Textual Enhancement of Input: Issues and Possibilities

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The input enhancement hypothesis proposed by Sharwood Smith (1991, 1993) has stimulated considerable research over the last 15 years. This article reviews the research on textual enhancement of input (TE), an area where the majority of input enhancement studies have aggregated. Methodological idiosyncrasies are the norm of this body of research. Seven major issues appear to be limiting the generalizability of the findings and holding up further progress in the understanding of the efficacy of TE for learning: (1) noticing and/or acquisition; (2) TE and comprehension; (3) simultaneous or sequential processing; (4) TE and the nature of the enhanced form; (5) TE and prior knowledge; (6) TE and input flood; and (7) TE and overuse. The existing research has nonetheless offered some important insights that future research should seek to build on.

Over the last 15 years, there has been a proliferation of studies on ways to work with, and more importantly, against second language (L2) learners’ natural, meaning-exclusive tendency for input processing (VanPatten 1996, 2004). The studies were guided by a number of theoretical and/or pedagogical proposals, which include, but are not limited to, Sharwood Smith’s (1991) ‘input enhancement’, Long’s (1991) ‘focus on form’, Gass’ (1988) model of second language acquisition (SLA), and VanPatten’s (1991) ‘processing instruction’. The empirical findings so far have largely been inconclusive.

In this article, we review the research conducted within the framework of Sharwood Smith’s input enhancement, delving, in particular, into 21 studies involving textual enhancement (TE, hereafter). Our goal is to explore and examine underlying issues, with a view to providing an interpretation of the conflicting findings, taking stock of insights, and identifying directions for future research.

WHAT IS INPUT ENHANCEMENT?

The question that has served as an impetus for Sharwood Smith’s (1991, 1993) proposal of input enhancement can be formulated as follows:

Why is it that L2 learners typically appear to ignore a vast mass of evidence and continue, obstinately, to operate with a system that is in contradiction with the target norms as manifest in the input?
(adapted from Sharwood Smith 1993: 168)
For Sharwood Smith, the answer to the question is multi-faceted. First, L2 learners, in general, lack sensitivity to grammatical features of target language input. Consequently, even when a large amount of input is available in their learning environment, they may not benefit much from it. Second, certain grammatical features in the input to which the learners are exposed are inherently non-salient, and hence their presence often escapes the learners' attention. Third, learners' first language (L1) may act as a hindrance to their ability to notice certain linguistic features in the input.

Thus, failure to benefit from input may arise from a combination of lack of noticing ability on the learner's part and poor input characteristics such as lack of perceptual salience or 'noticeability' (Schmidt 1990). Accordingly, Sharwood Smith hypothesizes that a way to stimulate input processing for form as well as meaning, and therefore language learning, is through improving the quality of input. Specifically, he proposes input enhancement, an operation whereby the saliency of linguistic features is augmented through, for example, TE (e.g. color-coding, boldfacing) for visual input, and phonological manipulations (e.g. oral repetition) for aural input. The underlying assumption is that noticing is a prerequisite for intake (Sharwood Smith 1981; Gass 1988; Schmidt 1990).

Input salience, Sharwood Smith further suggests, can be created by an outsider (e.g. a teacher) or by an insider (i.e. the learners themselves). Learners possess their own natural learning and processing mechanisms which can, in and of themselves, generate input enhancement—so-called 'internally generated input enhancement', which may or may not coincide with 'externally generated input enhancement' (as by a teacher or researcher). The learner's mind, as Sharwood Smith sees it, is not singular or global, but rather modular in character; the learner has many minds—to use his term—vis-à-vis different linguistic domains and subsystems. Consequently, when exposed to externally enhanced input, learners (a) may or may not notice it, or (b) may notice it partially, contingent on whether or not they are ready for it or how much overlap there is between externally and internally generated salience. A mismatch may, therefore, arise 'between the intentions lying behind teacher or textbook generated enhancement of the input and the actual effect it comes to have on the learner system' (Sharwood Smith 1991: 130). Hence, 'whether the enhanced input will ultimately trigger the relevant mental representation is...an empirical question' (p. 120). Precisely, it is this question that has spurred a considerable amount of empirical research, to which we will turn in the next section.

To facilitate an understanding of the empirical research, a further note on externally created salience is in order. Sharwood Smith (1991) posits two variables, elaboration (i.e. duration) and explicitness (i.e. metalinguistic depth), to allow permutations of a multitude of input enhancement strategies. Thus, one-time use of underlining would count as a non-elaborate, non-explicit strategy; one-time rule presentation would be a non-elaborate yet explicit strategy; and so forth. Sample strategies given in Sharwood Smith (1993)
include explicit discussion of the form, metalinguistic description, explicit or implicit error correction, and TE—the focus of the present article (for a review of first language research on TE, see Lorch 1989). Whatever its elaboration and explicitness, input enhancement is premised on the notion that learners must comprehend what they read or hear before their attention can be drawn to form within the input (cf. Gass 1988; VanPatten 1996, 2004; Wong 2005).

RESEARCH ON TEXTUAL ENHANCEMENT

A survey of the L2 literature since the 1990s yielded 21 empirical studies of TE,1 most of which adopted a comparative approach whereby TE was pitted against another strategy, such as rule presentation (Doughty 1991; Alanen 1995), output production (Izumi 2002), or exclusively meaning-based communicative teaching (Leeman et al. 1995).

The studies were typically controlled experiments under meaning-oriented task conditions, with a pretest–posttest design, the treatment period varying between 15 minutes (e.g. Alanen 1995) and 2 weeks (e.g. J. White 1998), with the posttest usually following immediately. On most occasions, the studies targeted one or more morphosyntactic elements2 such as locative suffixes in a semi-artificial form of Finnish (Alanen 1995), English relative clauses (Izumi 2002), and Spanish preterit versus imperfect forms (Jourdenais et al. 1995). These features were chosen largely based on considerations of difficulty, learnability, semantic content, communicative value, perceptual salience, and natural occurrence and frequency. Participants were mostly adult second language learners in the United States, and the sample size varied between 14 (Jourdenais et al. 1995) and 259 participants (Lee 2007). Some studies involved learners with little prior knowledge of the target form (Alanen 1995), and some had learners with considerable prior knowledge (Doughty 1991). The mode of exposure varied from reading printed texts (Alanen 1995) to reading computer-mediated texts (Doughty 1991). Although all studies employed TE, few did so singly. Rather, the majority of the studies employed additional means to augment the effect of TE, such as ‘an explicit mention to the learner to attend to the highlighted form’ (Izumi 2002: 543), a memory-based recall task (Williams 1999), or activation of prior knowledge (Shook 1994).

Another notable feature of the studies is that the post-instructional measurements employed were mostly form-oriented. Examples are: sentence completion (Izumi 2002), grammaticality judgement (Alanen 1995), sentence combination (Doughty 1991), sentence production (Doughty 1991), sentence interpretation (Izumi 2002), picture-cued oral sentence completion (Doughty 1991), picture-cued written production (Jourdenais et al. 1995), multiple-choice (Bowles 2003), fill-in-the-blanks (Leow 2001), and error correction (Lee 2007). In most cases, statistical significance served as a prime, if not the only, indicator of whether or not TE was effective.
The 21 studies have yielded a spectrum of effects for TE, as sampled below (for a complete listing, see Appendix):

1. ‘TE promotes noticing of target L2 form and has an effect on learners’ subsequent output’ (Jourdenais et al. 1995: 208).
2. ‘Input enhancement failed to show measurable gains in learning despite the documented positive impact of enhancement on the noticing of the target form items in the input’ (Izumi 2002: 542).
3. ‘The results indicated no significant benefit of TE over unenhanced input for (1) the amount of reported noticing of Spanish present perfect or present subjunctive forms, (2) learners’ intake of the forms, or (3) learners’ comprehension of the reading passage’ (Leow et al. 2003: 12).

Thus, in some studies TE was highly effective in that it led to noticing as well as acquisition; in some it was moderately effective in that it led to noticing but not to acquisition; but in others, it did not appear to be effective.

This lack of congruence in the findings is arguably a natural consequence stimulated by the numerous methodological idiosyncrasies characterizing the individual studies, some of which have been noted above. In the main, the studies differ in the following aspects: (1) employing simple versus compound enhancement; (2) employing isolated words versus sentences versus discourse as stimuli; (3) enhancing a meaning-bearing versus a non-meaningful form; (4) employing learners with or without prior knowledge of the target form; (5) enhancing the target form many versus one or a few times; (6) using a longer versus a shorter text; (7) employing a single versus multiple short sessions over an extended period of time; (8) enhancing one form versus multiple forms; (9) providing (or not) comprehension support prior to the treatment; and (10) providing (or not) explicit instruction on what to focus on prior to the treatment.

By way of illustration of (10), in Shook (1999), the following instructions were given to both the experimental groups and the control group:

Read the following article through so that you understand the information presented. You will be asked to recall the information from the article, so focus on comprehending the passage. (Shook 1999: 47)

Here the researcher explicitly oriented his participants to reading for meaning. In so doing, he was hoping to see if the groups exposed to the visually enhanced input would simultaneously focus on the forms as well. Such practice contrasted with that of Leeman et al. (1995) and J. White (1998) where there were explicit instructions to the experimental group to focus on the forms while reading the enhanced material.

Given the wide array of differences, the studies are not comparable, hence the difficulty of making any extrapolations. Each difference contributes a piece of divergence, essentially a variable, to what overall appears to be a confusing picture.
UNDERLYING ISSUES

The methodological idiosyncrasies, however, were not random. Rather, they were underlain by conceptual differences over, *inter alia*, these issues:

1. Noticing and/or acquisition;
2. TE and comprehension;
3. Simultaneous or sequential processing;
4. TE and the nature of the enhanced form;
5. TE and learner prior knowledge;
6. TE and input flood; and
7. TE and overuse.

Further advances in the general understanding of TE are to depend on how well these issues are to be resolved.

**Noticing and/or acquisition**

This issue concerns what to expect of TE. The assumption that appears to have underpinned the design of most of the studies is, as Izumi (2002) put it, a two-step logic:

First, the perceptual salience created by highlighting the input will draw the learner’s attention to the highlighted forms. Second, once the first step is successful, learning of the attended form will occur based on the premise that attention is what mediates input and intake. (Izumi 2002: 567–8)

However, in reality, the first step has more or less been eschewed in the TE research, as many have noted. Jourdenais *et al.* (1995), for example, observed that ‘while [the] effectiveness of input enhancement has been evaluated in terms of subsequent acquisition of the target forms, few attempts have been made to investigate whether enhanced input is processed differently by learners’ (p. 183). Similarly, Leow *et al.* (2003) pointed out that ‘most of the studies... did not methodologically measure learners’ noticing while exposed to the experimental L2 data’ (p. 2). Hence, the issue of internal validity arises.

One does not have to look beyond the abstracts of the 21 studies to notice a test bias in assessing the efficacy of TE: The majority of the studies solely invoked so-called acquisition measures for pre- and post-tests (cf. Wong 2003). Thus, most researchers have more or less equated the efficacy of TE with its ability to generate acquisition, where acquisition is associated mainly with improved accuracy in production. There are, nevertheless, studies, though few in number, that have sought to measure noticing and acquisition—using one or more tasks (e.g. Alanen 1995; Jourdenais *et al.* 1995; Leow 2001; Izumi 2002; Bowles 2003; Park 2004). For these researchers, the primary function of TE is to serve as a priming device for learners’ noticing of features in input, whose corollary may, then, be that what is noticed translates into acquisition (cf. Leow *et al.* 2003). This understanding is largely in accord with the tenor of the input enhancement hypothesis.

‘Noticing a form is a prerequisite for its acquisition’ (Leeman *et al.* 1995: 222), yet it is not enough, Sharwood Smith points out, for learners to just notice critical features in the input and/or to detect the anomaly in
their output. What is crucial is whether they can *act upon* the noticed features, and this would depend on whether or not they are able to perceive, store, and apply the salient information. Accordingly, it is hoped that input enhancement will spark a chain of cognitive processes initiated by noticing. Whether these processes can be, and how much time is needed for them to be, set in motion and completed has yet to be empirically ascertained. This issue itself in need of independent research, many studies appear to have operated on the assumption that if TE has any effect, it should show up instantly in learners’ production. This is aptly seen in the practice of providing a short treatment and an immediate, output-based posttest to measure acquisition (e.g. Alanen 1995; Jourdenais *et al.* 1995).

Just as it is problematic to assume, without establishing, that TE draws learners’ attention to the target form, which, in turn, leads to further processing of it, it is equally problematic to expect instant learning to arise from a single (typically, short) treatment session of TE (cf. Wong 2005). Both create validity and reliability concerns. In the latter case, notably, because the treatment does not allow learners time to pursue deeper processing of any of the attended input; changes (or lack thereof) shown on the posttest can be evidence of anything but learning.

Although it may be a truism that nothing in input can become intake without noticing (Schmidt 1990, 2001; see, however, Truscott 1998), the TE literature offers important evidence showing that noticing is not a guarantee for acquisition. For example, Izumi (2002) found that more externally induced noticing was not correlated with more learning, concluding that noticing may *not* lead to acquisition. Similarly, Williams (1999) noted that ‘not everything that is registered by the senses is…encoded in long-term memory’ (p. 2). Likewise, Leeman *et al.* (1995) observed that ‘forms may be noticed perceptually, but not linguistically’ (p. 219; cf. Doughty 1998). In a nutshell, enhanced forms may attract attention but may fall short of further processing.

Taking the possible pitfalls into consideration, Sharwood Smith (1991), in his critical elaboration of input enhancement, cautions:

> Externally generated input enhancement does not automatically imply the internalization of that enhancement by the learner…Input enhancement should take into account a modular view of the learner as a set of systems: signaling information to the learner is, in effect, signaling to one or more of many separate knowledge systems. *Input enhancement may…work in ways unforeseen by the enhancer.* (Sharwood Smith 1991: 131; emphasis added)

Implied here is (a) that not all the cognitive effects triggered by TE will have external manifestations, and (b) that the efficacy of TE is not as much controlled by the researcher as by the learner (cf. Bardovi-Harlig and Reynolds 1995; Wong 2005). As we will argue later, the efficacy of TE is, in part, a function of the learner’s prior knowledge (or lack thereof) and of the nature of the linguistic element enhanced.
Evidence that learners are active controllers of the input enhancement process can be found in Leeman et al. (1995), reporting that ‘not all of the enhancements were noticed by all the participants’ and ‘at least some learners prioritize meaning over form despite the emphatic instructions they received to consider both’ (p. 248). What such findings suggest is that learners have their own agenda to pursue, an agenda that may not be susceptible to instructional guidance (cf. Allwright 1984).

In sum, it appears that short-term TE research—both in terms of the duration of the treatment and the interval between the treatment and the posttest—should concentrate on measuring its effect at the level of noticing and refrain from measuring acquisition (cf. Shook 1994; Overstreet 1998), which we define here as mastery of form–meaning–function relations.

**TE and comprehension**

As indicated earlier, the input enhancement proposal is premised on comprehension, its underlying thrust being to prompt occasional metalinguistic attention for the ultimate benefit of balanced development in comprehension and acquisition (cf. Doughty 2004; Wong 2005; Kim 2006). It thus follows that any validation of its efficacy should investigate comprehension as well as noticing and, in the case of longer-term studies, acquisition. However, most of the studies have overlooked the need to measure comprehension (cf. Leow 1997; Wong 2003; Lee 2007). Thus, in spite of accumulated evidence suggesting that TE can promote noticing of some linguistic features, it remains unclear whether or not it has simultaneously created a trade-off with comprehension. Preliminary evidence from Overstreet (1998), substantiated recently by Lee (2007), suggests that input enhancement may detract from learners’ attention to meaning. This should, accordingly, raise a red flag for future TE researchers.

In most of the existing studies, researchers have made a conscious effort to establish a meaning-oriented environment. Some had their participants answer comprehension questions before the onset of the treatment (Alanen 1995), some provided vocabulary assistance (Williams 1999), some had their participants write recall summaries, often in their L1, of the content of the texts they had read during the treatment (Izumi 2002), and some even took care not to make the enhancement so salient that it would distract students from reading (J. White 1998). Still, the literature has not yet witnessed any study with a rigorous design for measuring comprehension. The most concerted effort yet has been seen in trying to obtain a single summative score from the participants’ recall summaries, as in Doughty (1991) and Izumi (2002), or putting participants through a post-treatment comprehension test, as in Leow et al. (2003). Inasmuch as these practices did not include a pre- and post-treatment comparison of comprehension, they shed little light on the effect of TE, if any, on comprehension. A more robust design to measure the latter, therefore, should treat comprehension as a dependent
variable to be measured both before and after the TE treatment, at within-group and/or between-group levels.

When measuring comprehension in relation to TE, it also appears that the focus should be on measuring local, as opposed to global comprehension, an insight from Leow (1997). Local comprehension here concerns only the part of the text that contains the enhanced form, and hence is arguably a more valid indicator of the influence, if any, of TE on comprehension; it also appears to be a good predictor of global comprehension, as demonstrated in Leow (1997). Other studies such as Shook (1999) and Wong (2003), however, have provided evidence that the effect of TE is positively felt at the level of local comprehension, but not at the level of global comprehension, thereby suggesting a dissociation between local and global comprehension. Future research controlling for local and global comprehension should shed further light on this issue.

**Simultaneous or sequential processing**

Many studies had as their underlying assumption that a focus on form integrated into an overall focus on meaning is beneficial to L2 acquisition (Lightbown 1991; Long and Robinson 1998). However, there was little consistency among them with regard to when such integration should occur.

According to information processing theory, (a) processing of information is selective; (b) individuals can process two different types of information simultaneously and effectively only if the processing of one of the information types is automatized and requires little, if any, conscious attention; and (c) simultaneous processing of two different types of information that are not automatized can lead to inadequate processing of either or both types of information, and to a ‘trade-off’ effect (cf. Skehan 1996; VanPatten 1996; Han and Peverly 2007; see, however, Robinson 2003). From this theory it follows that sequential processing will be more effective than simultaneous processing of meaning and form. In other words, learners might benefit more from having their attention first directed to meaning decoding and then to grammatical encoding than to both tasks at the same time.

The research on TE has employed both kinds of design, although most of the studies probed simultaneous processing. As an illustration, in Alanen (1995), participants in the TE group were invited to read two short passages in which the learning targets were italicized. At the outset of their reading, they were explicitly instructed to ‘try to understand its meaning’ (p. 271). Thus, an experimental condition was created to stimulate an intentional focus on meaning and an incidental focus on form. Such is also the thrust of Shook (1994, 1999). In Shook’s (1999) study, 73 participants were randomly assigned to three input conditions: (a) textually enhanced, (b) textually enhanced plus emphatic instruction, and (c) textually unenhanced. They subsequently performed a free written recall task in which they wrote down anything they could recall from the passages they had read. The recall task
sought to measure both comprehension and intake. The results were revealing: on the one hand, the unenhanced group recalled the most idea units, the enhanced group recalled fewer idea units, while the enhanced plus instruction group recalled the fewest, thus suggesting that the unenhanced group comprehended the reading passages better than both the enhanced and the enhanced plus instruction group. On the other hand, in terms of intake of the target items, the following picture emerged: participants who received TE recalled more tokens than did those who received TE plus instructions, while those who received no enhancement recalled the least tokens, thus evidencing a trade-off between comprehension and intake.

The difference between simultaneous and sequential processing lies not just in the temporal order of meaning-based and form-based processing of input, but in that one calls for *incidental* processing and the other *intentional* processing. In other words, the researchers who implemented a simultaneous processing design assumed that in processing the input for meaning, the processing of the enhanced forms would occur incidentally, as a byproduct, an assumption similar, though not identical, to that underlying Krashen’s Input Hypothesis. On the other hand, the researchers who had a sequential design assumed that with the processing of input for meaning happening first, attentional resources could be freed up and reallocated to the processing of form, an assumption in line with the fundamental tenets of cognitive theory of information processing.7

Although research on TE to date has not seen much of a sequential design, Doughty (1991) has offered some useful preliminary evidence. In her study, 20 participants, randomly assigned to one of the three groups, (a) the meaning-oriented TE group (MOG), (b) the rule-oriented enhancement group (ROG), and (c) the control group (COG), first had to undertake a comprehension task to achieve global comprehension of the content of a reading passage prior to receiving the treatment. Thus, the study roughly had a sequential arrangement for a focus on meaning and a focus on form, followed, then, by a more fine-tuned sequential arrangement during the treatment. The treatment itself comprised a series of lessons, one per day over a 10-day period, carried out as follows: during each lesson, the participants in the MOG received chunks of the reading passage aided *first by lexical and semantic explanation and then by TE*, and those in the ROG received the same chunks of text enhanced by a presentation of rules concerning the target item. In contrast, those in the COG, as expected, received the same chunks of texts with no enhancement whatsoever. Each lesson ended with the participants writing recall summaries based on their comprehension of the texts. Results from the post-treatment tasks indicated that the MOG and the ROG did almost equally well and better than the COG, with respect to acquisition of the target feature, but the MOG displayed an advantage over both the ROG and the COG in terms of comprehension.

Despite the fact that this study did not employ a pre- and a post-test task to measure and compare the participants’ comprehension, the TE employed did
not produce a trade-off, as evident in a twofold fact. First, the MOG and the ROG did equally well on the acquisition measures; and, second, the ROG and the COG did equally poorly on comprehension measures. If the TE had affected comprehension, the COG should have achieved greater comprehension than the ROG, because they were not ‘distracted’ by any sort of TE. What, then, explains the ‘double’ gains in comprehension and acquisition by the MOG, but not by either of the other groups? The answer is in fact simple: this group received assistance in both meaning and form processing, notably, sequentially. This combined and sequential treatment may have aided both comprehension and acquisition.

While future empirical research should attempt to ascertain which grammatical items would benefit most from a combined meaning–form enhancement, evidence from studies by Doughty (1991) and Izumi (2002) suffices to motivate the understanding that when meaning is clarified before a focus on form, TE is likely to stimulate even growth in comprehension and acquisition.

Izumi (2002) assessed the effects of an output-based approach versus those of a TE approach to integrating a focus on form with a focus on meaning. Sixty-one university level ESL learners served as participants in this study, and were divided into four groups: (a) the +output –enhancement group, (b) the +output +enhancement group, (c) the –output –enhancement group, and (d) the –output +enhancement group. The experimental design largely followed that of Doughty (1991). Thus, it began by having the participants perform content-based processing (i.e. skimming the text for overall comprehension) before subjecting them to an extended period of focus-on-form treatment, hence, similarly, a sequential design. The treatment procedures for the enhanced and unenhanced groups, although bearing some similarities to the Doughty study, are nevertheless different in two main respects: First, the participants were asked to take notes while reading chunks of the reading passage, a means to measure noticing. Second, exposure to TE was not preceded by a lexical and semantic explanation of the target item; instead, the participants were directed through instructions to focus on meaning throughout the treatment period. Results showed that TE was able to promote noticing without taxing comprehension.

Whereas the two studies mentioned above have incidentally revealed an advantage for sequential over simultaneous processing, a study by VanPatten (1990) has purposely investigated the feasibility of simultaneous processing of meaning and form, albeit within a different theoretical framework than input enhancement. Two hundred and two university students of Spanish, representing three levels of proficiency, were randomly assigned to one of the four experimental conditions: (a) attention to meaning alone, (b) simultaneous attention to meaning and an important lexical item, (c) simultaneous attention to meaning and a grammatical functor, or (d) simultaneous attention to meaning and a verb form. Results showed that ‘[C]onscious attention to form in the input competes with conscious attention to meaning, and, by extension, that only when input is easily understood can learners attend to form as part
of the intake process’ (p. 296). The study thus provides direct evidence that processing input for form presupposes that the meaning of the input has been comprehended, and that the former, when occurring, is sequential to the latter (see, however, Wong 2001). This finding is replicated in the TE research. Overstreet (1998) and Lee (2007) both noticed a similar form–meaning trade-off.

Apart from responding to the limited information processing capacity that characterizes all learners, sequential processing has an additional putative advantage, namely that it matches learners’ predilection for processing input first for meaning (Barry and Lazarte 1995; VanPatten 1996, 2004). Shook (1994, 1999) and Leeman et al. (1995) observed that some of their participants focused exclusively on meaning, in defiance of TE and the researchers’ admonition to focus on both meaning and form. In a case like this, sequential processing may take learners beyond such natural processing tendency through redirecting their attention to form. The importance of the latter aspect cannot be overstated, as research has shown that even when learners are able to reallocate attentional resources to form-based processing as a function of attainment of comprehension, they do not automatically do so (see, e.g. VanPatten 1990; Leeser 2004). Interestingly, however, J. White (1998) attributed this phenomenon to the fact that the input had been comprehended, noting that ‘the forms may not have been novel enough to attract the learners’ attention to the extent that was predicted’ (p. 103). Hence, there is an intriguing circular problem here: Does comprehension facilitate or hinder attention to form? Further research is clearly needed to tease out the intricacies between the two.

**TE and the nature of the enhanced form**

A now well-established tenet in SLA research is that not all linguistic elements are created equal. Over the years, researchers have posited a number of parameters for describing inter-structural differences. They include, but are not limited to, communicative value, formal complexity, functional complexity, semantic load, perceptual saliency, and underlying rules. VanPatten (1996), for example, distinguishes between linguistic features of high, medium, or low communicative value, based, in turn, on their semantic value and structural redundancy. Accordingly, English -ing is deemed of high communicative value in that it carries semantic value and, syntactically, is non-redundant. In comparison, English 3rd person -s is of low communicative value, because it is structurally redundant. In addition to functional differences, linguistic features may differ according to their underlying rules. DeKeyser (1994) notes that some linguistic features follow categorical rules (e.g. English plurals), and some probabilistic rules (e.g. English irregular past tense verbs).

In the instructed SLA literature, evidence abounds that not all forms are equal in terms of the effectiveness of instructional activities (Williams and Evans 1998). Form type can mitigate the effect of instruction through their
mutual interaction as well as interaction with other variables such as task demands, learner proficiency, prior knowledge, familiarity, content complexity, and availability of pragmatic information. In the TE literature, two studies have specifically investigated the nature of the target form and its interaction with different enhancement strategies. One study is Leow et al. (2003) in which two structures, the Spanish present perfect and present subjunctive, were investigated in connection with the presence or absence of TE. Analyses of the participants’ think-aloud protocols and their performance on an intake-oriented recognition task revealed more noticing and learning of the present perfect than of the present subjunctive. Of importance to note is that the structural effect overrode that of TE: both the enhanced and the unenhanced group noticed one structure better than the other. Similar findings are reported in Shook (1999) examining the free written recalls produced by participants in the wake of TE in relation to the Spanish present perfect and relative pronouns. Both studies thereby lend empirical support in favor of Sharwood Smith’s notion of learner-created salience.

In light of these findings, it is likely, then, that the positive effects of TE, as reported in some of the studies, have in part derived from the fact that the researchers happened to have chosen linguistic elements that are susceptible to this type of intervention, although it is not entirely clear at the present time what determines the susceptibility (cf. Wong 2003). Current speculations include form–meaning/form–function transparency (Wong 2005) and the relationship between cognitive processing and grammatical elements (Izumi 2002). While future research should test these speculations, it will equally be worthwhile to build on and extend the existing research by replicating Leow et al. (2003) and Shook (1994, 1999), and by investigating other forms, ideally from other languages as well. If future research indeed demonstrates that only some forms are amenable to TE, then instruction utilizing this type of strategy should selectively target certain forms as opposed to any forms indiscriminately.

The question of what forms to (or not to) enhance is a complex one, and the existing evidence is meager but suggestive. Preliminary evidence from Wong (2003), corroborated by Shook (1999), showed that enhancing a non-meaningful form does not lead to better intake. On the other hand, as noted above, results from Leow et al. (2003; see also Leow 2001) and Shook (1994, 1999) revealed that learners are able to notice, on their own, meaning-bearing forms, suggesting, therefore, that there is no need to enhance them (see, however, Leow 1997; Shook 1999 for a different interpretation). This reasoning would seem logical were it not for the results of Leow (1997) comparing the effects of TE and text length on comprehension and intake. One of the findings of the study, although not statistically significant, illustrates a meaningful effect for enhancement on the participants’ comprehension, while no such effect was discerned for their intake. Pending future, independent verification, this finding underscores that comprehension and intake are different entities (cf. Færch and Kasper 1986; Sharwood Smith 1986),
inasmuch as enhancing the same linguistic element can produce a differential impact on comprehension and intake (cf. Wong 2003, 2005).

**TE and learners’ prior knowledge**

One approach to tackling the susceptibility issue is through examining variables that can interact with the target form to modulate the effect of TE. Learners’ prior knowledge is one such factor. Evidence thereof can be found in studies that employed participants with or without prior knowledge of the target form (e.g. Jourdenais et al. 1995 vs. Leow et al. 2003).

Research to date has offered three main findings on the relationship between TE and learners’ prior knowledge. First, simple enhancement (i.e. TE alone) is more effective for learners with some prior knowledge of the form in question (Park 2004) than for learners without (Alanen 1995). Second, simple enhancement may induce noticing (i.e. low-level awareness, following Schmidt 1990) but not understanding (i.e. high-level awareness) in learners with little prior knowledge (Shook 1994); however, it may incite understanding as well as noticing in learners with some prior knowledge (Lee 2007). Third, compound enhancement (i.e. TE in combination with other attention-getting strategies such as corrective feedback) is more effective than simple enhancement in inducing noticing, and further processing of, the target form in both types of learners (e.g. Doughty 1991; Leeman et al. 1995; Williams 1999).

Given the nature of simple versus compound enhancement, these findings are logical. According to Sharwood Smith (1991, 1993) and as Robinson (1997) has demonstrated, TE is more an implicit than an explicit attention-focusing device. As such, its underlying purpose may not always be transparent, even to learners with some prior knowledge of the target form. Several participants in J. White’s (1998) study reported, via a post-treatment debriefing questionnaire, that they were not certain about the purpose of the enhanced forms. For learners with little prior knowledge of the target form, TE could be even more of a puzzle. Participants in the Leow (2001) study provided the following comments in their think-aloud protocols: ‘I don’t know what that is (means)’, ‘I don’t understand these underlined ones’, ‘I am not sure’, ‘I don’t know why this is underlined’, etc. (p. 502). Likewise, as shown in the protocols from Alanen (1995), some participants who reported noticing the use of italics had not considered a reason for its use.

Thus, the fact that TE alone (i.e. simple enhancement) may fail to have a noticeable impact on learners’ comprehension and intake, as reported in Leow (1997, 2001) and Leow et al. (2003), might be due to the learners having no prior knowledge of the target form. Had those learners been exposed to compound enhancement, they would likely have demonstrated superior intake to that shown in the comparison group (i.e. who received unenhanced input).
TE and input flood

Most studies in the TE literature exhibited varying degrees of conflation of TE and input flood, both being options of input enhancement. In the case of input flood, salience is created of the target of instruction by virtue of (usually, artificially engineered) frequency. As an illustration, compare Leow et al. (2003) with Shook (1999). In Leow et al. (2003), two passages were used as stimuli, one having 222 words and the other 227 words. In each passage there were 10 tokens of a target form, giving the frequency ratios of 1/22 for one passage and 1/23 for the other—meaning in one text, one out of every 22 words was an exemplar of the target form, and one out of 23 words in the other. Shook (1999), on the other hand, also utilized two written texts as stimuli, one containing 185 words and the other 217 words, but there were only 6 instances of the target item in each text, yielding frequency ratios of 1/30 words for one text and 1/36 words for the other. Thus, the two studies differ in the amount of exposure to the target forms created for the participants: There is more of an ‘input flood’ in Leow et al. (2003) than in Shook (1999). Neither, however, matches the degree of input flood found in J. White’s quasi-experimental study where the students were provided numerous instances of the target form over an extended period of time.

These variations notwithstanding, problems may arise when input flood is used along with TE to control for the experimental text and at the same time to manipulate the control text—the so-called ‘unenhanced text’. For one thing, the results from the experimental group can be contaminated with ambiguity. For another, input flood may cancel out the effects of TE. As J. White (1998) noted in her study, ‘benefits resulting from the experimental treatment conditions were due to increased exposure through input flood of target forms and not to any other kinds of enhancement’ (p. 103). The available evidence, albeit limited, induces the hypothesis that input flood may have a greater attention-getting capacity than TE. Future research should examine this further, including ascertaining, in the case of input flood, how many exemplars would be optimal (Wong 2005).

TE and overuse

Several studies have provided evidence that learners receiving TE over-supplied the target form; that is, their production of the target form extended to non-obligatory contexts. Close inspection of the experimental procedures underlying these studies indicates that not only was the relevant input typographically enhanced, but there was input flood as well, which, as mentioned, is itself a form of enhancement. Hence, the target forms were double-enhanced. In the Jourdenais et al. (1995) study, in which participants showed overuse of the target form, the stimulus text of 204 words contained 10 instances of the Spanish imperfect and 18 of the preterit, each enhanced
in three typographic ways (i.e. underlining, changing the font, bolding/shadowing). Similarly, in Alanen (1995), participants’ overgeneralization of -lla and -ssa could be linked to the over-salience of the target forms which were not only highlighted but also exhibited a high frequency in the two stimulus texts. In one text of 87 words, they appeared 6 versus 5 times, and in the other text of 98 words, 7 against 8 times, as compared with the rest of the target forms which each made between 2 and 4 appearances in either stimulus text. Alanen herself recognized that ‘these errors could have been caused by instruction itself (Selinker 1972)’ (p. 289). Further evidence of overuse can be found in Leeman et al. (1995) where overgeneralizations may be attributed to the fact that the researchers overemphasized the target forms through enhancing them in and out of the classroom, including providing corrective feedback whenever possible and giving explicit instructions, in order to attract the learners’ attention.

Clearly, over-enhancing the target form can be counterproductive. When the target form is unnaturally frequent and excessively salient in the input, it hurts, rather than facilitates, learners’ processing of meaning as well as form. A case in point is Overstreet (1998), where participants in the enhancement groups not only received an input flood via a short text, but each instance of the target form was highlighted in three ways: (a) font enlargement, (b) underlining, and (c) boldface or shadowing. Results obtained from measures of recognition, comprehension, and production revealed the absence of a positive effect for TE on the intake of the target forms but the presence of a negative effect on comprehension.

Indeed, underlying the reported negative effect of TE, it may not only have been the fact that there was too much salience, but also that more than one form was enhanced in the same input text.11 The coalescence of these two factors might have confused, rather than enlightened, the learners. Enhanced as such, input may trigger learners’ noticing but may not lead to much understanding, as seen in Jourdenais et al.’s study.

In sum, finding the right balance appears difficult but necessary between frequency and saliency (cf. Barcroft 2003). If TE is purported only to induce noticing, then, of course, the more frequent the target forms are in the input, the more salient they are likely to be (however, see Lorch 1989), and the more salient they are, the more likely it is that they will be noticed. This reasoning has driven most of the empirical studies to date. Nonetheless, it seems to be time to switch gears and investigate a different question: if TE is intended to stimulate higher-level awareness of form–meaning connections, to what extent should input be enhanced so as not to produce aberrant noticing to the detriment of acquisition?

CONCLUSION

As Wong (2003) has noted, ‘The contribution of [TE] to SLA…is presently not clear’ (p. 18). The available literature has provided conflicting findings on
its efficacy. Taken at face value, these findings may suggest that TE is either helpful or unhelpful. Such an understanding is, however, the least desirable: from a theoretical standpoint, it neither validates nor invalidates the theory, and from a practical standpoint, little can be extrapolated from the ambiguous findings to teaching in the classroom.

Although the jury is still out on the efficacy of TE for learning, the research to date has nonetheless produced a number of valuable and, importantly, testable insights, such as the following:

- Simple enhancement is capable of inducing learner noticing of externally enhanced forms in meaning-bearing input.
- Whether or not it also leads to acquisition depends largely on whether the learner has prior knowledge of the target form.
- Learners may automatically notice forms that are meaningful.
- Simple enhancement is more likely to induce learner noticing of the target form when sequential to comprehension than when it is concurrent with comprehension.
- Simple enhancement of a meaningful form contributes to comprehension.
- Simple enhancement of a non-meaningful form does not hurt comprehension.
- Simple enhancement is more effective if it draws focal rather than peripheral attention.
- Compound enhancement is more likely to induce deeper cognitive processing than simple enhancement, possibly to the extent of engendering ‘overlearning’.

Future research should seek to test the robustness of, and/or substantiate, these insights. This effort will lead researchers into ascertaining psycholinguistic contingencies under which TE is able to trigger a chain of cognitive processes that result ultimately in acquisition. En route, researchers will gain a better understanding of the key modulating variables such as learners’ prior knowledge, the nature of the target form, learner processing capacity, and frequency of the enhanced element. They will perforce strive to operationalize the type and process of attention and memory adequately and rigorously in order to find out how what is noticed is further processed, retained, and eventually becomes transferable. Moreover, they will likely be able to determine, and even set up a benchmark for, ‘the extent to which learner attention should be directed’ (Doughty 2004: 187). Current research has provided evidence showing that compound enhancement is not always necessary (see Williams and Evans 1998; Berent et al. 2007).

Furthermore, future research on TE must include a longitudinal perspective. SLA researchers at large have paid excessive lip service to the need for carrying out longitudinal studies, but have not yet been able to break the status quo (cf. Ortega and Iberri-Shea 2005). This is particularly surprising for research on the effects of instruction, since it is here—more than anywhere else—where study after study has conceded that its methodological
shortcoming is the lack of a longitudinal perspective. Non-longitudinal studies of effects of instruction have an inherent bias in favor of explicit instruction (for discussion, see Doughty 2004). Explicit instruction is known to be quick at provoking instant yet superficial changes (see, e.g. L. White 1991) in behavior, in contrast to implicit instruction whose impact on learning—especially in the domain of morphosyntax—may take time to build and be felt (see, e.g. Robinson 1996; Hulstijn 1997; Doughty 2004; Long 2007; Mackey and Goo 2007).

A related issue that researchers at large have overlooked, but that TE researchers should examine, is the scope of form–meaning connection (FMC) in acquisition. If FMC concerns linking one surface form with one meaning, then explicit (in particular, short and intensive) instruction might be more effective than implicit instruction in drawing learner attention and provoking changes in representation and behavior. However, if FMC entails connecting a form with its multi-faceted meaning in a variety of contexts, protracted implicit instruction might prove superior to explicit instruction (cf. Han 2007). Clearly, unless the time issue is taken into account, any comparison between explicit and implicit instructional strategies, TE included, may risk being invalid and misleading.

ACKNOWLEDGEMENTS

We are grateful to the anonymous reviewers for their insightful comments and helpful suggestions. Any errors are exclusively our own.

APPENDIX

General findings from 21 studies on textual enhancement

1 ‘[A]ttention to form, either via detailed analysis of structure or highlighting of target language (TL) structures in context, promotes acquisition of interlanguage (IL) grammar, but that only the latter comes hand-in-hand with comprehension of input’ (Doughty 1991: 431).

2 ‘A significant main effect was found for the attention condition across all of the data, indicating that subjects whose attention was drawn to the grammatical items gained more linguistic information about the items than the subjects whose attention was not called to the items. Also, the type of information called to the input was shown not to be a significant factor’ (Shook 1994: 79).

3 ‘Visual enhancement seemed to have a facilitating effect on the learners’ recall and use of the targets, especially those of locative suffixes’ (Alanen 1995: 259).

4 ‘Textual enhancement promotes noticing of target L2 form and has an effect on learners’ subsequent output’ (Jourdenais et al. 1995: 208).

5 ‘Only participants in the Focus on Form group demonstrated significantly improved accuracy and suppliance of the target forms, thus suggesting that it is
possible to increase accuracy within a content-based instructional setting’ (Leeman et al. 1995: 217).

6 ‘Results revealed a significant main effect for text length on readers’ comprehension but not on intake, no significant main effect for input enhancement on either comprehension or intake, and no significant interaction’ (Leow 1997: 151).

7 ‘The knowledge acquired during incidental and enhanced learning is also partially memory-based, but the enhanced learners in particular show evidence of the development of a generalizable rule-based representation. Access to this is slow and effortful, in contrast to decisions based on memory for prior experiences’ (Robinson 1997: 242).

8 ‘Even though learners in all three treatment groups improved in their ability to use his and her in an oral communication task, the findings did not support the hypotheses of this study. Although accuracy ratios overall followed the predicted order, that is, Group E+ > Group E > Group U, the within-group variance canceled out most of the predicted between-group effects at the two posttests’ (J. White 1998: 101).

9 ‘No positive effect was found for either enhancement or content familiarity on either the production or recognition tasks, but a negative effect was found on the subjects’ comprehension of the texts’ (Overstreet 1998: 228).

10 ‘[D]rawing attention to the input can benefit processing, and that salience/meaningfulness of the input is a major component in determining the extent of that benefit’ (Shook 1999: 39).

11 ‘In general terms, these improvements would seem to demonstrate the effectiveness of devices that draw the subjects’ attention to specific aspects of the input through highlighting’ (Williams 1999: 29).

12 ‘Results indicated no significant benefits of written input enhancement over unenhanced written input for (1) the amount of reported noticing of Spanish formal imperatives, (2) readers’ comprehension, or (3) readers’ intake’ (Leow 2001: 496).

13 ‘Input enhancement failed to show measurable gains in learning despite the documented positive impact of enhancement on the noticing of the target form items in the input’ (Izumi 2002: 542).

14 ‘The results indicated no significant benefit of textual enhancement over unenhanced input for (1) the amount of reported noticing of Spanish present perfect or present subjunctive forms, (2) learners’ intake of the forms, or (3) learners’ comprehension of the reading passage. The study did indicate a significant benefit of more salient forms (present perfect) over less salient forms (present subjunctive) for (1) the amount of reported noticing of the targeted verb forms, but not for (2) learners’ intake or (3) learners’ comprehension’ (Leow et al. 2003: 12).

15 ‘[Textual enhancement] is not effective as a form of input enhancement on the acquisition of the French past participle agreement in relative clauses…Drawing learners’ attention to form via [textual enhancement] does not interfere with comprehension when whole clauses that contain the target form are underlined and when the form is a form of no communicative value’ (Wong 2003: 35).

16 ‘[T]he main findings of the present study on discrete-item vocabulary learning were (a) no effect for enhancing 9 out of 24 words on learning rates for the enhanced words, (b) no effect for enhancing 9 out of 24 words on learning rates
for the unenhanced words, (c) a positive effect for enhancing 3 out of 24 words on learning rates for the enhanced words based on some but not all dependent measures, and (d) a negative effect for enhancing 3 out of 24 words on learning rates for the unenhanced words based on some but not all dependent measures’ (Barcroft 2003: 70).

17 ‘No statistically significant benefit was found for enhanced input as compared to unenhanced input for (1) amount of reported noticing of targeted forms, (2) readers’ comprehension, or (3) readers’ intake’ (Bowles 2003: 406).

18 ‘All of the 12 learners (6 dyads) in the [input enhancement] group reported that they had noticed some kind of visual enhancement in the reading given between Task 1 and Task 2’ (Park 2004: 14).

19 ‘[Textual enhancement] alone did not aid form and meaning recognition of vocabulary, [and] [lexical elaboration] and [typographic enhancement] combined did not aid form recognition of vocabulary’ (Kim 2006: 341).

20 ‘98% of the students in the Input [Enhancement] Group and 78% of the students in the Dictogloss Group experienced a positive change between the First and Last Essay. In contrast, only 38% of the students in the Conventional Group changed in a positive direction’ (Berent et al. 2007: 19).

21 ‘Textual enhancement aided the learning of the target forms while having unfavorable effects on meaning comprehension’ (Lee 2007: 87)

NOTES

1 The 21 studies all had TE either as an independent variable or as a level thereof.

2 Of the 21 studies, Barcroft (2003) and Kim (2006) are the only two studies that focused on discrete-item vocabulary learning. There is arguably a distinction between vocabulary learning and grammar learning, which we will not deal with in this paper.

3 The cognitive processes may or may not be accessible to consciousness (Sharwood Smith, personal communication).

4 Barcroft (2003) provides evidence of a different kind of trade-off, ‘bidirectional effects’, namely that TE can draw attention to the enhanced items but away from the unenhanced items.

5 In order to account for the possible detracting effect of enhancement, J. White (1998) enhanced a different form than the target one in the reading texts for the unenhanced group.

6 The researcher explicitly told the participants to focus on the enhanced form.

7 What we have in mind here are the mainstream single-capacity models (see Robinson, 1997 for discussion).

8 The theoretical framework that underlies much of VanPatten’s research is known as ‘input processing’, which examines the form–meaning connection process in relation to intake.

9 See Greenslade et al.’s (1999) replication using aural and written input.

10 Wong (2005) sheds additional light on the lack of difference between the enhanced and the unenhanced group in this study, noting that both groups received explicit instructions to focus on verbal morphology, and that the effectiveness of the instructions may have overridden the effectiveness of the TE.

11 There is evidence from Barcroft (2003) that the fewer the enhanced
items, the more effective they are, suggesting that ‘distinctiveness’ can be a moderator variable to TE.

12 A related issue that is worth looking into concerns the nature of learning as a function of input enhancement. In discussing the research on input flood, Wong (2005) insightfully notes that ‘input flood does not appear to be effective in showing learners what is not possible in the target language’ (p. 42) hence suggesting that the learning incurred by this particular strategy might be inadequate.

REFERENCES


Leow, R. 2001. ‘Do learners notice enhanced forms while interacting with the L2?: An online and offline study of the role of written input enhancement in L2 reading,’ Hispania 84: 496–509.


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