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Causal Connection in the Detached Participle Clause Construction* **

UCHIDA Mitsumi***

本論文は、コンマで主節と区切られる後置分離現在分詞構文のうち、ジャーナリズム、学術論文などでしばしば見られる、分詞の意味上の主語が先行主節であるものを考察対象とする。主に情報伝達型ジャンルのコーパス資料から用例を収集し、文内レベル・文章レベルでの考察を行った。結果として、

- (1) この用法には、分詞になる動詞の意味特性として、結果情報を導入し、順向接続を明示するはたらきが不可欠であること
- (2) そういった意味特性を持つ動詞が分詞に置かれることによって独特の情報構造が作り出されていること
- (3) 分詞節で導かれる結果情報の登場が文脈上、読み手によってすでにある程度予測されているような状況で用いられ、その予測を確認するような場面で使用されること

の3点が明らかになった。

本研究は、単独の文だけを取り上げるのではなく、文章構成を視野に入れた考察をすることで、一見破格と見える現象が情報伝達の上で有意義な機能を果たしていることを明らかにするものである。

*分離現在分詞構文における因果的接続(内田充美)

** A part of this work was originally presented in my MA thesis. I have also presented subsets of the material in several places, including LCCC (Language, Communication and Computing Circle) meetings at Osaka University, 1994-1997; the 11th meeting of Osaka University Society for the Study of Language and Culture, 1996; the 9th meeting of the Japan Association of English Corpus Studies, 1997; and the 26th meeting of the Japan Society of English Usage and Style, 1997. I am grateful to T. Gunji, Y. Haruki, M. Imai, T. Okita, T. Saito and the two anonymous reviewers for the journal for their invaluable comments and suggestions on more than one version of the ideas presented here. I would also like to thank E. Costigan for the refinement of the English. I alone am responsible for the remaining errors or inconsistencies.

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1 Introduction

One of the major concerns for the writer of informative texts is to clearly demonstrate the causal relationship between one event or fact and another.¹⁾ Readers of informative texts expect the text to develop in an orderly way, while writers create texts on the assumption that their readers expect the connection between events or facts to be made explicit.

The present article focuses on an expression frequently used in the texts of informative genres which establishes a causal connection between clauses in a sentence. Examples (1) and (2) are from *TIME* magazine:

- (1) With the exception of the Salang Highway, roads into the city are cut, resulting in shortages of bread, diesel fuel, sugar, kerosene and other basics; (*TIME*, Feb. 6, 1989)
- (2) But in those with glaucoma, the drainage canals are somehow blocked, leading to an increase in pressure. (*TIME*, Apr. 23, 1990)

In each case, the detached participle clause, which is separated by a comma from its head clause,²⁾ introduces a piece of information consequential on the one stated in the head clause. That is, the fact that roads into the city are cut provoked the shortages of bread, diesel fuel, sugar, kerosene and other basics in (1); the situation that the drainage canals are blocked makes the pressure higher in (2). By employing this construction, we can state explicitly and concisely the causal connection between separate pieces of information, which is an advantage in the creation of a text of the informative type.

This construction, although encountered frequently in informative texts such as academic papers, product catalogs, and news articles, is often evalu-

¹⁾ The type "informative" contrasts with the "imaginative" text type, as in the LOB Corpus (cf. note 4). Texts of the informative type emphasize information content rather than literary effects.

²⁾ I use the term 'head clause' to designate the clause that directly superordinates the participle clause, which is sometimes not the 'main clause' of the whole sentence, as in examples (6), (12), (13) and (14) below.

ated as “anomalous” in that the implicit subject of the participle does not coincide with that of the head clause. Many reference books for practical use — e.g., Brusaw et al. (1976: 126-7), Booth (1984: 9, 45-6), and Harrison (1985: 89-90) — recommend abandoning the use of a participle clause of this type and recasting the sentence.

In what follows, I will show that the “downgraded” evaluation of the usage is untenable. Distributional variation across text genres is first presented in Section 2. The information structure realized in the sentence is examined in comparison with other constructions in Section 3. Analysis of examples from the viewpoint of text organization in Section 4 will clarify how effectively this type of participle clause functions in a text.

2 Consequential Participle Clauses

In this section, I review my previous observations, made in Uchida (1997, 1998) on this specific subtype of detached participle clause. After establishing a preliminary criterion in Subsection 2.1, I will present a cross-genre survey of the usage and reveal its skewed distribution in frequency (Subsection 2.2). Also considered are the common semantic properties among the verbs frequently used in participles (Subsection 2.3). It is shown that the type exemplified in (1) and (2) makes an independent subtype which deserves study in its own right, apart from ordinary backgrounding participle clauses.

2.1 The Implicit Subject of the Participle

The form of the target sentence in the present research is defined by the following syntactic criterion: the participle clause follows the head clause separated by a comma, and its implicit subject is not identical with the grammatical subject of the head clause but with the whole of the preceding head clause.

This phenomenon is often given the “downgraded” description of “dan-

gling”, meaning that the implicit subject of the participle does not coincide with the grammatical subject of the head clause, although the relative amelioration in acceptability compared to the typical example of “dangling” participle as in (3) is often noticed in major reference books.³⁾

- (3) *Having eaten our lunch, **the steamboat** departed.

(Quirk et al., 1985: 1122)

Even though such description of the phenomenon as “downgraded” could be justifiable, I claim that uniform application of the equi-subject rule is misguided. There is an underlying confusion of two different kinds of participle clauses: the type exemplified in (1) and (2) and ordinary backgrounding participle clauses as in (4).

- (4) **She** left the room, slamming the door behind her.

(Hopper & Thompson, 1980: 284)

2.2 Variation across Text Genres

My previous surveys on this specific subtype of “dangling” participle clauses have shown that its frequency is much higher in scientific text genres, especially in those of experimental sciences (Uchida, 1997, 1998). Fig. 1 shows the result of the survey on the frequency of detached participle clauses in the LOB Corpus⁴⁾ and in academic papers in chemistry.⁵⁾ Each bar represents the frequency per 10,000 words of detached participle clauses including both ordinary backgrounding ones and consequential ones.⁶⁾

The dark-colored portions represent the percentages of the “dangling” type exemplified by (1) and (2) in each category group. As is evident, the percentage in papers in chemistry is by far the highest. Among category

³⁾ Quirk et al. (1985: 1122) refers to the phenomenon in the course of describing the cases where the acceptability of “dangling” ameliorates. Swan (1995: 406) pays little attention to “misrelated” participles that are postposed.

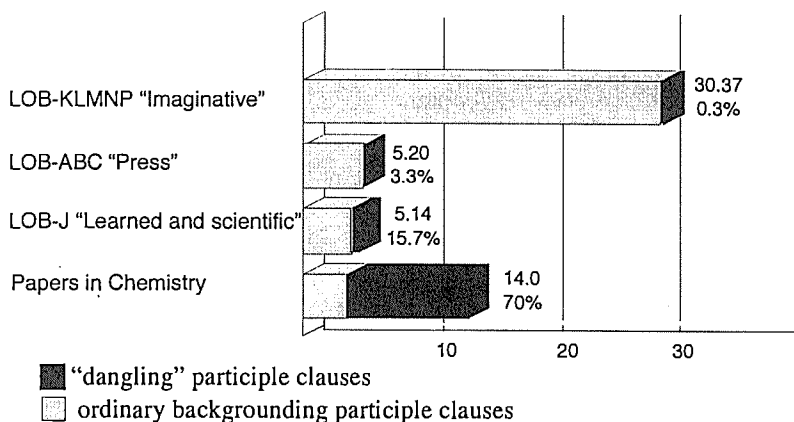


Fig. 1 Cross-Genre Comparison of Frequencies (Horizontal Scale) and Percentages of the "Dangling" Type (Modified from Uchida (1998))

⁴⁾ Categorization in the LOB Corpus is as follows:

Informative

A.	Press:reportage	88,543 words
B.	Press: editorial	54,294 words
C.	Press:reviews	34,216 words
D.	Religion	34,226 words
E.	Skills, trades and hobbies	76,567 words
F.	Popular lore	88,685 words
G.	Belles lettres, biography, essays	155,109 words
H.	Miscellaneous (Government documents, industry reports etc.)	60,600 words
J.	Learned and scientific writing	161,389 words

Imaginative

K.	General fiction	58,475 words
L.	Mystery and detective fiction	48,199 words
M.	Science fiction	12,026 words
N.	Adventure and western fiction	58,273 words
P.	Romance and love story	58,161 words
R.	Humour	18,070 words

Total 1,006,833 words

The comparative analysis is made among three groups of ABC (Press), J (Learned and scientific writing) and KLMNP (Imaginative).

groups in the LOB Corpus, the percentage in category J (Learned and scientific) is significantly higher than those in other category groups (KLMNP: Imaginative, ABC: Press). Note also that this usage is *not* restricted to scientific text types.

2.3 Semantically Limited Range of Verbs

I started with the syntactic criterion of subject identification pattern: the implicit subject of the participle is not the grammatical subject but the whole of the main clause. The result, however, has shown a shared functional tendency regardless of the text genre: the participle introduces information consequential to the main clause information. As Table 1 shows, the verbs in the surveyed examples are semantically restricted. All the verbs in the list have the implication of causal relationship in common.

As this suggests, the limited range of verbs indicates that the postposed participle clause, headed by a verb capable of establishing a causal connection, legitimately takes the foregoing clause as its implicit subject, regardless of the text genre. I have called this type of participle clause *consequential* and shown that it can be regarded as an independent class of clause combination in text organization (Uchida, 1998).

⁵⁾ I used 13 articles from the *Journal of the American Chemical Society*, 7 from *Nature* — retrieved from *CAS 12th Collective Abstracts CD-ROM* (American Chemical Society, 1993) which covers 2.4 million abstracts of papers published in 1987–1991, using the keywords “C60”, “fullerene” and “buckminsterfullerene”, which all designate a specific molecule consisting of 60 carbon atoms.

Journal of the American Chemical Society 1991.

5456–7 (USA), 5907–8 (USA), 6274–5 (USA), 6291–3 (USA), 6298–9 (USA), 6302–3 (USA), 6698–700 (USA), 6795–8 (USA), 7499–503 (USA), 7770–1 (USA), 7820–1 (Australia), 7870–2 (Canada), 8957–8 (USA)

Nature 1987. 6107: 792–4 (USA)

1991. 6324: 277 (UK), 6236: 464–7 (USA), 6328: 632–4 (USA), 6325: 380–2 (USA), 6331: 139–41 (USA), 6336: 605–7 (USA)

⁶⁾ This result is consistent with Thompson (1983) in that the frequency is much higher in imaginative category groups than in informative ones.

Table 1 Limited Variety of Verbs Used in the Surveyed Examples
(Modified from Uchida (1998))

LOB	KLMNP (Imaginative)	confirm, make
	ABC (Press)	cause, give, make
	J (Learned and scientific)	allow, concentrate, confirm, demonstrate, explain, give rise to, make, result in, reveal, show, support
Papers in Chemistry		afford, bring, confirm, generate, give, imply, indicate, lead to, make, produce, provide evidence for, result in, separate, suggest, yield

3 Topic-Comment Structure and “Grounding”

In this section, we will examine the information structure of the consequential participle clause construction in comparison with the ordinary type of detached participle clause construction.

The complex sentence which comprises a finite clause with a subordinated infinite clause has attracted the interest of researchers in functional and cognitive linguistics (e.g., Hopper and Thompson, 1980; Thompson, 1983; Tomlin, 1985; Givón, 1987; Talmy, 1978; Hayase, 1993 among others). In sum, there has been a general consensus that syntactic finiteness in form and the semantic significance in function tend to coincide: a psychologically more significant event or fact tends to be stated in the finite clause, less significant information in the infinite clause.

In the following subsection, we will look into one of the representative works subscribing to this generalization, namely, Thompson (1983), and question the appropriateness of the way the author deals with the consequential type of participle clause.

3.1 Thompson's Generalization

Thompson (1983) analyzes examples of detached participle clauses collected from various sorts of texts.⁷⁾ Based on the hypothesis presented in Hopper and Thompson (1980), the author compares participle clauses and head clauses by measuring respective "transitivity" rates.⁸⁾ She concludes that the essential function of the detached participle clause is backgrounding.

Example in (5), like example (4), represents the most common type of detached participle clause: the implicit subject of the participle coincides with the grammatical subject of the head clause (shown in bold face), and the information conveyed by the participle clause is construed as secondary or additive to that of the head clause. The generalization by Thompson is perfectly applicable to these examples of the ordinary type.

- (5) She walked that way down an ugly loading ramp with her back straight and her chin up, carrying immeasurable grief.

(*TIME*, May 30, 1994)

However, it is questionable whether this is also the case with the consequential type exemplified in (1) and (2). Example (6), which I would categorize as the consequential type, is quoted in Thompson (1983) as a typical example of "non-depictive" text.

⁷⁾ Her sources of data (to name only the authors and the titles): Alexander, T. *Darwinism and Human Affairs*; Buck, P. S. *The Three Daughters of Madame Liang*; Carterette, E. et al. *Informal Speech*; Chafe, W. (ed.) *The Pear Stories*; Erbaugh, M. *Coming to Order: Natural Selection and the Origin of Syntax in the Mandarin-Speaking Child*; Frye, N. *Fearful Symmetry: A Study of William Blake*; Goth, A. *Medial Pharmacology: Principles and Concepts*; Meyer, L. B. *Emotion and Meaning in Music*; Quine, W. V. O. *Word and Object*; Read, H. *Henry Moore: A Study of His Life and Work*; Severin, T. *Explorers of the Mississippi*; Tannahill, R. *Food in History*; Woodcock, G. *Asia, Gods and Cities*. (Thompson 1983: 64)

⁸⁾ Many works find the hypothesis of transitivity useful in explaining linguistic phenomena (e.g., Siewierska (1984) on the passive, Co Vet (1991) on tense and aspect). Their notion of transitivity, however, is a vague, circular and insufficiently-formalized tool for discourse studies: first, their listing of the factors of transitivity (i.e., Participants, Kinesis, Aspect, Punctuality, Volitionality, Affirmation, Mode, Agency, Affectedness of the Object, and Individuation of the Object) is not guaranteed to be exhaustive; second, all factors are treated as of equal importance, while some of them seem to be dependent on one another.

- (6) Preliminary findings already show that patterns of culture match predictions from the modern version of Darwinian theory to a much more significant degree than they were thought to in the past, indicating that objections from ontogenetic arguments must be reexamined.

(*Darwinism and Human Affairs* in Thompson (1983: 55))

It seems inappropriate, in relation to our present discussion, that she does not pay special attention to the significance of the information introduced by the participle clause. It is by no means background information that "does not immediately and crucially contribute to the speaker's goal" (Hopper and Thompson, 1980: 280). On the contrary, the fact that *objections from ontogenetic arguments must be reexamined* is an important, even crucial, point that is arising from *preliminary findings*.

It is evident that the generalization proposed by Thompson (1983) does not cover participle clauses of the consequential type. Moreover, the defining characteristics of the foregrounded portion proposed in Hopper and Thompson (1980), shown below, is inadequate for the consequential type:

... the foregrounded portions together comprise the backbone or skeleton of the text, forming its basic structure

... the foregrounded clauses are ordered in a temporal sequence. (p. 281)

In terms of this working definition, which is assumed by Thompson (1983), the dichotomy of foreground/background is not recognizable in most informative texts.

In the next subsection, the participle clause of consequential type will be compared with the ordinary backgrounding type in more general terms of topic-comment structure.

3.2 Topic-Comment Structure

In what follows, I use the term *topic* (*theme*) to designate the intraclausal function that contrasts with *comment* (*rheme*). The intraclausal function of *comment* is assigned to the portion that brings a new piece of information into the text and *topic* to the “grounding point for the information to cohere” (Givón, 1990: 897-898).

Fig. 2 shows the topic-comment structure of the ordinary backgrounding type of detached participle clause construction.

- (4) **She** left the room, slamming the door behind her.

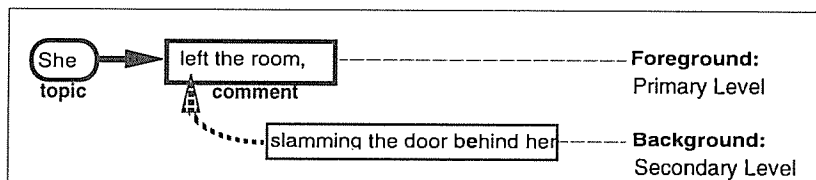


Fig. 2 Topic-Comment Structure of the Ordinary Backgrounding Type

The head clause *she left the room* comprises a topic-comment structure and makes the gist of the story, i.e., it belongs to the foreground portion in the text. The participle clause is the background portion “which does not immediately and crucially contribute to the speaker’s goal, but which merely assists, amplifies, or comments on it” (Hopper and Thompson, 1980: 280).

In contrast, Fig. 3 illustrates the structure of the consequential type I propose. In this structure, the participle clause carries an important piece of information that is indispensable in the text.⁹⁾ This indispensable information is introduced as a comment added to what is just stated in the head clause. That is, the whole head clause makes the topic for which new information can cohere.

⁹⁾ Its significant role in text organization will be further discussed in Subsection 4.3.

- (2) ... the drainage canals are somehow blocked, leading to an increase in pressure.

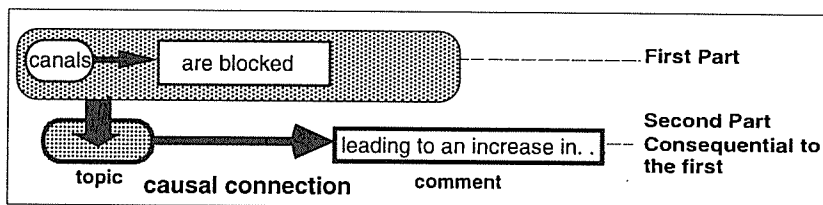


Fig. 3 Topic-Comment Structure of the Consequential Type

The topic-comment structure of the consequential participle clause construction closely resembles that of the sentential relative clause construction shown in Fig. 4.

- (7) He had some basic instinct that he didn't like inflation, which was a great help to us. (TIME, Jan. 23, 1989)

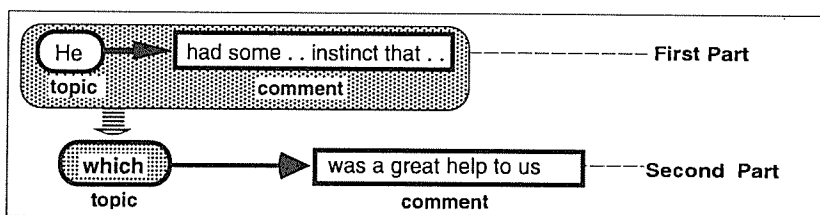


Fig. 4 Topic-Comment Structure of the Sentential Relative Clause Construction

In fact, the example (2) can be recast using a sentential relative clause as in (2') below, as pointed out in Quirk et al. (1985: 1122) and Thompson (1983: 55), among others:

- (2') ... the drainage canals are somehow blocked, which leads to an in-

crease in pressure.

However, the reverse paraphrase is not always possible; sentence (7) is a nonrephrasable example.

(7') *He had some basic instinct that he didn't like inflation, being a great help to us.

This is because the verb *be* does not imply causal relationship, and a participle clause with *being* cannot function as the consequential type.

The semantically restricted range of verbs shown in Subsection 2.3 indicates that the causal implication of the participle plays a crucial role in this construction.¹⁰⁾ The comparison of the topic-comment structure of this type of construction with that of ordinary backgrounding type, and with that of the sentential relative clause illustrates how the causal connection functions: the participle that denotes the causal relationship prompts the reader to anticipate a consequential piece of information, while the preceding information now becomes the topic (grounding point for coherence) for the new information.

3.3 The Tight-Knit Connection in Form and Meaning

One of the formal differences between the nonrestrictive relative clause and the consequential participle clause is whether the grammatical subject is expressed or not.

¹⁰⁾ Note that the relationship between the combined clauses is relatively weak and indirect, as the grammatical subject of the head clause is *not* shared with the implicit subject of the participle, and, moreover, consequential participle clauses do *not* necessarily share the tense, aspect, or modality with their head clauses. The connection established by causality, in this respect, seems to be just strong enough to compensate for this apparent lack of interdependence. In order for the two pieces of information, with few grammatical components in common, to be integrated into a single sentence, there should be such strong connection as causal relationship that justifies the combination of the clauses. This is, however, only speculation and subject to further examination.

In the participle clause, the subject is not specified overtly and the expression lacks tense and modality. Thus, the consequential information is immediately connected to the head clause without any intervention of subject, tense, or modality expression. Owing to this tight-knit connection in form, the writer can present the information that follows as if it were an automatic, inevitable natural consequence.

On the other hand, in the nonrestrictive relative clause, the relative pronoun *which* explicitly refers to the preceding clause and provides the grammatical subject. The relative clause expresses its own tense and modality as in (8), while the participle counterpart cannot.

- (8) The new printing systems will give us much greater flexibility and speed in our billing operations, which will result in a higher level of service for customers. (*Sunday Times*, Feb. 19, 1995)

With this construction, even though the verb *result* explicitly denotes a causal relationship, the connection is less automatic.

The semantic connection established by the *-ing* form, which is represented by the horizontal arrow in Fig. 3, is more automatic than that in the *which*-clause construction in Fig. 4.

4 Role of the Causal Connection

The participle clause lacks explicit indication of its subject. In this section, I will show that the implicit subject of the participle need not be explicitly identified for the consequential interpretation to be made. The sense of causality explicitly denoted by the participle forcibly directs the reader's attention almost exclusively to the consequence that follows.

Examination of the examples in larger contexts will give supporting evidence that this construction is restricted to the contexts where the consequential information is more or less expected or foreseen by the reader. Since the reader is ready to receive the consequential information, she or he concen-

trates attention on the coming information without ever trying to specifically identify the implicit subject of the participle from the context.

4.1 Semantically Unidentified Subject

In the consequential participle clause constructions in (9) through (11) below, the causal connection established by the participle is functionally equivalent to the coordinate causal connection as in (9') through (11') respectively. The cause is rather broadly construed as the preceding context.

- (9) Normally aircrafts are filled from the back to the front regardless of whether the passenger has a ticket for a window seat or an aisle, causing congestion and long delays.

(*The Times*, Feb. 9, 1995)

- (9') ..., and consequently congestion and long delays happen.

- (10) In some British cities the number of taxis has increased by up to 600% since 1960, resulting in fierce competition for passengers and a wave of violence and dirty tricks.

(*Sunday Times*, Jan. 1, 1995)

- (10') ..., and as a result there is fierce competition for passengers and a wave of violence and dirty tricks.

- (11) The product is partly soluble in potassium bicarbonate, indicating the presence of a carboxyl group. (*Nature*, 351. 6324, 1991)

- (11') ..., and therefore the presence of a carboxyl group is clear.

For the participle clause to be understood, there is no necessity for the cause to be specifically identified.

4.2 Intrasentential Observation

The lack of explicit identification of the cause, as well as the formal infiniteness of the clause, allows connection at various syntactic levels. In examples (12) through (14), the participle clauses, together with their head

clauses, comprise an embedded element of the sentence: *that*-clauses in (12) and (14), and a bare (*that*-less) embedded clause in (13). That is, the causal connection made by the participle is established within the embedded clauses.

- (12) Part of the problem is that most of the potential dam sites are in the less populated southwestern part of the country, making it expensive to transmit electricity to the industrial north and east.
(*TIME*, Dec. 19, 1994)
- (13) New research shows minorities living in poor urban areas are more likely to die from asthma than any other group, largely contributing to the rise in asthma deaths nationwide since the late 1970s.
(*TIME*, Dec. 19, 1994)
- (14) They discovered that the average computer user may click the mouse between 10,000 and 80,000 times a week, resulting in discomfort and injuries to the shoulder, elbow, wrist, hand, thumb and fingers.
(*The Times*, Jan. 6, 1995)

However, this is not always the case:

- (15) Murphy discovered that every one of its electrodes had been wired incorrectly, prompting him to declare: "If there are two or more ways of doing something, and one of them can lead to catastrophe, then someone will do it." (*Scientific American*, Apr. 1997)

Here, the causal relationship is linked beyond the boundary of a *that*-clause. The participle clause is connected to the matrix clause:

- (15') Murphy discovered that . . . , and as a result, he decided to declare: "If there are two or more ways of doing something . . ."

In sentence (16), more clauses than one seem to participate in the "leading to" connection.

- (16) When these people are sensitized to milk, the theory goes, they are also sensitized to their own cells, leading to the cells' destruction.
(*TIME*, Aug. 10, 1992)

This subsection regarding intrasentential function has shown that relative flexibility, or apparent inconsistency exists in the levels at which the causal connection is established. It is the lack of semantic identification of the subject that induces the phenomenon. That is, the cause of the connection can be identified relatively freely by the reader from the foregoing context, independent of the syntactic structure.

In the next subsection, some more examples will be analyzed from the viewpoint of text organization. The examination of contexts points to a shared tendency in their function in the texts. A functional motivation that underlies apparent inconsistency will be made clear.

4.3 Intersentential Observation: Function in Text Organization

The basic pattern of the function that I will show at the text level is typically represented at the intrasentential level by examples (12) through (14) above. That is, in (12) for example, the main purpose is to point to one of the problems about the dam project stated by the matrix clause. The head clause of the participle—namely, *most of the potential dam sites are in the less populated southwestern part of the country*—presents a fact as a problem. This presentation of the fact by itself, however, is not enough to clarify the problem of present concern. The participle clause completes the description of the problem by explicitly connecting fact and consequence. That is, it explains the worry occasioned by the fact just stated—it becomes expensive to transmit electricity to the industrial north and east. This is also the case with examples (13) and (14). In each case, the expectation of the reader who has just read the head clause is not yet fulfilled, as information that is directly relevant to the present context is not presented. Then, the participle signals the causal connection, directing the reader's attention to the consequence that fol-

lows. The consequential information satisfies the reader's expectation, and the sentence is successfully completed.

This suspension-satisfaction structure established at the intrasentential level is also observable across the boundary of the sentence. A fuller version of example (15) is given below as (17):

- (17) The modern version of Murphy's Law has its roots in U.S. Air Force studies performed in 1949 on the effects of rapid deceleration on pilots. Volunteers were strapped on a rocket-propelled sled, and their condition was monitored as the sled was brought to an abrupt halt. The monitoring was done by electrodes fitted to a harness designed by Captain Edward A. Murphy.

After what had seemed to be a flawless test run one day, the harness's failure to record any data puzzled technicians. Murphy discovered that every one of its electrodes had been wired incorrectly, prompting him to declare: "If there are two or more ways of doing something, and one of them can lead to catastrophe, then someone will do it." (Ibid.)

The participle clause is situated at the end of the second paragraph, which, together with the preceding one, states how Captain Edward A. Murphy has come to create the celebrated "Murphy's Law." The preceding paragraph begins with a sentence announcing the topic of the passage: *The modern version of Murphy's Law has its roots in U.S. Air Force studies performed in 1949 ...* After this, several pieces of factual information are stated in a neutral way, suspending the reader's expectation. The participle clause headed by *prompting* introduces the consequential information that appropriately fulfills the reader's expectation.

The wider context of example (16), shown below as (18), displays a similar tendency.

- (18) (...) But why does the immune system go on the attack?

A report in the *New England Journal of Medicine* says the culprit may be cow's milk, and the process a bizarre case of mistaken identity. Doctors at the Hospital for Sick Children in Toronto found that the diabetics had a much higher than normal level of antibodies to a protein in cow's milk called bovine serum albumin; their bodies have targeted the protein as an invader to be destroyed. By a terrible coincidence, a section of this milk protein is almost identical to a protein on the surface of insulin-producing cells. When these people are sensitized to milk, the theory goes, they are also sensitized to their own cells, leading to the cells' destruction. (*Ibid.*)

Just before the paragraph of our concern, the main theme of the passage is presented: *why does the immune system go on the attack?* The reader expects that the report in the *New England Journal of Medicine* will give an answer to this question. Most of the paragraph, however, states what is presented in the report in a neutral way. At the end, finally, the disclosed information about the report is successfully anchored to the reader's concern in terms of the consequential information introduced by the participle clause.

5 Conclusion

I have shown, through close observation of collected real texts, that the type of "dangling" participle clause that I define as the consequential type constitutes an independent class of clause combination in text organization. By illustrating the topic-comment structure of the consequential type in comparison with that of the ordinary backgrounding type, I have shown the inadequacy of previous descriptions.

As the semantically limited range of verbs shows, this type of "dangling" construction is made possible by the semantic properties of the verb in the participle. That is, the strong implication of a causal relationship is indispensable. The sense of causality expressed by the verb forcibly directs the read-

er's attention to the consequential information that follows. The immediate connection performed by the form implies automatic connection in meaning which the sentential relative clause construction cannot achieve.

The consequential participle clause can establish a causal connection at different syntactic levels. This is possible because the semantic subject of the causality need not be identified. The apparent inconsistency in the level at which the connection takes place can be given a consistent functional explanation at the text level: the consequential participle clause anchors the foregoing apparently less relevant information to the main flow of the text.

Examination at text level also reveals that the mutual assumption between writer and reader is indispensable. The construction is employed where the reader anticipates an additional piece of information consequential to the information stated so far, while the writer produces the text in order to fulfill the expectation by the reader.

This also provides explanation of the distributional variation across genres. When we read such informative texts as research papers, product catalogs and news articles, we are not satisfied with bald facts stated merely successively in a neutral way. We expect them to be accompanied by felicitous interpretations and commentaries, arranged in an orderly, logical sequence.

Thus, the alleged "anomalous" use of the participle clause is given a reasonable, consistent explication. The postposed participle clause, headed by a verb capable of establishing a causal connection, legitimately anchors the foregoing information to the current theme of the passage. The specific topic-comment structure realized in the sentence thus performs an important function in text organization, and contributes to the communicative efficiency of the text.

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