 2	oh-you see 4	you see-I mean 7
so-as a result 2	so-look 4	well-instead 6
in fact-I mean 2	you see-like 3	well-nevertheless 6
you see-in fact 2	however-I mean 3	like-in fact 6
I mean-nevertheless 2	you know-on the other hand 3	you see-look 6
well-therefore 2	well-on the other hand 3	you know-you see 5
oh-in fact 2	oh-in fact 3	in fact-you know 5
oh-you see 2	oh-on the contrary 3	like-on the other hand 5
in fact-oh 2	look-you see 3	oh-in fact 5
so-instead 1	you know-you see 2	oh-you see 5
however-in fact 1	however-you know 2	you know-as a result 4
however-on the other hand 1	you know-therefore 2	well-however 4
however-well 1	you see-in fact 2	well-therefore 4
in fact-well 1	I mean-on the other hand 2	however-look 4
you know-however 1	look-but 2	you see-oh 4
you know-nevertheless 1	like-look 2	however-on the other hand 3
you know-therefore 1	so-however 1	you know-nevertheless 3
you see-on the contrary 1	like-you see 1	you know-therefore 3
you see-on the other hand 1	on the other hand-however 1	I mean-instead 3
I mean-however 1	on the other hand-you see 1	I mean-on the other hand 3
I mean-on the other hand 1	therefore-you see 1	so-however 2
I mean-therefore 1	therefore-you know 1	like-you see 2
like-in fact 1	however-well 1	however-instead 2
well-on the other hand 1	you know-however 1	in fact-you see 2
look-but 1	like-in fact 1	instead-you see 2
oh-however 1	well-on the contrary 1	you know-however 2
look-you see 1	well-instead 1	you know-instead 2
look-I mean 1	look-oh 1	in fact-look 2

instead-oh 1, like-look 1, look-like 0, look-well 0
The number of other 62 SDM sequences is zero.

look-well 1, you see-look 1, look-like 1
The number of other 63 SDM sequences is zero.

you see-well 1, look-you see 1, look-well 1, look-but 0, look-so 0
The number of other 61 SDM sequences is zero.