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<td>Author(s)</td>
<td>Bradford, J., Lee</td>
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A Qualitative Analysis of Three Textual Enhancement Techniques

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The concept of noticing is a key tenet of second language acquisition (SLA). Teachers have long been using every method available to get their students to pay attention, in the hopes of increasing the likelihood that their lessons will 'stick', a term known as intake in SLA. The current study investigated the efficacy of three textual enhancement (TE) techniques at drawing N = 168 Japanese university students' awareness to the desired language feature, the first step towards noticing. Results indicated that contrary to predictions, participants were only moderately able to identify the target of instruction (47.6%; 74.4%; 58.3%, respectively). These results carry significant implications for not only language teachers, but for SLA researchers who have thus far been baffled as to why TE research has often yielded conflicting results.

Key Words:  Input Enhancement; Textual Enhancement, Noticing Hypothesis, Focus-on-Form

1. Introduction

The noticing hypothesis (Schmidt, 1990(1), 2001(2)) posits that input does not result in language learning unless it is consciously registered (i.e., noticed). However, explicit instruction results in explicit knowledge, not the development of the implicit ability required to hold fluent, spontaneous discourse. The challenge for second language instructors is then: how to trigger noticing in students (and thus develop their communicative competence) without directly telling them what it is we wish them to learn (i.e., via explicit instruction). This led to the development of input enhancement (IE) techniques, an umbrella term for the artificial manipulation of input to increase the perceptual saliency of desired features. However, despite decades of research, IE's contribution towards language acquisition is still unclear. Particularly, work done on textual enhancement (TE) has proven inconclusive, due in large part to the disparity of research methods, materials, target features, and target populations (Han et al., 2008(3); Lee & Huang, 2008(4)).

While the effects of various TE techniques have been analyzed in terms of specific outcome measures (i.e., the success or failure of acquisition of the target feature), it has been noted that there is a time lag between when features are first noticed, to when they appear in the interlanguage (Fotos, 1993(5)). A more elucidative strategy might therefore be to first examine whether various enhancements are successful at eliciting noticing of the proper target. It stands to reason that if the treatment methods do not result in noticing of the targets, observed outcomes cannot be reliably measured, attributed to the enhancement, or be a function of the duration/timing of the study design. The current study sought to address this concern by asking the following research questions (RQ):

① To what degree are students able to decipher the intended grammar lesson embedded in three enhanced texts?
② What common misconceptions exist, if any, in student’s interpretation of the enhancements?
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2. Review of the Literature

2.1 The Noticing Hypothesis

While it may seem intuitive that a student will learn something better if they were paying attention than if they were not, formally describing the neuropsychological workings of the brain is much more complicated. In the field of applied linguistics, Schmidt’s (1990)\(^{(1)}\) attempt at compiling his noticing hypothesis was one of the most influential theories to date. According to this hypothesis, perception, noticing, and understanding are three distinct levels of awareness. Perception refers to the physiological aspects related to the body’s senses, in essence, whether the stimulus rises to the degree where it is physically able to be detected by a person. Schmidt notes that perception does not require consciousness; a stimulus can even be perceived subliminally, for example. This contrasts with the second level, noticing, which can only be said to begin when a person consciously directs their awareness to the stimulus. It should be noted that just because the stimulus has risen to the state where it is picked up consciously, noticing does not entail any reflection or analysis. That distinction marks the final stage, understanding, where a person makes an effort to process the significance of the noticed stimulus.

When reading, for example, we are normally aware of (notice) the content of what we are reading, rather than the syntactic peculiarities of the writer’s style, the style of type in which the text is set, music playing on a radio in the next room, or background noise outside a window. However, we still perceive these competing stimuli and may pay attention to them if we choose. (Schmidt, 1990, p. 132)\(^{(1)}\)

Despite heavy criticism due to the untestable and ambiguous nature of its claims (notably Truscott, 1998)\(^{(6)}\), the noticing hypothesis has found vast support, both theoretically and empirically (see Baars, 1997\(^{(7)}\); Hama & Leow, 2010\(^{(8)}\); Perruchet & Pacton, 2006\(^{(9)}\); Williams, 2005\(^{(10)}\)). Researchers have suggested that paying attention vastly improves the rate and success of linguistic encoding (Cowan, 1995\(^{(11)}\); LaBerge, 1995\(^{(12)}\)), while lax attention or passiveness are inefficient and unsuccessful (Hulstijn, 2001\(^{(13)}\); Schmidt, 2001\(^{(2)}\)). The consensus has therefore been that while attention is not always required for learning (Schmidt, 2001\(^{(2)}\)), more attention generally leads to more learning.

2.2 Input Enhancement

First formally termed by Sharwood Smith (1991)\(^{(14)}\), IE is an umbrella term for any “techniques for manipulating the target language input in order to increase the saliency of certain linguistic elements in otherwise meaning-oriented activities” (Reinders & Cho, 2012, p. 7)\(^{(15)}\). As such, IE lends itself to the instruction of all aspects of language learning: grammatical, lexical, pronunciation, reading comprehension, among others. The goal of raising the perceptual salience of target forms is that learners are more likely to pay attention to them, retain them longer, and possibly process them further (i.e., the first step towards eventual acquisition) (Gass, 1997\(^{(16)}\); Schmidt, 2001\(^{(2)}\); Sharwood Smith, 1993\(^{(17)}\); VanPatten, 1996\(^{(18)}\)). Types of IE include both negative evidence (e.g., corrective feedback or metalinguistic explanation) as well as positive (e.g., highlighting occurrences of the target grammar). Table 1 below shows some common forms of IE in applied linguistics research.

<table>
<thead>
<tr>
<th>IE</th>
<th>features</th>
<th>suggested reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textual / Visual</td>
<td>highlighting, bolding, italicizing, coloring, enlarging, etc.</td>
<td>Lee &amp; Huang, 2008(^{(4)})</td>
</tr>
<tr>
<td>Audio / Aural</td>
<td>varying volume, speed, or introducing pauses</td>
<td>Reinders &amp; Cho, 2012(^{(15)})</td>
</tr>
<tr>
<td>Input Flooding</td>
<td>plentiful repetitions of the target</td>
<td>Loewen et al., 2009(^{(19)})</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>physical activity (e.g., clapping in time with input)</td>
<td>Lee et al., 2020(^{(26)})</td>
</tr>
<tr>
<td>Corrective Feedback</td>
<td>explicit correction, recasts, clarification requests, etc.</td>
<td>Lyster &amp; Ranta, 1997(^{(21)})</td>
</tr>
</tbody>
</table>
Unfortunately, while massive amounts of studies have examined the effect of IE on various aspects of language acquisition, evidence of its efficacy has thus far proved inconclusive. While IE techniques have been shown to be effective at drawing noticing to the target forms, explicit development from noticing to acquisition have been difficult to measure (Simard, 2018) (22). Experimental conditions also seem to affect the outcome of experiments as well, with English-as-a-foreign-language students generally showing more gains than English-as-a-second-language ones (Li, 2010) (23). The duration of treatment, along with the age of the learners have also been suggested to impact results (Lyster & Saito, 2010) (24). The IE technique itself is also a large factor, with explicit techniques such as corrective feedback or explicit direction to pay attention to form generally appearing more effective than implicit ones (see Norris & Ortega, 2000 (25) for a meta-analysis of 49 studies).

Specifically regarding textual enhancement, the focus of the current study, Lee and Huang’s (2008) (4) meta-analysis found that in many studies, TE’s effects were being compared to that of input flooding or explicit grammar instruction, not to a control group, thus making it difficult to isolate the effects of the techniques. In addition, learner proficiencies, target languages, target forms, TE techniques, the length of treatment, the length of the reading material, and post-testing procedures (e.g., immediate versus delayed testing, fill-in-the-blank, correction tasks, free production, etc.), were all different across the studies. With such a wide range of variables, it is difficult to draw any significant conclusions, exacerbated by the conflicting results presented in the studies.

One fundamental aspect to examine when investigating the effectiveness of TE techniques is to determine what the learner is cognizant of regarding the enhanced feature. While recent eye-tracking studies have objectively measured that TE generally leads to greater physical direction of the eyes to the areas of interest (e.g., Indraratna, 2019 (26); Indraratna & Kormos, 2016 (27); Issa et al., 2015 (28)), it cannot be assumed that this attention equates to noticing the target as intended. The current study therefore will make use of interview and think-aloud protocols to determine what learners attend to while looking at three forms of enhanced text.

3. Study Design

3.1 Participants

The current study was conducted at the self-directed learning center of a small, private university in a rural area of Japan. While this university does not have an English major, students are required to take English courses throughout their four years of enrollment to satisfy their graduation requirements. In addition to these mandatory classes, the university has a facility that is open daily which is staffed by members of the English faculty. Students are able to come and go freely and use the room for private or group study or speak with the faculty members on hand. First year students are required to visit the center at least once every two months, though upperclassmen do not have this requirement.

Recruitment efforts resulted in 168 participants, comprised of first year ($n = 127$), second year ($n = 24$), and third year students ($n = 17$). Members from all eight of the university’s academic departments were found to be represented, though it should be noted that the mandatory English curriculum is the same for the entire student body, regardless of academic major. As the general enrollment of the university is predominantly male, the volunteer participants were accordingly so (88.10%), and included both Japanese nationals ($n = 156$) and foreign students ($n = 12$).

3.2 Materials and Methodology

Two short passages were created for the study which focused on either the third-person /-s/ and /-es/ allomorphs (89 words; see Appendix) or present progressive /-ing/ form (100 words; see Appendix). The texts were written in a casual style most familiar to the participants and graded at Level 3 (intermediate) on the New General Service List (Browne, 2014) (29). The texts detailed the daily activities of two people with the target forms embedded 13 times each.

Students who consented to join the study were interviewed individually by the researcher. First, they were told the difference between implicit and explicit instruction and told that they would be shown a series of enhanced texts. They were then presented with Text 1 (Appendix A), a short paragraph where every instance of the third-person /-s/ or /-es/ allomorphs were changed to a red font color. They were then asked if they could determine what the text was trying to implicitly teach.
them. Those who answered in the affirmative were prompted to surmise what they thought the lesson was. This pattern was repeated for Text 2 (Appendix B), a short paragraph where every instance of the present progressive /-ing/ was enlarged to double the size of the surrounding text. Text 3 (Appendix C), made use of the same passage as Text 1, but with each instance of a third-person verb (i.e., not only the allomorphs) enlarged to double the size of the surrounding text. Once the three texts had been analyzed individually, all three texts were laid out in front of the students. Participants were asked to comment on what they noticed while looking at each one in a think-aloud protocol. At this stage, the researcher took notes of the participants’ responses and coded them as either marked or unmarked for the mention of the correct grammatical feature.

4. Results

The responses to the analyses of the individual texts are presented below in Tables 2 – 4. As reported in Table 2, when students were asked if they could deduce what each enhanced text was trying to emphasize, a large percentage of the students reported that they could (75.60%, 88.10%, and 77.98%, respectively).

<table>
<thead>
<tr>
<th>Responses to: Can you guess what point this enhanced text is trying to teach?</th>
<th>Frequency</th>
<th>Relative Frequency (n/168)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text 1</td>
<td>Yes</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>41</td>
</tr>
<tr>
<td>Text 2</td>
<td>Yes</td>
<td>148</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>20</td>
</tr>
<tr>
<td>Text 3</td>
<td>Yes</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>37</td>
</tr>
</tbody>
</table>

*Note: Text 1: /-s/, /-es/ colored red; Text 2: enlarged font for /-ing/ suffixes; Text 3: enlarged font for all 3rd person verbs*  

Those participants who answered yes above were asked to explicitly state what they thought the emphasis was in each text. The responses were coded as marked or unmarked for mention of the correct target form. The percentages of accurate responses are reported below. As can be seen in Table 3, while a majority of respondents had correctly assumed the target of instruction based on the textual enhancements, large portions of the population were revealed to have made incorrect assumptions about each task (37.01%, 15.54%, and 21.19%, respectively). Table 4 then shows the percentage of accurate responses from each text as expressed as a percentage of the entire population (N = 168).

<table>
<thead>
<tr>
<th>Responses to: If you answered “yes”, what do you think the point of the lesson is?</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text 1</td>
<td>Accurate response</td>
<td>80/127</td>
</tr>
<tr>
<td></td>
<td>Inaccurate response</td>
<td>47/127</td>
</tr>
<tr>
<td>Text 2</td>
<td>Accurate response</td>
<td>125/148</td>
</tr>
<tr>
<td></td>
<td>Inaccurate response</td>
<td>23/148</td>
</tr>
<tr>
<td>Text 3</td>
<td>Accurate response</td>
<td>98/131</td>
</tr>
<tr>
<td></td>
<td>Inaccurate response</td>
<td>33/131</td>
</tr>
</tbody>
</table>

*Note: Text 1: /-s/, /-es/ colored red; Text 2: enlarged font for /-ing/ suffixes; Text 3: enlarged font for all 3rd person verbs*
As can be seen in the tables above, while a great majority of the students had initially assumed that they correctly interpreted the meaning of the textual enhancements, they were often mistaken. In the case of Text 1, only 47.62% of participants interpreted the meaning accurately. This raises serious doubts as to this enhancement technique’s ability to reliably draw students’ attention to the target feature. In fact, Text 3 at 58.33% accuracy was not much better, and even Text 2 at 74.40% accuracy failed to trigger noticing in over a quarter of participants.

In order to further interpret these results, the individual analyses of the three texts were followed by think-aloud protocols. Students were asked to look at all three enhanced texts and verbalize aloud what went through their minds. Some excerpts from participants who misinterpreted the target feature will be presented below in Table 5 to elucidate the pitfalls of the various enhancement techniques and to answer RQ2: (w)hat common misconceptions exist, if any, in students’ interpretation of the enhancements?

Table 5
Exemplars from the think-aloud protocol: What do you think when you see this text?

<table>
<thead>
<tr>
<th>Student’s Response</th>
<th>Text 1</th>
<th>Text 2</th>
<th>Text 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The story teaches the difference between /s/ and /es/</td>
<td>A student’s life is very busy</td>
<td>I don’t want to live in America after reading this story.</td>
</tr>
<tr>
<td></td>
<td>This story has many /s/.</td>
<td>The teacher missed the words “always” and “friends”.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All the plural words are marked.</td>
<td>The level of the text is basic.</td>
<td></td>
</tr>
</tbody>
</table>

Note: Text 1: /-s/, /-es/ colored red; Text 2: enlarged font for /-ing/ suffixes; Text 3: enlarged font for all 3rd person verbs

5. Discussion

The results of the current study, which found that large proportions of the sample population were unable to accurately interpret the textual enhancements, are significant for teachers and researchers for a number of reasons. First and foremost, it should serve as a cautionary tale to researchers that although the point of the enhancements might seem obvious to us, we must take in account the possibility that students see things differently than we expect. The student who noticed the prevalence of /-s/ in the text and incorrectly concluded that this was a matter of singular vs. plural is one such example. Likewise, the student who commented that the words “always” and “friends” had not been highlighted, incorrectly assumed that every word that ended in /s/ were the targets. As such, it would behoove researchers to conduct post-interviews to determine the level of their participants’ cognition of the target feature; without such data any conclusions drawn should be viewed with skepticism regarding that study’s validity.

However, while noting the prevalence of misconceptions regarding the target features, the TE techniques still appeared to have a significant success rate of implicitly triggering noticing of the appropriate form (between 47.42% and 74.40% of the
time). As the conditions of the study were completely implicit, these percentages can only be expected to rise when TE is used in combination with provision of grammatical rules or instruction (e.g., Li, 2010). However, it should again be noted that all participants had prior knowledge of both forms, though explicit knowledge does not necessarily equate to implicit mastery. It is therefore even more difficult explain why more learners were not able to make the connection between enhancement and target form.

One complicating factor is the fact that input enhancement techniques are meant to be delivered implicitly. In other words, they should be embedded into tasks that are focused on meaning. Therefore the comments from students such as, “A student’s day is very busy” and “I don’t want to live in America after reading this story” are evidence that these students were properly focused on the content of the text, rather than the grammar. These comments in themselves therefore do not constitute evidence of the failure of the TE technique; the entire think-aloud protocol must be analyzed. Ideally, the participant will provide positive evidence of noticing at some point. However, it should be noted that even a complete lack of commentary on the target feature is not conclusive evidence that the learner did not notice it (e.g., Alanen, 1995; Leow, 1997; Rosa & O’Neill, 1999). It may therefore be possible that the participants noticed the target but were unable to verbalize it (e.g., they could not remember the name of the grammatical structure), or that they noticed it but chose, for whatever reason, not to say so (e.g., they felt it was too obvious/simple that it didn’t warrant mention).

6. Limitations and Further Research

The current study was conducted in isolation; the students were not actually engaged in the task for a communicative purpose. Rather, the students were specifically asked to analyze the texts intellectually, something that would not normally be done in a study of input enhancement. As previously stated, the whole point of TE is to trigger implicit noticing while students are focused on comprehension of meaning. While this heightened attention to form would be anticipated to increase the likelihood of participants noticing the desired target features, the results were surprisingly low. It is possible that the selection of target features was an issue, as well as the TE techniques themselves. Particularly for Text 1, in which instances of the third-person -s/ and -es/ were being targeted, many students were unable to grasp the meaning. This may be due to the fact that the acquisition of these forms are some of the latest features that language learners master, while Text 2, which highlighted the present-progressive tense, had the highest instance of noticing but was also one of the easier grammatical patterns to acquire (for more on the natural order hypothesis of L2 morpheme acquisition, see Brown, 1973; Duyer & Burt, 1974; Ellis, 2008; Krashen, 1982). More research would be needed, using different enhancements and different targets in order to determine whether this was the case.

One potential limitation of the study was the lack of control measures regarding participants. As the sample population was entirely random, students of different ages, educational backgrounds, and English proficiency levels were present. While both target grammatical forms are part of the national English curriculum for Japanese students during secondary school, future research may benefit from tighter control measures such as conducting pretests or selecting grammatical patterns that are completely novel to the participants.

This study made use of common TE techniques found in the literature but are by no means the only ones in existence. There are limitless possibilities, multiplied by the number of grammatical targets that are available. This is perhaps one reason why past research has been so difficult to correlate. The findings of the current study also suggest that the TE heavily impact the success/failure of triggering noticing of the target. Careful selection and validation of the techniques (such as the inclusion of mixed-methods into the study design) are necessary in order to properly interpret the results of empirical research.

7. Conclusion

Despite decades of research, the effects and efficacy of textual enhancement remains unclear. The current study, utilizing interview and think-aloud data from 168 Japanese university students, sought to ascertain the ability of three textual input enhancement techniques to draw learners’ attention to the grammatical form being targeted. Results found that the
enhancements were only moderately successful at triggering noticing in the participants, sometimes less than 50% of the time. These results suggest that at least in some instances, the TE techniques used in past research may not have been valid. Essentially, students may have misinterpreted the enhancements as highlighting a different feature than the researchers had intended to measure. This finding shows the need to incorporate post-interviews into study designs to determine whether the failure of such studies to produce significant results was rooted in noticing or the enhancements themselves.

8. References


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9. Appendices

Appendix A - Text 1

My friend, Nick, lives in San Diego. He is American. He always has a full day. He wakes up at 8 o’clock every morning. He always eats cereal for breakfast. He gets dressed for school and arrives at school at 9 o’clock every day. He eats lunch with his friends at his school. After his school is over, he swims every day. When he gets home, he usually plays with his dog. He eats dinner with his family. He reads a book every night before he goes to sleep.

Appendix B - Text 2

Now, I am living in San Diego. I am a student. I am going to U.C. San Diego. I am studying economics because I love math. I am hoping that I can get a job as an accountant. After school, I have a part-time job. I am trying to save enough money for a vacation in Hawaii. Going to school and working at night is so hard, but I am enjoying my student life. Living alone is hard too, especially cooking and cleaning every day. My friends are helping me though! My friend is teaching me how to sew.
Appendix C - Text 3

My friend, Nick, lives in San Diego. He is American. He always has a full day. He wakes up at 8 o’clock every morning. He always eats cereal for breakfast. He gets dressed for school and arrives at school at 9 o’clock every day. He eats lunch with his friends at his school. After his school is over, he swims every day. When he gets home, he usually plays with his dog. He eats dinner with his family. He reads a book every night before he goes to sleep.