A Study on the Definite Article in English Based on the Rasch Model*

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Kim, Nayu & Lee, Heechul. (2018). A study on the definite article in English based on the Rasch model. *The Linguistic Association of Korea Journal, 26*(4), 37-54. The purpose of this study is to investigate the hierarchy of difficulty in the usage of the definite article by high school students in Korea based on the Rasch model and to analyze what causes the hierarchy of difficulty. This study investigates 133 high school students' responses on eight different uses of the definite article *a*s noted by Segall (1990). According to the findings, it is confirmed that students respond differently to the definite article depending on whether they have grammatical knowledge of it and understand the context of paragraphs. In order for students to understand the definite article correctly, systematic lessons are needed in English reading and writing classes. Moreover, an English teacher should include sentences that have different meaning by the definite article distributed throughout the text when designing a lesson plan for reading comprehension.

Key Words: definite article, Rasch model, hierarchy of difficulty

1. Introduction

Definite article *the* has difficult syntactic and semantic features in learning English as a foreign language. Just as indefinite article *a* or *an* plays an important role in English writing, definite article is not less significant than the

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other (Samraj, 2002). The use of article makes the meaning of the sentences completely different, and minor mistakes in the use of article have a decisive influence on the overall context (Mizuno, 1999). Excessive article makes it difficult to understand the sentence, and even when article is not properly inserted, it negatively affects delivering clear meaning (Myers, 1992). In particular, through definite article, readers are able to grasp the flow of the text more correctly and understand the whole context by understanding how words mentioned in the text are presented again (Snape, 2006).

However, high school students do not systematically learn about article. The proportion of grammar in English class has been reduced gradually due to the introduction of communicative language teaching and student-centered instruction (Young, 1995). Rather, English class is just based on key structures necessary for understanding or writing the sentences correctly, and there is no systematic lesson of the eight parts of speech including article. In the same vein, even high school students do not identify the features of definite article *the* correctly (Park, 2011). The fact that the most frequent occurrence when analyzing textbooks or reading materials is definite article reminds the English teachers that they need to provide students with an opportunity to learn more about definite article (Robertson, 2000). For this, it is needed to study how students perceive definite article and what is the most difficult. Most of studies on definite article *the* have focused on semantic or syntactic features, which lack in the investigation of the difficulty that students have felt with it. Considering that, it is necessary to extract factors that students have difficulty learning from the various uses of definite article and reflect them on the lesson plan (Kim, 2004). Just as other grammatical knowledge influences on students' English learning based on its difficulty, students have a hard time understanding the whole context by various usages of definite article. In other words, students understand some functions of definite article better than the others, and vice versa.

In this study, high school students' understanding of definite article *the* was investigated based on Rasch model, reflecting on eight uses of definite article *the* by Segall (1990). Learning the relatively easy and difficult usages to understand the hierarchical learning structure of definite article plays an important role for the English teacher to convey the correct contents effectively to the students. In

order to complete the purpose of this study, the research questions are followed: 1) What are the usages of definite article *the* that students in high school feel difficult? 2) What are the implications of the hierarchy of definite article *the* based on the Rasch model? 3) What does the teacher do in order to instruct definite article *the* in class?

2. Theoretical Backgrounds

The specific features of definite article *the* were analyzed on various dimensions. The research of definite article is mainly related to semantic features. Ionin, Ko and Wexler (2004) suggested that the features of article were categorized into two conceptualizations. They argued that the feature of *definiteness* reflects both the speaker's and the listener's knowledge about the referent of a noun phrase, while the feature *specificity* reflects only the speaker's. *Definiteness* means that if a determiner phrase is [+definite], the speaker and listener presuppose being of a unique individual in the set represented by the noun phrase. In other words, article encodes the feature of *definiteness*. The feature of *specificity* means whether a determiner phrase is [+specific], the speaker wants to refer to a unique object in the set represented by the noun phrase and supposes the individual to have some remarkable property (Jung & Park, 2013). In examples (1) ~ (4), only the feature of *definiteness* affects the choice of *the* and the feature of *specificity* does not result in its selection (Jung & Park, 2013). Therefore, *the* is selected with the feature of [+definite] in (1) and (2), and *a*, with the feature of [-definite] in (3) and (4) (Chung, 2009).

(1) I ordered a glass of milk, but I think something dropped into *the* milk. [+definite, +specific]
(2) The reporter is eager to interview *the* winner of tomorrow's 100-meter race, whoever it is. [+definite, -specific]
(3) When I woke up this morning, I saw *a* bird on a tree and it soon flew away. [-definite, +specific]
(4) I am looking for *a* book for my son's birthday. Can you help me find one? [-definite, -specific]

Moreover, according to the Fluctuation Hypothesis of Ionin, Ko and Wexler (2004), Korean and Russian L2 learners of English vary between *specificity* and *definiteness*. They refer to these two semantic features in their formulation of the Article Choice Parameter. The Article Choice Parameter suggests that a language which has two articles has *definiteness* setting and *specificity* setting. The Fluctuation Hypothesis means L2 learners have access to Universal Grammar principles and parameter settings and they have a variety of different parameter settings until the input makes them set the parameter to the proper value. Korean learners of EFL adopt definite article when the determiner phrase occurs in the [+specific] more frequently than when in the [-specific] (22% and 4%) (Ionin, Ko and Wexler, 2004). In the same vein, Jung and Park (2013) suggested that the English dialogues consisted of one of four features such as [+definite, +specific], [+definite, -specific], [-definite, +specific] and [-definite, -specific].

Research has also been conducted on how students actually respond to these features. Kim (2006) used an online assessment measuring the time of reading the sentences which presented the semantic contexts of [-definite, -specific] or [-definite, +specific]. The results showed that the intermediate Korean learners of EFL revealed various responses between the two settings such as the *definiteness* and *specificity*. However, the findings of Kim's (2006) in offline test verified that the participants distinguished article mainly based on *definiteness*. Chung (2009) examined the roles of definite article in the understanding of English article by Korean high school students. His online test attempted to investigate the time of reading the noun and article in the same semantic features including [-definite, -specific] and [-definite, +specific]. This study showed that the semantic feature of *specificity* plays an important role in learning indefinite article *a*. His study revealed that Universal Grammar is also related to the acquisition of English article.

Segall (1990) suggested that article indicates an attitude that is to be taken toward a noun, and the attitude that readers have is different to Koreans and native English speakers. The concepts of *definiteness*, *indefiniteness*, *limitedness*, and *unlimitedness*, as transmitted by article to nouns, are connected with the mentality, culture, and history of English speaking people (Segall, 1990). He claimed that article caused many problems for Koreans in that they reflected basic attitudes not easy to get at, that they had unique roots in their history and

that they admitted many exceptions. He argued that even though researchers had tried to formulate rules in order for students to know which article to use, no one has been successful in designing the rules because of the nature of article as indicators of basic attitudes toward noun. Based on this dimension, he analyzed eight uses of definite article *the* such as "backward reference," "forward reference," "implied post-modification," "uniqueness," "uniqueness in a limited context," "whole-group reference," "proper names," and "titles containing *of*." The following examples (5) ~ (12) reveal each use of definite article *the* (Segall 1990).

(5) He has a cat and a dog. *The* dog barks a lot. [backward reference]
(6) *The* man in the blue suit is my father. [forward reference]
(7) *The* coal (that you ordered) has arrived. [implied post-modification]
(8) *The* sun is hot today. [uniqueness]
(9) Please pass *the* butter (in the dining room). [uniqueness in a limited context]
(10) He is in a school for *the* blind. [whole-group reference]
(11) We will go to *the* Atlantic Ocean. [proper names]
(12) She is *the* president of Harvard. [titles containing *of*]

Suggesting the uses presented above, Segall (1990) argued that native English speakers do not think about the uses when choosing definite article and their focus is on their attitude toward a noun and on the impact they want to make in a certain context so that they communicate a sense of *definiteness*, *indefiniteness*, *uniqueness* or *generality*. Moreover, he suggested that the students acquire the features only for that purpose so that he or she finally internalizes them and makes their use automatic. However, what matters in discussing definite article *the* is not only semantic or syntactic features but also how students understand its uses and how to teach it in class (Eun, 2008, Lee and Uhm, 2014).

3. Research Procedure

3.1. Participants

In this study, 133 high school students participated. They are all high school second graders. All students attend the same high school and the school is located in the provincial city of Korea in 2018. All students have learned the same English curriculum and receive five hours of English classes per week. None of the students had ever studied in English-speaking countries for more than three months. Given the standardized English achievement test scores conducted nationwide for students' English proficiency, the level of the students is approximately intermediate. All students have English classes with the same English teacher, and no experience of teaching English article *a, an* and *the* separately.

3.2. Instrument

The instrument consisted of eight items. Each question contains a sentence containing one of the eight uses of definite article categorized by Segall (1990), and the example used by him was modified to reflect the English level of the students who participated in the study. The instrument was a story composed of 366 words in total, and eight cloze items were placed in the middle of the six paragraphs, which contained definite article *the* or not. The eight items included eight different usages of definite article. The usage that each item asked is as shown in Table 1. Students were asked whether they knew the knowledge of definite article *the* correctly by inserting or not *the* in each blank.

Table 1. Item & Uses of Definite Article

Item	Uses of Definite Article
1	uniqueness
2	proper names
3	backward reference
4	whole-group reference
5	titles containing *of*
6	uniqueness in a limited context
7	implied post-modification
8	forward reference

3.3. Data Analysis

The subjects responded to Segall's (1990) eight usages: 1) "backward reference," 2) "forward reference," 3) "implied post-modification," 4) "uniqueness," 5) "uniqueness in a limited context," 6) "whole-group reference," 7) "proper names," and 8) "titles containing *of*." The correct answer in each item was coded and entered as "one" and the incorrect answer "zero" in Excel version 2010 before it was processed by Winsteps, which is normally used for Rasch modeling of dichotomous data (Linacre, 2009). The program reveals statistics and graphs for analyzing test items including misfit items, item difficulty, item map, and summary statistics (McNamara, 1996). The Rasch model transforms empirical data such as participants' responses into a logit scale ranging anywhere from -4 to +4 (Bond & Fox, 2007). On the logit scale, the average performance is set as "zero". As the number unit on the scale increases, so does the difficulty associated with items (Li & Olejnik, 1997). Winsteps converts the person ability and item difficulty into logit values and evaluates both phases at the same time (Linacre, 2009). This logit value is obtained by converting the response of the participant to the natural log value, and has the effect of readjusting the sequence scale to the isometric scale (Bond & Fox, 2007).

4. Results and Discussions

4.1. Analysis of Reliability

The item reliability in the Rasch model refers to the degree of consistency observed in a similar group of students (Linacre, 2009). The item reliability of this research was .84 as shown in Table 2, indicating that high levels of agreement would be expected from another similar group who have the same English proficiency. The mean value of raw score was 81.6 with the standard deviation (SD) of 12.9. The maximum score was 104.0 and the minimum one was 67.0. The item difficulty ranged from -.89 to 0, and the misfit index of Infit ZSTD ranged from -2.0 to .2. Considering the mean and SD, it was confirmed that the students showed a big difference in understanding definite article *the*. In

particular, the fact that the difference between the maximum and the minimum is almost twice as much represents that the students' knowledge of definite article *the* is superficial and is not simply related to students' English ability.

Table 2. Summary of Measured Items

	Raw Score	Count	Measure	Model Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	81.6	133	.00	.19	1.00	-.2	1.03	-.1
SD	12.9	0	.49	.01	.09	1.3	.16	1.3
Max.	104.0	133	.54	.22	1.14	1.5	1.37	2.0
Min.	67.0	133	-.89	.19	.89	-2.0	.86	-1.9
Reliability		.84	S.E. of Item Mean	.19				

4.2. Analysis of Misfit Items

The criterion for determining the fitness of the Rasch model is between the MNSQ value of .70 and 1.3 in the Infit, the ZSTD value of between 2.0 and -2.0 in the Outfit, and the point fit correlation coefficient (PT Measure Corr) between 0.4 and 0.8. The items that do not meet all three criteria are divided into low-fit items and over-sum items. The low fit item is one whose MNSQ score is 1.4 or higher in the Infit and at the same time, the ZSTD value is 2.0 or higher in the Outfit. It is an item whose difficulty level is unpredictable regardless of the ability parameters of the subjects. On the other hand, the over-sum item has a value of MNSQ of less than .7 the Infit and a value of ZSTD of less than -2.0 in the Outfit, which is not helpful in measuring the difference between the respondents (Linacre, 2009). The fit statistics in Table 3 revealed that item 3, 4 and 6 do not have perfect fitness in the Rasch model and each value of ZSTD in the Outfit is 2.0, -1.9, and -1.9.

Table 3. Item Statistics−Misfit Order

Item	Total Score	Count	Measure	Infit		Outfit		PT-measure	
				MNSQ	ZSTD	MNSQ	ZSTD	Corr.	Exp.
3	104	133	-.89	1.13	1.1	1.37	**2.0**	.12	.30
2	96	133	-.53	1.14	1.5	1.17	1.3	.15	.32
7	71	133	.40	1.08	1.3	1.07	1.0	.27	.35
5	75	133	.26	.97	-.6	.97	-.4	.38	.35
1	78	133	.15	.95	-.8	.96	-.5	.40	.34
8	92	133	-.36	.95	-.6	.95	-.4	.38	.33
6	70	133	.43	.90	-1.8	.86	**-1.9**	.47	.35
4	67	133	.54	.89	-2.0	.87	**-1.9**	.48	.35

Item 3 contains the use of "backward reference" of definite article, where "the matters" is repeated in the text, in the previous sentence in (13). In this case, since words that should be repeated in text need definite article, the students identify the use easily. Item 4 in (14) represents "whole-group reference," where "the poor" means "poor people," which the students understand easily. That's because in English class from in middle school, particularly in grammar class, the students have been taught frequently that "the adjective" meant "adjective people." However, if the student did not think of such knowledge, even if he or she understood the whole context, they could not identify the correct answer. Item 6 is the use of "uniqueness in a limited context" in (15), where "the mail" means "the mail to the office" in the context. In the use of definite article, the students find out definite article not through something or someone directly referent but through inferring context, where words that need definite article are not repeated in the text and that makes the students confused.
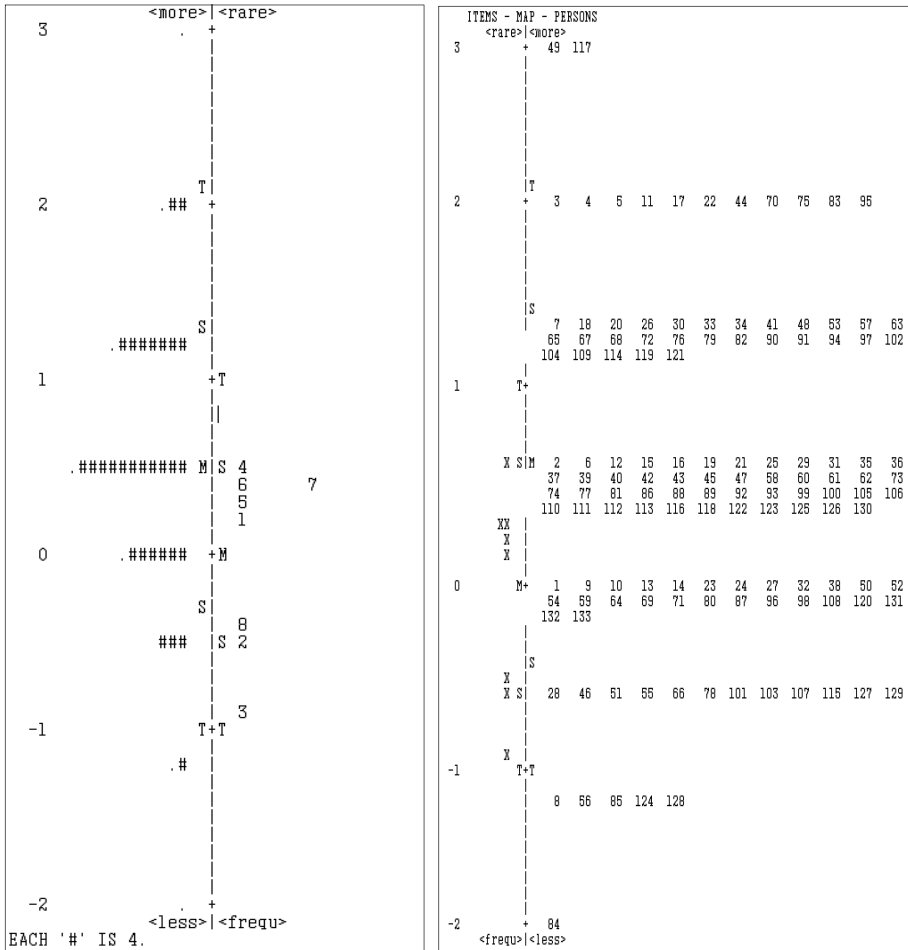
(13) But before I could act on my own youthful dreams, there were other matters to take care of. _____ matters were really important to me at that time. (item 3-[backward reference])

(14) After the spectacular success of the Falcon, Robert McNamara had authorized the development of another new car, a German- built compact known as the Cardinal, as he took ____ poor into consideration. (item 4-[whole-group reference])

(15) This was a surprise to us, because that car had not been very successful, selling only fifty-three thousand units over three years. But _____ mail was telling us consumer tastes were changing. (item 6-[uniqueness in a limited context])

4.3. Analysis of Item and Person Map

In the item map provided in the Rasch model, item difficulty were matched with subjects' ability levels along the logit scale at the same time. The subject is interpreted as a relatively high-level student when the log value is zero or more, and when the log value is zero or less, the ability is low. Likewise, the item is interpreted as having a relatively high degree of difficulty when the item is distributed over the log value zero, and on the other hand, when the value is less than zero, the difficulty is relatively low. In addition, on both axes, M and S corresponds to the log average value and the standard deviation of +/-1 log value respectively, and T corresponds to the standard deviation of +/-2 log value. If the subject and the item difficulty are located at the same log value, the possibility that the subject finds out the correct answer on the item is 50% (Linacre, 2009).

Figure 1. Item & Person Map

Items 4, 5, 6 and 7 are relatively difficult items and items 2, 3 and 8 are easy ones as shown in Figure 1. The former group consists of 'uniqueness,' 'whole-group reference', 'titles containing *of*', 'uniqueness in a limited context' and "implied post-modification," which appear when something or someone are not repeated in the text. However, in items 1 and 5, even though there are clear characteristics which need definite article such as unique presence and preposition *of*, items 4, 6 and 7 do not have manifested clues, so the students infer the knowledge vaguely. The latter group including items 2, 3 and 8 have

words that are repeated in the text or have a capital letter on initial. These factors help students easily solve the questions.

Item 2 in (16) is the use of "uniqueness" of definite article, where "White House" is not duplicated in the world. In this case, since words that need definite article have a capital letter on initial, the students identify the use easily regardless of understanding whole context. When solving item 8 in (17), students easily use two clues. First, students are sure to use "the number of ~" phrases to find out the answer, or to fill the blank with definite article *the* considering the phrase of "college students" mentioned above.

(16) In 1960, the whole country was optimistic. With Kennedy in _____ White House, a fresh breeze was blowing across the land. It carried an unspoken message that anything was possible. (item 2-[uniqueness])

(17) We already knew that college-educated people bought cars at a much higher rate than their less-educated counterparts, and our projections showed that _____ number of college students was going to double by 1970. (item 8-[forward reference])
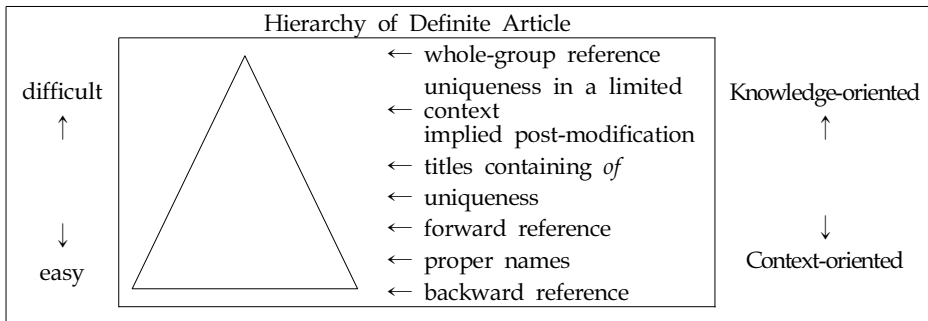
Item 5 in (18) is not solved if students do not have the knowledge that they use *the* in title and position in the job. This item asks students to have knowledge of the grammar rather than confirming the use of it through the context of the text. In particular, item 7 in (19) is the use of "implied post-modification" of definite article, where "the researchers" means "the researchers in the laboratory" in the text. In this case, since clues are not repeated in the presented sentences, and students infer the implied post-modification which are not manifested, the students do not identify the use easily.

(18) Meanwhile, _____ director of our public-relations department was receiving a steady stream of letters from people who wanted us to bring out another two-passenger Thunderbird. (item 5-[titles containing *of*])

(19) _____ researchers added an obscure but interesting footnote. Not only would there be more young people than ever before, but they would also be better educated than previous generations. (item 7-[implied post-modification])

5. Conclusion and Implication

The purpose of this study was to investigate the degree of high school students' understanding and the difficulty of definite article *the*. In order to do this, the eight uses of *the* by Segall's (1990) classification were utilized and the misfit, the most difficult or the easiest items containing the uses were extracted. The uses of definite article *the* that students feel difficult are analyzed in the order of "whole-group reference," "uniqueness in a limited context," and "implied post-modification," and "backward reference," "proper names," and "forward reference" are relatively easy for students. The use of each definite article showed the following hierarchy based on difficulty level as shown in Figure 2.

Figure 2. Hierarchy of Definite Article

The elements that make students feel easy or difficult are as follows. First, there is a grammatical knowledge of the particular case where definite article *the* is used. For example, in the expression of the whole group, the presentation of position and title, the occurrence of proper noun, the knowledge using definite article *the* serves as an important factor in the correct use. A student who does not have the grammatical knowledge correctly does not understand the whole context of English reading and does not perform writing tasks. English lessons nowadays have focused on communication skills rather than on grammar and vocabulary knowledge, and the ignorance of grammatical knowledge causes unintended incompetence. To improve this, systematic lessons of *the* are needed

in English class, particularly in the reading and writing. It does not mean mechanical memorization of definite article. However, just as the learning of the basic structure of the sentence is significant, the importance of article learning should not be overlooked. Second, it is necessary for teachers to make students understand the context of paragraphs and text as a whole. The "implied post-modification," "backward reference," and "forward reference" are the uses of definite article *the* that cannot be grasped if the students do not understand the context. In addition, it is overly superficial to teach them that it is definite article *the* that describes the preceding word repeatedly. It needs to reflect actively understanding the modification and references distributed throughout the text on the reading comprehension lesson plan. In the instrument used in this study, students felt relatively easy to understand "backward reference" and "forward reference," but it was important to consider the probability that they obtained clues from repeated words without accurate knowledge of it and noticed it. Moreover, there is no item about the proper use of article in the College Aptitude Test in Korea, and the fact that the question requiring accurate identification of the reference is just one item reminds the teachers that it is necessary to perform accurate reading and writing lessons with understanding of article.

However, there are some limits on this study. First, this study focused on just high school students, which meant primary or middle school students could be included as the subjects. In addition, the eight uses of definite article *the* by Segall (1990) were investigated in this study, which insisted that categorizations of definite article by the other researchers needed to be discussed. Moreover, it is necessary to investigate indefinite article *a* or *an*, even though definite article *the* were analyzed in this study, in order to analyze the authentic traits of article.

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Appendix Instrument of Definite Article <Segall, 1990>

Date: _____. _____.
Grade: _____.

■ 다음 글을 읽고 빈 칸에 **the**가 필요하면 **the**를 써 넣으시오. **the**가 필요 없는 빈 칸에는 X를 써 넣으시오.

My years as general manager of the Ford Division were (1)_____ happiest period of my life. For my colleagues and me, this was fire-in-the-belly time. We were high from smoking our own brand - a combination of hard work and big dreams.

In 1960, the whole country was optimistic. With Kennedy in (2)_____ White House, a fresh breeze was blowing across the land. It carried an unspoken message that anything was possible. The striking contrast between the new decade and the 1950s, between John Kennedy and Dwight Eisenhower, could be summed up in a single word - youth.

But before I could act on my own youthful dreams, there were other matters to take care of. (3)_____ matters were really important to me at that time. After the spectacular success of the Falcon, Robert McNamara had authorized the development of another new car, a German-built compact known as the Cardinal, as he took (4)_____ poor into consideration. It was scheduled to be introduced in the fall of 1962, and when I took over the Ford Division, one of my responsibilities was to oversee its production.

...

With the Cardinal out of the way, I was free to work on my own projects. Right away, I brought together a group of bright and creative young guys from the Ford Division. I was a young Turk, a new vice-president who hadn't yet proved himself. My guys were talented, but they weren't always the most popular people in the company.

Meanwhile, (5)____ director of our public-relations department was receiving a steady stream of letters from people who wanted us to bring out another two-passenger Thunderbird. This was a surprise to us, because that car had not been very successful, selling only fifty-three thousand units over three years. But (6)____ mail was telling us consumer tastes were changing.

(7)_____ researchers added an obscure but interesting footnote. Not only would there be more young people than ever before, but they would also be better educated than previous generations. We already knew that college-educated people bought cars at a much higher rate than their less-educated counterparts, and our projections showed that (8)_____ number of college students was going to double by 1970.

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