

Typographical Enhancement as a Language Awareness Learning Technique

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## TYPOGRAPHICAL ENHANCEMENT

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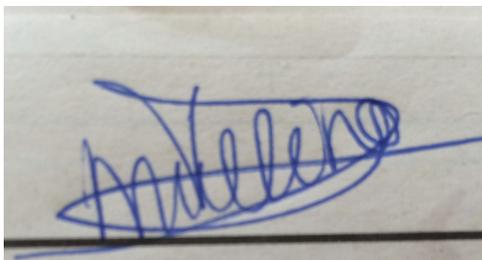
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### *Table of Contents*

Abstract	3
<b>1. Introduction</b>	<b>4</b>
<b>2. Literature review</b>	<b>8</b>
2.1. <i>(Second) language learning</i>	8
2.2. <i>Word recognition</i>	10
2.3. <i>L2 vocabulary acquisition</i>	11
2.4. <i>Language awareness and noticing</i>	14
2.5. <i>Typographical enhancement</i>	16
2.6. <i>Former research</i>	17
<b>3. Methodology</b>	<b>19</b>
3.1. <i>Participants</i>	19
3.2. <i>Materials</i>	20
3.3. <i>Design of Study</i>	22
3.4. <i>Procedure</i>	23
3.5. <i>Data Analysis</i>	24
<b>4. Results</b>	<b>25</b>
4.1. <i>Contrasts &amp; Post-hoc analysis</i>	29
<b>5. Discussion</b>	<b>35</b>
<b>6. Conclusion</b>	<b>43</b>
References	45
<b>Appendices</b>	<b>48</b>
<i>Appendix 1. Demographic information and instructions</i>	48
<i>Appendix 2. Original text</i>	49
<i>Appendix 3. Edited text</i>	51
<i>Appendix 4. Word list</i>	53

## TYPOGRAPHICAL ENHANCEMENT

## Abstract

This study investigates the effect of typographical enhancement on L2 vocabulary acquisition. This study explores the following research questions: are typographically enhanced nouns, adjectives and verbs remembered better than nouns, adjectives and verbs that are not typographically enhanced? Is there a significant difference between these three lexical categories and is there a significant effect of gender on the outcomes of this study? A total of 47 participants participated in this study, who were all students in the second grade of Gymnasium, which is the highest educational level of secondary school in the Netherlands. The method used in this study is typographical enhancement, which means the manipulation of fonts. The participants were asked to read a text and had to mark the words on a list that they remembered reading in the text. This study is conducted by means of an ANOVA. The results show that typographical enhanced words are remembered better than normal words. It also shows that nouns are better remembered than adjectives and verbs, but that there is no significant difference between the adjectives and verbs remembered. The study also showed that the difference between the results of the participants on different lexical categories significantly differed depending on whether the words were typographically enhanced or not. Verbs is the lexical category that benefits the most from typographical enhancement. A preliminary test shows that gender cannot be taken into account and thus this study cannot say anything about the relation of gender and the words

## TYPOGRAPHICAL ENHANCEMENT

remembered. Future research can take into account gender by increasing the sample size (*N*). Although this study shows significant outcomes of the effect of typographical enhancement on L2 vocabulary acquisition, future research in this field is recommended.

*Keywords:* language awareness, typographical enhancement, L2 vocabulary acquisition, language learning, recognition, noticing, attention.

### ***1. Introduction***

How do we learn what we learn and how can we improve our learning skills? These are important questions, which are investigated in second language acquisition (SLA) research. Learning a second or foreign language is a complex and difficult process, which is still not fully understood by researchers today. In several parts of the academic field, research is conducted on the acquisition of a second language. Neurolinguistics focus on the exact processes of language comprehension and production in the human brain. Linguistics and psycholinguistics focus on the acquisition of a second language by means of several theories and hypotheses conducted since the 19<sup>th</sup> century. Because of the technological developments in the academic field, our knowledge of the human brain and therefore the cognitive processes of language learning increases by the day. This gives researchers the opportunity to apply this knowledge of the processes of language learning in general towards finding ways in improving second language learning.

An important concept in language learning is language awareness. Svalberg discusses the success of language awareness (LA) in language learning: "Language awareness can be defined as explicit knowledge about language, and conscious perception and sensitivity in language learning, language teaching and language use" (Svalberg, 2007, p. 288). Besides language awareness, there are many other aspects that are involved in the processes of

## TYPOGRAPHICAL ENHANCEMENT

language learning. A cognitive aspect of awareness is attention (Posner & Petersen, 1990), and attention and awareness conjoin in a phenomenon called noticing. To make this process of second language learning even more complex is that noticing is the necessary step for input to become intake (Schmidt, 1994).

There are many different LA techniques for improving second language learning, for instance dictogloss, discovery-type and typographical enhancement (Svalberg, 2007). VanPatten's research on second language acquisition showed that learners focused on meaning rather than form when focusing on the stimuli that were presented to them (1990). This gave rise to the notion of typographical enhancement, in which the focus shifts from meaning to form. Typographical enhancement simply refers to the manipulation of fonts to attract participants' attention without distracting them from their task (Doughty & Williams, 1998).

Former research in the field of typographical enhancement has all focused on grammatical acquisition rather than vocabulary acquisition, and these studies have shown contrasting results. The researchers Alanen (1995) and Radwan (2005) both found no significant results in their study on typographical enhancement, whereas Svalberg mentions that the study of Jourdenais et al. (1995) found that typographical enhancement did have a significant effect on language learning (2007). These three studies all focused on grammatical acquisition, like syntax or morphology, rather than vocabulary acquisition. Paul Meara states that "vocabulary acquisition is the part of the psychology of second language learning that has received short shrift from applied linguistics, and has been very largely neglected by recent developments in research" (1980, p. 221). That is why the study conducted in this thesis focuses on vocabulary acquisition rather than grammatical acquisition by means of typographical enhancement.

## TYPOGRAPHICAL ENHANCEMENT

This study explores the following research questions: are typographically enhanced nouns, adjectives and verbs remembered better than nouns, adjectives and verbs that are not typographically enhanced? Is there a significant difference between these three lexical categories and is there a significant effect of gender on the outcomes of this study? The hypothesis of this study is that the enhanced nouns, adjectives and verbs are better remembered than the 'normal' nouns, adjectives and verbs. The second hypothesis is that a significant difference is expected to be found between the three different lexical categories. Nouns, adjectives and verbs are all content words, "whose main function is to express meaning" (content word, 2010, p. 326), and not function words, "which are important for the grammar of a sentence rather than its meaning" (function word, 2010, p. 630). People with deep dyslexia appear to have greater difficulty reading function words than content words (Harley, 2010). This does not mean that the participants in these study have more difficulty reading function words instead of content words. However, this study focuses only on content words, nouns, adjectives and verbs, – adverbs are also content words, but this study does not examine those – as stimuli and avoid function words as stimuli. There is evidence for the fact that people with deep dyslexia have less trouble reading nouns than adjectives, and also have less trouble reading adjectives than verbs (Harley, 2010). Whether this distinction can be made for the *recognition* of nouns, adjectives and verbs, and if it is the case with these participants, who are not dyslectic except for three, is not investigated, however, maybe a comparison can be found. Finally, the last and third hypothesis of this study is that gender will have a significant effect on the remembered words.

The participants are tested by reading a text that had the length that fitted on one page. After a 7-minute period they are asked to stop reading and turn the page. On this page

## TYPOGRAPHICAL ENHANCEMENT

the participants are asked during a 5-minute period to encircle all the words that they could remember reading in the text. The data is analysed by means of an ANOVA.

This study will first provide relevant literary background for the experiment conducted. The literature review will first provide information about (second) language learning. From (second) language learning the focus shifts towards word recognition and from here shifts to a the more complex process of L2 vocabulary acquisition. The next chapter will discuss the (cognitive) processes of language learning, which will lead to the following section that describes the method used in this study typographical enhancement. Finally, earlier research in the field of typographical enhancement is discussed. After providing the reader with the relevant literary background, the method of the study, typographical enhancement, is explained. The methodology section is followed by the results. This section simply shows the results of the ANOVA and the further contrasts and post-hoc analyses. This thesis ends with a thorough discussion about the results that were conducted by means of the ANOVA and an overall conclusion of this study.

### *2. Literature review*

To understand the technique of typographical enhancement, general knowledge on language learning needs to be provided. Therefore, the first section of this literature review will provide information about (second) language learning and the critical period, in which it is believed that language learning occurs best. Because this study focuses on the recognition of words, the next section will discuss what word recognition is exactly, and how this occurs. From word recognition, the focus will shift towards L2 vocabulary acquisition. This section will also cover the importance of the difference between input and intake of stimuli. To understand a little more about the (cognitive) processes in language learning the following

## TYPOGRAPHICAL ENHANCEMENT

topics will be discussed: language awareness, attention and noticing and their relation towards implicit or explicit learning. Finally, this literary background will provide information about typographical enhancement itself, which is the method used for the research conducted in this study, and will briefly discuss former research conducted in the field of typographical enhancement.

### ***2.1. (Second) language learning***

This study focuses on the processes of language learning, and more specifically second language learning. When it comes to language learning in general, there has been a division between two camps. There were the linguists on the one hand and the psycholinguists on the other hand. Linguists such as Chomsky, believed that “language processes run along nicely without any help or interference from any other cognitive processing” (Harley, 2010, p. 27). Psycholinguists on the other hand believed that “language makes use of the same cognitive processes that run the rest of our lives” (Harley, 2010, p. 27). This division between ideas on how a language in general is learned comes down to the debate of nature versus nurture. Chomsky holds that people are born with a Universal Grammar, which means that our language behaviour is governed by rules or multiple constraints and statistical regularities. Psycholinguists however, believe that language is learned from experience rather than a Universal Grammar. “We are born an empty canvas, and have to learn things from experience” (Harley, 2010, p. 25).

Nowadays it is known that language learning in general does not happen entirely by nature or nurture, but rather through a combination of these aspects. Linguists and psycholinguists try to meet half way. Linguistic studies try to engage the psycholinguistic theories into their own theories and vice versa. Despite the different point of views on

## TYPOGRAPHICAL ENHANCEMENT

language learning, it is certainly believed that the younger someone is, the easier it is to learn a language, which is also the case for learning a second language. “The limited window in which something has to happen if subsequent development is to proceed normally is called the *critical period*” (Harley, 2010, p. 77), and the critical period hypothesis states that it is recommended to start learning a language early on. What exactly is meant by ‘early’ is another question that needs to be answered (Harley, 2010).

A classic study conducted by Johnson and Newport showed an analysis of Chinese and Korean immigrants, of various age groups, trying to learn the English language (1989). This study drew two important conclusions. The first is that there was no sudden cut-off point after which it became very difficult to learn a second language (Johnson & Newport, 1989). This meant that although “there is a decline in ability, it is a gradual one” (Harley, 2010, p. 78). The second conclusion was that more exposure to a new language improved the learning of this new language (Johnson & Newport, 1989).

Another argument for the assumption that exposure is necessary for the acquisition of language are the several accounts of *feral children* through the ages. Feral children are children that “have either been lost or abandoned by their parents in the wilderness, and have managed to grow up fending for themselves” (Harley, 2010, p. 78). There are a number of stories about these feral children, one of these stories is the “wolf child of Aveyron” (Harley, 2010, p. 78). This child, Victor, was found while wandering in the woods, and was not able to speak. A medical student tried to teach him social skills and language, however this attempt was “largely unsuccessful” (Harley, 2010, p. 78). Not only Victor, but none of the other feral children in the stories acquired language. However, before these stories are accepted as evidence for a critical period, it must be taken into account that nothing is known about the linguistic abilities of a child before they were abandoned in the first place

## TYPOGRAPHICAL ENHANCEMENT

(Harley, 2010). Despite the fact that these feral children or any children for that matter lack certain linguistic abilities, it is widely accepted that exposure is of great importance when learning a language. Language learning occurs in different stages. In the study conducted in this thesis, the participants had to remember and recognise the words that they had read before. This study was therefore not interested in the reproduction of words but rather in the recognition of words.

## **2.2. Word recognition**

Language occurs in two different modalities: speech and writing. Speech is acquired by auditory perception and writing is acquired by means of visual perception (Brouwer, 2016). In this study the participants are presented with language in writing, as they are asked to read a text and afterwards mark the words that they had remembered reading.

According to Harley, “Words are the building blocks of language” (2010, p. 145). Recognising words is a data-driven process, which mainly occurs from the bottom-up. Bottom-up means that a perception leads to a mental presentation (Brouwer, 2016). There are times, however, that word recognition happens from the top-down. Top-down means that knowledge or expectations influence perception (Brouwer, 2016). This could happen when reading a text in which parts are missing because of for instance printing errors. If a text says ‘the roof of the ouse’, *house* will be the first word that pops up in someone’s mind, because general knowledge in combination with the context of the sentence leads towards the realisation of *house* rather than for instance *mouse*.

Recognising a word entails that “you’ve made a decision in some way that the word is familiar” (Harley, 2010, p. 146). In other words, “recognition doesn’t necessarily entail anything more: you could in principle decide something’s a word you know and not do

## TYPOGRAPHICAL ENHANCEMENT

anything more with it” (Harley, 2010, p. 146). Word processing entails more steps than just recognition. After recognition there is identification, which means knowing exactly which word it is, followed by lexical access, which means accessing the mental lexicon and “obtaining potentially all knowledge about the word” (Harley, 2010, p. 146) The mental lexicon is a hypothetical dictionary in the brain, independent of the form and modality of language (Brouwer, 2016). Lexical access is followed by the last step of word processing, which is understanding. This means that there is access to the actual word meaning (Brouwer, 2016). This study covers the recognition of words, and does not discuss the other interesting steps of word processing necessary for L2 vocabulary acquisition. The next section covers the topic of L2 vocabulary acquisition, which all begins with recognition.

### ***2.3. L2 vocabulary acquisition***

The former section covers the issue of word recognition. This section, however, covers L2 vocabulary acquisition. Schmidt says that the processes that occur in second language learning are also applicable to theories of second language acquisition (1994). The study conducted in this thesis focuses on second or foreign language acquisition rather than first language acquisition, by exploring the possibility for improving vocabulary acquisition in a foreign language by means of typographical enhancement. Therefore, the rules or theories that apply to first language acquisition, that – usually - occurs in a different stadium than the stadium of L2 acquisition, were irrelevant for this study. When teaching a second or a foreign language it is difficult to choose the exact input that will be provided to the new language learner. “When we are confronted with the task of teaching a learner a second or a

## TYPOGRAPHICAL ENHANCEMENT

foreign language, one of the first decisions to be made is what samples of the target language, that is, *input*, should be provided and at what moment that input should be given” (Sharwood Smith, 1993, p. 165).

The main point of understanding how second or foreign language learning takes place is to understand how input that the learner is exposed to, becomes intake (Alanen, 1995). In any language learning situation there is input, which is the language material the learner is exposed to, and there is intake, which refers to the part of the input that the “learner incorporate[s] into his or her developing knowledge” (Alanen, 1995, p. 290). This process of how input becomes intake is a complex one, which goes beyond the scope of this bachelor thesis, but nevertheless is still worth mentioning. The next section in this thesis will discuss Schmidt’s Noticing Theory that claims to have found an explanation for input to become intake.

Many papers and researchers have discussed acquisition, without, however, specifying what exactly was being acquired. Many SLA researchers from the 1970s and the early 1980s saw acquisition as a way of becoming familiar with the L2’s grammatical system, while other levels of language such as phonology, vocabulary, and discourse were neglected (Ellis, Tanaka, Yamazaki, 1994). Paul Meara states that vocabulary acquisition has been neglected by most of the researchers, whereas learners of an L2 “experience considerable difficulty with vocabulary” (1980, p. 221). However, there are some studies that did pay attention to vocabulary acquisition.

Ellis et al. (1994) mentioned that the main foci of vocabulary acquisition research have been the effectiveness of various strategies for memorizing new items (e.g., Cohen, 1990) and the extent learners are successful in inferring the meaning of new items

## TYPOGRAPHICAL ENHANCEMENT

from written texts (e.g., Li, 1989). In addition, some work has investigated the effects of listening to stories on vocabulary acquisition (e.g., Elley, 1989), and Brown (1993) has also examined the effects of frequency and saliency of words in oral input from a videodisk program. (p. 457)

The acquisition of vocabulary is a very complex process.

According to Richards, who is cited in Ellis et al. (1994), it involves discovering the frequency with which the lexical item is used in speech and writing, its situational and functional uses, its syntactical behaviour, its underlying form and the forms that can be

derived from it, the network of associations between it and other items, its semantic features and, of course, the various meanings associated with the item. (p. 457)

Unfortunately, not much is yet known about how L2 learners gradually acquire all the information listed above. As mentioned in the former section concerning word recognition, it is emphasised that learning to recognise lexical items is different and less difficult than learning how to produce lexical items (Ellis et al., 1994). A widely used method of measuring L2 word acquisition is measuring the acquisition of basic word meanings. This is usually examined via learners' recognition of either written or oral words. (de la Fuente, 2006). In this study the acquisition of basic word meanings is not measured. Instead, this study examines L2 vocabulary acquisition by using a different technique and focusses on recognising lexical items, rather than producing them. Learning a (second) language concerns many (cognitive) processes, which are briefly discussed in the next section.

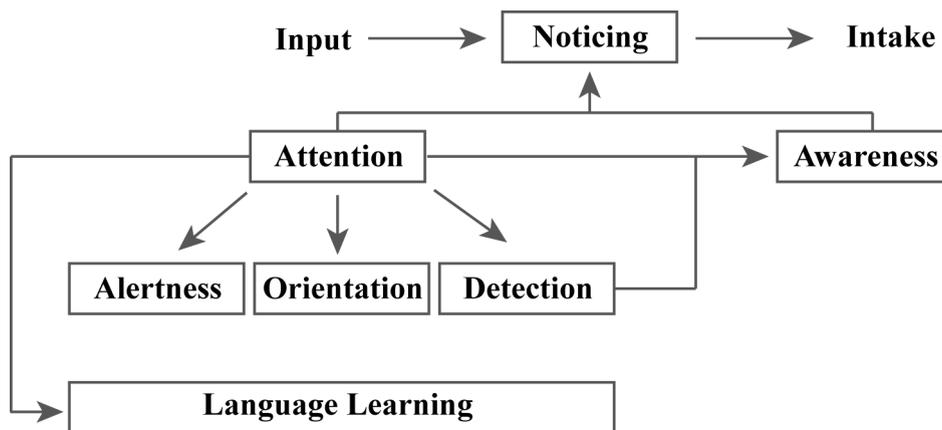
#### ***2.4. Language awareness and noticing***

The Association of Language Awareness (ALA) defines Language Awareness (LA) as follows: “Language Awareness can be defined as explicit knowledge about language, and conscious perception and sensitivity in language learning, language teaching and language use” (Svalberg, 2007, p. 288). A cognitive aspect of language learning is attention, which consists of three elements: alertness, detection, and orientation (Posner and Petersen, 1990). “A person who attends to something is by definition alert”. (Svalberg, 2007, p. 289). There is a connection between attention and awareness. According to Svalberg, “Attention in the form of detection is a pre-condition for awareness” (2007, p. 289). Svalberg cites the researcher Al-Hejin in her paper, stating that awareness “changes a person’s behaviour or cognitive state and this person is able to report that they became aware, and what they have become aware of. Attention and awareness come together in the phenomenon that we call noticing” (2007, p. 289). Al-Hejin himself adds that “awareness refers to the learner’s knowledge or subjective experience that he is detecting a stimulus” (2004, p. 11).

Attention and terms related to it such as consciousness, noticing, and awareness are sometimes used interchangeably in literature, which makes it difficult to compare results and theories from different studies (Al-Hejin, 2004). The reason why these terms are used interchangeably is the inherent subjectivity in defining these concepts. Schmidt has stated that “noticing is the necessary and sufficient condition for the conversion of input to intake for learning” (1994, p. 17). This claim about noticing is in line with his Noticing Hypothesis. This Hypothesis claims that “learners must attend to and notice linguistics features of the input that they are exposed to if those forms are to become intake for learning” (Schmidt, 2012, p. 29). This means that both awareness and attention (and thus noticing) facilitate

## TYPOGRAPHICAL ENHANCEMENT

learning, and in this case more specifically language learning. Figure 1 below shows a schematic overview of the terms discussed above.



*Figure 1. Schematic overview of the relation between attention, awareness, and noticing according to the researchers Schmidt, Posner & Petersen, Svalberg and Al-Heijjin.*

The point of putting language awareness into practice, is that developing a “better understanding of the language and of learning processes will generally enhance language learning and use”. (Svalberg, 2007, p. 290). Apart from the debate of the role of awareness in language learning there is the “issue of the degree of explicitness necessary to draw learners’ attention to the targeted linguistic elements” (Radwan, 2005, p. 71). Radwan showed that several studies concluded that “learners exposed to explicit learning conditions outperformed those exposed to implicit learning conditions” (2005, p. 72). Implicit learning is a process by which the properties of a stimulus are acquired subconsciously and this process takes place without awareness (Al-Heijjin, 2004). Explicit learning, on the other hand, is when a learner is actively involved in and aware of the processing of the input (Al-Heijjin, 2004). This means that a learner is able to learn a second language just by implicit learning,

## TYPOGRAPHICAL ENHANCEMENT

but it will only take him so far. Learning a second language by explicit learning, on the other hand, will take the learner much further.

### ***2.5. Typographical enhancement***

There are several methods and techniques that have been commonly associated with LA in the classroom. Generally speaking, approaches and techniques that make use of or bring forth conscious knowledge, and “which stimulate engagement with the language in a specific context, within a constructivist framework, are consistent within an LA pedagogy” (Svalberg, 2007, p. 292). Svalberg refers to several techniques or/and approaches in her paper: input enhancement, discovery type, inductive tasks and dictogloss (2007). Though it is likely that different learners benefit from different approaches, this study does not focus on all of the techniques referred to above, but focusses specifically on the LA technique input enhancement.

This study has chosen typographical enhancement as a method, because of VanPatten’s study on second language acquisition (1990). He conducted one of the most influential studies involving SLA. VanPatten’s research investigated whether learners were able to consciously attend to both form and meaning when they were processing input (1990). In his study, he concluded that it was difficult for learners, especially early stage learners, to notice meaning and form simultaneously (VanPatten, 1990). His results also suggested that learners notice meaning before form, because in everyday life there is a primary focus on meaning rather than on form (VanPatten, 1990). This study, however, only focused on the grammatical morphology in the input, so it is not certain that the same observations for instance apply to syntax or vocabulary. VanPatten’s observations have been a reason for researchers to find a way to shift the focus of meaning to the focus on both

## TYPOGRAPHICAL ENHANCEMENT

form and meaning. One way of doing this is by means of input enhancement (Al-Heijin, 2004). Input enhancement has often been used interchangeably with the term typographical enhancement, because these terms can practically be interpreted the same way.

Sharwood-Smith has used the term input enhancement for ways in which “certain language features are made salient by for instance teachers or materials in order to promote noticing” (1993, p. 176).

Typographical enhancement simply refers to the manipulation of fonts such as bolding and underlining (Svalberg, 2007). Svalberg argues that form needs to be foregrounded somehow to make sure that learners detect their attention to it (2007). Although the learners’ attention has to be attracted to these foregrounded elements, the learners should not be distracted by it. Doughty and Williams’ researched has shown that typographical enhancement was salient enough to attract attention to the target forms without distracting participants while they read (1998). Thus, typographical enhancement is a good way to draw a reader’s attention while reading a text, without distracting him from his actual reading. This technique has been used in the past to improve the acquisition of for instance morphology and syntax. The next section will discuss previous research done in the field using typographical enhancement.

### ***2.6. Former research***

Typographical enhancement sounds like a perfect technique to teach children - or adults - a second language, whether they are taught vocabulary or grammar. Former studies have focused on grammatical acquisition rather than vocabulary acquisition by typographical enhancement. Their focus was either on morphology or syntax, but never on vocabulary. This research, however, will focus on vocabulary acquisition by typographical enhancement.

## TYPOGRAPHICAL ENHANCEMENT

Former research on the learning effect of typographical enhancement has not (yet) shown clear results. Riiki Alanen for instance, researched the effect of input enhancement in second language acquisition (1995). This study investigated how visual input enhancement, in this case the use of italics, “affected the acquisition of structural language elements by L1 English beginning learners of semi-artificial Finnish” (Alanen, 1995, p. 259). Alanen found that the visual enhancement technique helped the learners improve their recall and use of the targets (1995). This effect, however, was not instantly obvious and it appeared that “visual input enhancement did not have an effect on the learners’ performance” (Alanen, 1995, p. 288). Al-Heijin had discussed Alanen’s research (1995) in his article and said that although no significant difference was found between the enhanced and unenhanced input groups, think-aloud protocols showed that learners, who actually noticed the target forms, learned more than learners who did not notice the target forms (2004).

Another study that has failed to show any significant results using typographical enhancement is the study of Adel Abu Radwan (2005). The research that Radwan conducted focused on the facilitative effects - of among other things - typographical enhancement on the acquisition of English dative alternation (2005). Radwan decided to shift focus from the morphological elements of language towards a syntactic feature of language. However, the research showed that textual manipulation, in this case input enhancement, was “insufficient to induce changes in the learners’ L2 ability” (Radwan, 2005, p. 82). Radwan mentioned several other studies that supported his point of view that typographical enhancement did not necessarily produce significant results Izumi (2002), Jourdenais (1998), and White (1998). These studies showed that making targets salient by means of typographical enhancement, was not enough to “trigger the cognitive processes required for language learning to occur” (Radwan, 2005, p. 82).

## TYPOGRAPHICAL ENHANCEMENT

However, not all studies conducted showed non-significant effects of typographical enhancement on language learning. Some studies have shown the opposite. Svalberg has referred to for instance the study of Jourdenais et al. (1995) in which “enhancement seemed to produce both an increased quantity and greater accuracy of the target feature in immediate and delayed post-tests” (Cited in Svalberg, 2007, p. 292). As mentioned before, the study of Jourdenais (1998) found no significant results, whereas the study of Jourdenais et al (1995) did find significant results. Jourdenais et al (1995) focused on think-aloud protocols (Svalberg, 2007), whereas, according to Radwan, Jourdenais (1998) investigated “The Effects of Textual Enhancement on the Acquisition of the Spanish Preterit and Imperfect” (2005). The fact that the same researcher conducted studies that showed non-significant and significant results shows just how less we know about typographical enhancement and second language acquisition. In the 1990’s the role of input or typographical enhancement in second language acquisition was heavily debated (Alanen, 1995), and this study revives this discussion.

### *3. Methodology*

This thesis explored the question whether typographically enhanced nouns, verbs and adjectives were better remembered than nouns, verbs and adjectives that were not typographically enhanced. This thesis also tested the hypothesis that there is a significant difference between these three lexical categories. Finally, this thesis tested the effect of gender on the outcomes of the study. Participants were tested on how many words they could remember from the text that they had read a few minutes before.

### **3.1. Participants**

The participants in this study were students aged either 13, 14 or 15. They were all in the second grade of Gymnasium, which is the highest educational level in the Netherlands at a secondary school. The participants' L1 was Dutch. A total of 47 participants ( $N=47$ ) participated in the experiment. Of these 47 participants, 23 attended school at Het Rhedens Lyceum located in Rozendaal, and 24 attended school at Het Heerbeek College located in Best. Of these 47 participants 29 were female and 19 were male. 19 of these females and 4 of these males attended school at Het Rhedens Lyceum and 10 of these females and 15 of these males attended school at Het Heerbeek College. Of these 47 participants, 3 children were dyslectic.

### **3.2. Materials**

The experiment of this study consisted of a text and a word list. Before the experiment started the students had to answer a few demographic questions and they had to read the instructions (Appendix 1). Firstly, the participants had to read a text. The length of the text was 789 words and fitted on one printed page. The original text was about formula 1 racer Max Verstappen, and was received from *Alquin Magazine* (Appendix 2). The original title of this text was "The Youngest Racer in Formula 1". This experiment contained an edited version of this original text (Appendix 3). This is an A2-level text. This level was chosen by means of the guidelines of the CEFR (Common European Framework of Reference for Languages). The CEFR is a framework that describes descriptions of language learners' proficiency at six different reference levels (Council of Europe, 2001). These levels were described in Table 1 below.

## TYPOGRAPHICAL ENHANCEMENT

*Table 1. Common Reference Levels according to the CEFR: global scale (Council of Europe, 2001, p. 25).*

Proficient User	C2	Can understand with ease virtually everything heard or read. Can summarise information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation. Can express him/herself spontaneously, very fluently and precisely, differentiating finer shades of meaning even in more complex situations.
	C1	Can understand a wide range of demanding, longer texts, and recognise implicit meaning. Can express him/herself fluently and spontaneously without much obvious searching for expressions. Can use language flexibly and effectively for social, academic and professional purposes. Can produce clear, well-structured, detailed text on complex subjects, showing controlled use of organisational patterns, connectors and cohesive devices.
Independent User	B2	Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.
	B1	Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. Can deal with most situations likely to arise whilst travelling in an area where the language is spoken. Can produce simple connected text on topics which are familiar or of personal interest. Can describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.
Basic User	A2	Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment). Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Can describe in simple terms

## TYPOGRAPHICAL ENHANCEMENT

	aspects of his/her background, immediate environment and matters in areas of immediate need.
A1	Can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. Can introduce him/herself and others and can ask and answer questions about personal details such as where he/she lives, people he/she knows and things he/she has. Can interact in a simple way provided the other person talks slowly and clearly and is prepared to help.

A secondary school teacher was consulted about the level of English for these participants, and concluded that Gymnasium students' level of English should be higher than the basic A1 level; however, they are not yet independent users of English. This meant that an A2-level text was best suited for the participants. The title and images of the original text were left out of the experiment to make sure these aspects would not influence the children during the experiment. In this way the theme of the text remained unknown until the participants started reading. The entire text was written in Times New Roman 12-point size.

Secondly, the participants had to flip a page to see the word list (Appendix 4). The words on the word list consisted of 24 nouns, 24 verbs, 24 adjectives, and 18 fillers. Bolding was used as the typographical enhancement technique. The 24 words per word category are divided in 12 words that were bolded in the text and 12 words that were not bolded in the text. Of these 12 words, 4 words consisted of 1 syllable, 4 words consisted of two syllables, and 4 words consisted of 3 syllables or more. All these 72 words only occurred once in the text, such that no word had the 'advantage' over others. This is because "frequency of a word is an extremely important variable in word processing – the more common a word is, the easier it is to recognise" (Harley, 2010, p. 147). The word list provided the words in the same types as they occurred in the text. This way there would be no ambiguity if a word - either a noun, verb or adjective - was irregular. Irregular verbs for instance could create

## TYPOGRAPHICAL ENHANCEMENT

some trouble if the text mentioned 'went' and the word list mentioned 'go', because in that case, technically, the children did not read that exact word in the text. Beside the 72 words that actually occurred in the text, the word list also contained 18 fillers. These fillers were divided in 6 nouns, 6 verbs and 6 adjectives. These 6 words were divided once again in 2 words that consisted of 1 syllable, 2 words that consisted of 2 syllables, and 2 words that consisted of 3 syllables or more. All these fillers could be remotely linked to the topic of the text, and therefore could all have occurred in the text. The experiment contained 6 different versions of the word list; all the versions naturally consisted of the same ninety words. However, the words in every version were listed in a different order. This way the words were randomized, and no other factors – as fatigue or lack of concentration - could influence the outcomes of the experiment.

### ***3.3. Design of Study***

This study was intended as a mixed design, which meant that next to the within-subjects factors there was also a between-subjects factor. The within-subjects factors are lexical category and whether a word was typographically enhanced or not. These were the within-subjects factors because all the participants were exposed to the same conditions. The between-subjects factor was gender, simply because girls and boys make up two different groups. This study contained 3 independent variables and 1 dependent variable. The first independent variable in this study was whether words are typographically enhanced or not. The second independent variable in this study was lexical category (nouns, adjectives or verbs). The last independent variable in this study was gender. The dependent variable in this study was the number of words that had been remembered by the participants. However, the assumption of normality was violated for the ANOVA Mixed

## TYPOGRAPHICAL ENHANCEMENT

Design, which meant that this analysis could not be conducted by means of an ANOVA, but had to be conducted by a non-parametrical test. Non-parametrical tests, however, are very complex and are for the purpose of this study not conducted. For that reason, an ANOVA Repeated Measures Design was conducted instead of a Mixed Design. That means that only the within-subjects factors and independent variables lexical category and whether a word was typographically enhanced or not were taken into account. The dependent variable remained the number of words that had been remembered by the participants. The ANOVA Mixed Design was, however, conducted as a preliminary test to investigate the effect of gender on the remembered words.

### ***3.4. Procedure***

At the beginning of the experiment, the participants received clear oral, and written instructions about their assignment (Appendix 1). They were also asked to answer several demographic questions beforehand such as; their names, first language, age, gender, and whether or not they were dyslectic (Appendix 1). After the participants were given a few minutes to read the instructions, there was an opportunity to ask questions about the experiment. When the entire experiment was clear to every participant, the experiment began by starting the stopwatch and the children could turn the page.

This next page consisted of a text (Appendix 3), and the participants were given 7 minutes to read this text. They were asked to remember the words in the text rather than the context of the text. After 7 minutes had passed, a sign was given to them to turn the page. This page was empty. Before the participants could turn the page, they were asked if the task was still clear to them. Then the children could turn the page, and they were given 5 minutes to encircle as many words on the word list (Appendix 4) as they could, which they

## TYPOGRAPHICAL ENHANCEMENT

had remembered reading in the text. The children were also strongly reminded that they could not look at the text they had read a few minutes before during the encircling of the words on the word list. When all was clear, the 5-minute period started. After 5 minutes had passed, the children were asked to put their pens down. This indicated the end of the experiment.

**3.5. Data Analysis**

The present study aimed to investigate the effect of typographical enhancement on the remembering of either nouns, verbs or adjectives, and to investigate whether a certain lexical category is better remembered than another one. This thesis also tended to investigate whether gender had an influence on the outcomes of the experiment. However, as mentioned before, the assumption of normality was violated. This meant that the ANOVA Mixed Design was only conducted as a preliminary test, and that the effect of gender on the words remembered could not be taken into account for this research. Therefore, the present study aimed to investigate the effect of typographical enhancement on the remembering of nouns, verbs and adjectives, and to investigate whether a certain lexical category is remembered better than another one. The data of this experiment was analysed by means of an ANOVA Repeated Measures Design. This design showed whether there was a main effect of the within-subjects factors typographical enhancement and lexical category. This ANOVA design also showed whether there was an interaction-effect of typographical enhancement and lexical category. For further analysis of the main-effect lexical category and interaction-effect typographical enhancement \* lexical category, a post-hoc test with a Sidak correction and contrasts were conducted.

## TYPOGRAPHICAL ENHANCEMENT

When an ANOVA Repeated Measures Design is conducted, there are four assumptions that need to be checked beforehand.

- i. Observations are independent of one another; thus the different groups do not influence each other.
- ii. The dependent variable is minimally of an interval level.
- iii. The dependent variable is normally distributed within groups (Field, 2009).
- iv. Sphericity is assumed, which means that the variances of the differences between the conditions are equal. "So if each pair of treatment levels is taken, and the differences between each pair of scores is calculated, then it is necessary that these differences have approximately equal variances" (Field, 2009, p. 545).

Assumptions (i) and (ii) were checked, and assumed. Assumptions (iii) and (iv) were checked and explained in the results section.

### ***4. Results***

Before the results of the ANOVA are shown below, it is necessary to check the assumptions for an ANOVA Repeated Measures Design. As mentioned in the methodology section, assumptions (i) and (ii) are already accounted for. The assumptions for normality (iii) and sphericity (iv) are thoroughly checked in this section.

*Table 2. Tests of Normality.*

	<i>Kolmogorov-Smirnov</i>	
	<i>df</i>	<i>p</i>
<i>Typographically Enhanced Nouns</i>	47	0.033
<i>Typographically Enhanced Adjectives</i>	47	0.018



## TYPOGRAPHICAL ENHANCEMENT

<i>Typographical Enhancement</i>	1.000	0.000	0	-	1.000	1.000	1.000
<i>Lexical Category</i>	0.961	1.789	2	0.409	0.962	1.000	0.500
<i>Typographical enhancement * Lexical category</i>	0.866	6.470	2	0.039	0.882	0.914	0.500

*Significance at the  $p < 0.05$  level.*

The last assumption that needed to be checked, was the assumption of sphericity. If the results are significant, it means that the assumption of sphericity is violated. Table 3 above showed that the main-effect lexical category  $\chi^2(2) = 1.789$ ,  $p = 0.409$  was not significant. However, the interaction-effect typographical enhancement \* lexical category  $\chi^2(2) = 6.470$ ,  $p = 0.039$  was significant and has therefore violated the assumption of sphericity. Because of the violation of sphericity a Huyn-Feldt correction was carried through. A Huyn-Feldt correction rather than a Greenhouse-Geisser correction is carried through because  $\epsilon$  (epsilon)  $> 0.75$ . The assumption of sphericity cannot be violated by the main-effect typographical enhancement because this main effect only consists of 2 levels, enhanced or normal words.

Now that the last two assumptions are checked, it is time to focus on the results brought forward by the ANOVA Repeated Measures Design analysis showed below in Table 4.

*Table 4. Results of the ANOVA Repeated Measures Design*

## TYPOGRAPHICAL ENHANCEMENT

	<i>df</i>	<i>F</i>	$\eta^2$	<i>p</i>
<i>Typographical enhancement</i>	1	99.677*	0.684	0.000
<i>Error (Typographical enhancement)</i>	46			
<i>Lexical category</i>	2	35.012*	0.432	0.000
<i>Error (Lexical category)</i>	92			
<i>Typographical enhancement*Lexical category</i>	1.829	4.862*	0.096	0.012
<i>Error (Typographical enhancement*Lexical category)</i>	84.12 4			

Significance at the  $p < 0.05$  level. \* $p < 0.05$ .

A 3x2 ANOVA Repeated Measures Design with the within-subjects factors lexical category (nouns, adjectives and verbs) and typographical enhancement (enhanced or normal) and the dependent variable the number of words remembered by the participants showed the following:

There was a significant main-effect of typographical enhancement on the number of words remembered  $F(1,46) = 99.677, p < 0.001, \eta^2_p = 0.684$ .

There was a significant main-effect of lexical category on the number of words remembered  $F(2,92) = 35.012, p < 0.001, \eta^2_p = 0.432$ .

There was a significant interaction-effect of typographical enhancement \* lexical category, which meant that the difference between the results of the participants on different lexical categories significantly differed depending on whether the words were typographically enhanced or not  $F(1.892,84.124) = 4.862, p = 0.012, \eta^2_p = 0.096$ .

The results above showed that the main-effects typographical enhancement and lexical category, and the interaction-effect typographical enhancement \* lexical category

## TYPOGRAPHICAL ENHANCEMENT

showed a significant result. It is, however, not clear which levels exactly caused these significant results. Therefore, further analysis was conducted by means of contrasts and post-hoc tests.

### **4.1. Contrasts & Post-hoc analysis**

As reported in the previous section, further analysis was necessary to understand at which levels the results were significant. Table 5, 6, and 7 below give information about the general statistics for the main- and interaction-effect(s). Table 8 lists the results of the contrasts.

*Table 5. Estimates of the main-effect Typographical Enhancement.*

<i>Typographical enhancement</i>	<i>Mean</i>	<i>Std. Error</i>
<i>Typographically enhanced</i>	6.582	0.274
<i>Normal</i>	3.064	0.275

*Table 6. Estimates of the main-effect Lexical Category.*

<i>Lexical category</i>	<i>Mean</i>	<i>Std. Error</i>
<i>Nouns</i>	5.904	0.263
<i>Adjectives</i>	4.415	0.229
<i>Verbs</i>	4.149	0.250

## TYPOGRAPHICAL ENHANCEMENT

Table 7. Estimates of the interaction-effect Typographical Enhancement \* Lexical Category

<i>Typographical Enhancement</i>	<i>Lexical Category</i>	<i>Mean</i>	<i>Std. Error</i>
<i>Enhanced</i>	Nouns	7.426	0.338
	Adjectives	6.021	0.291
	Verbs	6.298	0.343
<i>Normal</i>	Nouns	4.383	0.404
	Adjectives	2.809	0.302
	Verbs	2.000	0.280

## TYPOGRAPHICAL ENHANCEMENT

Table 8. Tests of Within-Subjects Contrasts

<i>Source</i>		<i>Typographical enhancement</i>	<i>Lexical category</i>	<i>df</i>	<i>F</i>	<i>η</i>	<i>p</i>
<i>Typographical enhancement</i>	Enhanced vs. normal			1	99.677	0.68	0.00
					*	4	0
<i>Error (Typographical enhancement)</i>	Enhanced vs. normal			4			
				6			
<i>Lexical category</i>			nouns vs. verbs	1	55.311	0.54	0.00
			adjectives vs. verbs	1	*	6	0
					1.249	0.02	0.27
						6	0
<i>Error (Lexical category)</i>			nouns vs. verbs	4			
			adjectives vs. verbs	6			
				4			
				6			
<i>Typographical enhancement * lexical category</i>	Enhanced vs. normal		nouns vs. verbs	1	6.052*	0.11	0.01
			adjectives vs. verbs	1	7.769*	6	8
						0.14	0.00
						4	8
<i>(Error) Typographical</i>	Enhanced vs. normal		nouns vs. verbs	4			
			adjectives vs. verbs	6			

## TYPOGRAPHICAL ENHANCEMENT

<i>enhancement *</i>			4			
<i>Lexical category</i>			6			

Significance at the  $p < 0.05$  level.  $*p < 0.05$ .

Table 8 above shows the results of the contrasts.

Contrasts of the main-effect typographical enhancement showed that the typographically enhanced words ( $M=6.582$ ,  $SE=0.274$ ) were remembered significantly better than the normal words ( $M=3.064$ ,  $SE=0.275$ ),  $F(1,46) = 99.677$ ,  $p < 0.001$ ,  $\eta^2_p = 0.684$ .

Contrasts of the main-effect lexical category showed that nouns ( $M=5.904$ ,  $SE=0.263$ ) were remembered significantly better than verbs ( $M=4.149$ ,  $SE=0.250$ )  $F(1,46) = 55.311$ ,  $p < 0.001$ ,  $\eta^2_p = 0.546$ . But that there was no significant difference between the adjectives remembered ( $M=4.415$ ,  $SE=0.229$ ) and the verbs remembered ( $M=4.149$ ,  $SE=0.250$ )  $F(1,46) = 1.249$ ,  $p = 0.270$ ,  $\eta^2_p = 0.026$ .

Contrasts of the interaction effect typographical enhancement \* lexical category showed that the effect of lexical category varied depending on whether the word was typographically enhanced or not. The difference between the results of the participants on nouns and on verbs differ significantly depending on whether these words were typographically enhanced or not, in such a way that the difference between the enhanced verbs ( $M=6.298$ ,  $SE=0.343$ ) and the normal verbs ( $M=2.000$ ,  $SE=0.280$ ) is significantly bigger than the difference between the enhanced nouns ( $M=7.426$ ,  $SE=0.338$ ) and the normal nouns ( $M=4.383$ ,  $SE=0.404$ ).

The difference between the results of the participants on adjectives and on verbs differ significantly dependent on whether these words were typographically enhanced or not, in such a way that the difference between the enhanced verbs ( $M=6.298$ ,  $SE=0.343$ ) and

TYPOGRAPHICAL ENHANCEMENT

the normal verbs remembered ( $M=2.000$ ,  $SE=0.280$ ) is significantly bigger than the difference between the enhanced adjectives ( $M=6.021$ ,  $SE=0.291$ ) and normal adjectives remembered ( $M=2.809$ ,  $SE=0.302$ ).

As showed above, not all the combinations of the main-effect lexical category were stated in the results of the contrasts. A further post-hoc analysis was necessary to see whether a significant effect can be found between nouns and adjectives.

*Table 9. Post-hoc analysis. Pairwise Comparisons of the main-effect Lexical Category.*

<i>Lexical category</i>	<i>Lexical category</i>	<i>Mean Difference</i>	<i>Std. Error</i>	<i>Sig.<sup>b</sup></i>
<i>Nouns</i>	<i>Adjectives</i>	1.489*	0.203	0.000
	<i>Verbs</i>	1.775*	0.236	0.000
<i>Adjectives</i>	<i>Nouns</i>	-1.489*	0.203	0.000
	<i>Verbs</i>	0.266	0.238	0.610
<i>Verbs</i>	<i>Nouns</i>	-1.775*	0.236	0.000
	<i>Adjectives</i>	-0.266	0.238	0.610

*\* The mean difference is significant at the 0.05 level*

*b. Adjustment for multiple comparisons: Bonferroni.*

Table 8 above shows the results of the contrasts and how there was a significant difference between nouns and verbs, but that there was no significant difference between

TYPOGRAPHICAL ENHANCEMENT

adjectives and verbs. These contrasts however did not show the relationship between nouns and adjectives. That was why a post-hoc analysis of the main-effect lexical category was conducted. Table 9 above shows that there is also a significant difference between nouns and adjectives ( $p < 0.001$ ), in such a way that nouns ( $M=5.904$ ,  $SE=0.263$ ) were remembered significantly better than adjectives ( $M=4.415$ ,  $SE=0.229$ ). Just like the contrasts did not cover all the levels of the main-effect lexical category, they also did not cover all the levels of the interaction-effect typographical enhancement \* lexical category.

*Table 10. Post-Hoc Analysis. Pairwise comparisons of the interaction-effect.*

<i>Lexical Category</i>	<i>Typographical enhancement</i>	<i>Typographical enhancement</i>	<i>Mean difference</i>	<i>Std. Error</i>	<i>p</i>
<i>1</i>	1	2	3.043*	0.529	0.000
	2	1	-3.043*	0.529	0.000
<i>2</i>	1	2	3.213*	0.376	0.000
	2	1	-3.213*	0.376	0.000

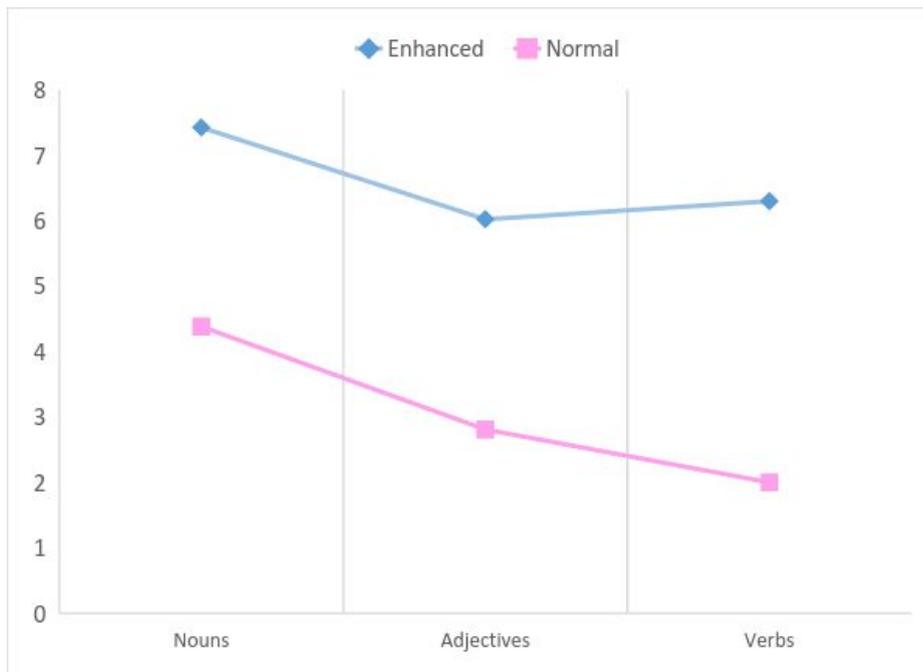
## TYPOGRAPHICAL ENHANCEMENT

3	1	2	4.298*	0.37	0.00
				7	0
	2	1	-4.298*	0.37	0.00
				7	0

\* The mean difference is significant at the 0.05 level  
 b. Adjustment for multiple comparisons: Sidak.

Table 10 above shows the results of a post-hoc analysis of the interaction-effect typographical enhancement \* lexical category. Table 10 only provides the difference between the enhanced nouns and the normal nouns remembered ( $MD=3.043$ ) and the difference between the enhanced adjectives and normal adjectives remembered ( $MD=3.213$ ). This post-hoc analyses does not provide the information needed to know whether there is a significant difference between the results of the participants on nouns and on adjectives dependent on whether these words were typographically enhanced or not. However, based on Figure 2 below, the difference between the enhanced nouns and the normal nouns remembered will probably not be significantly bigger than the difference between the enhanced adjectives and normal adjectives remembered.

### TYPOGRAPHICAL ENHANCEMENT



*Figure 2. A visual representation of the results of the interaction-effect typographical enhancement\*lexical category.*

### **5. Discussion**

The study conducted in this thesis examined whether typographically enhanced nouns, adjectives and verbs were remembered better than normal nouns, adjectives and verbs. This study also examined whether there was a significant difference between these three lexical categories, and whether gender had a significant effect on the outcomes of this study. This was supposed to be examined by means of a Mixed Design ANOVA, and further investigated using contrasts and post-hoc tests.

The research questions of this study are the following: are typographically enhanced nouns, adjectives and verbs remembered better than nouns, adjectives and verbs that are not typographically enhanced? Is there a significant difference between these three lexical categories and is there a significant effect of gender on the outcomes of this study? The

## TYPOGRAPHICAL ENHANCEMENT

hypotheses of this study are that the enhanced nouns, adjectives and verbs are remembered better than the 'normal' nouns, adjectives and verbs, that this study expects to find a significant difference between the three different lexical categories, and finally that gender will have a significant effect on the outcomes of this study.

The original ANOVA Mixed Design shows that the assumption of normality is violated. However, this study still conducts an ANOVA Mixed Design as a preliminary check, but these results are not officially reported. It appears that gender does not show a significant result on the words remembered, which refutes this study's hypothesis. However, because the assumption of normality is violated for this ANOVA Mixed Design, this result is not reliable. Therefore, this study shows no evidence for the relationship of gender and the words remembered. In this case, a non-parametrical test is the solution for conducting an experiment that shows the relationship of gender and the remembered words. There is also another solution. If the sample size ( $N$ ) would increase, the group sizes for males and females would also increase. If these group sizes would become equal or would both be bigger than 30 ( $N > 30$ ), ANOVA would have been robust against the violation of the assumption of normality and the relationship between gender and the remembered words could still be examined by means of an ANOVA Mixed Design. This study conducts an ANOVA Repeated Measures Design, instead of an ANOVA Mixed Design, in which only the within-subjects factors lexical category and typographical enhancement were explored.

This study shows that there is indeed a significant difference between the words from the three different lexical categories, and confirms the hypothesis of this study that there will be a significant difference between the three lexical categories. Nouns are remembered better than verbs and nouns are remembered better than adjectives. However, there was no significant difference between the verbs and adjectives remembered. This

## TYPOGRAPHICAL ENHANCEMENT

study mentions that people with deep dyslexia find nouns easier to read than adjectives, and adjectives easier to read than verbs (Harley, 2010). Harley does not mention that this automatically means that people with deep dyslexia find nouns easier to read than verbs. This study, however, shows a non-significant effect between the adjectives and verbs, and indicates that these participants have no preference for reading (or remembering) either adjectives or verbs. This study shows that nouns are easier to remember than adjectives, which is in line with the statement that people with deep dyslexia find nouns easier to read than adjectives (Harley, 2010). Although reading and remembering are two different tasks, the participants did have to read a text including these nouns, adjectives and verbs. A comparison can be made between these two findings, because if nouns are easier to read, there could also be said that they are easier to remember. However, this study is careful of drawing such comparisons, because there is no hard evidence that if a word is easier to read, it is also easier to recognise. This comparison, however, might be an interesting topic to investigate.

This study also shows that the typographically enhanced words are significantly remembered better than the normal words. It therefore does find a significant effect of the language awareness technique typographical enhancement, which confirms the third and last hypothesis. This study occurs by means of explicit learning rather than implicit learning, because the students were consciously aware of the input that had to become intake (Radwan, 2005). This outcome shows once again that typographical enhancement is a field in which more research needs to be conducted, whereas the outcomes vary constantly. Despite this study's significant outcomes, former research on typographical enhancement – as mentioned in the literature review – also showed non-significant outcomes. Alanen's research showed that there was no effect on the learners' performance by visual input

## TYPOGRAPHICAL ENHANCEMENT

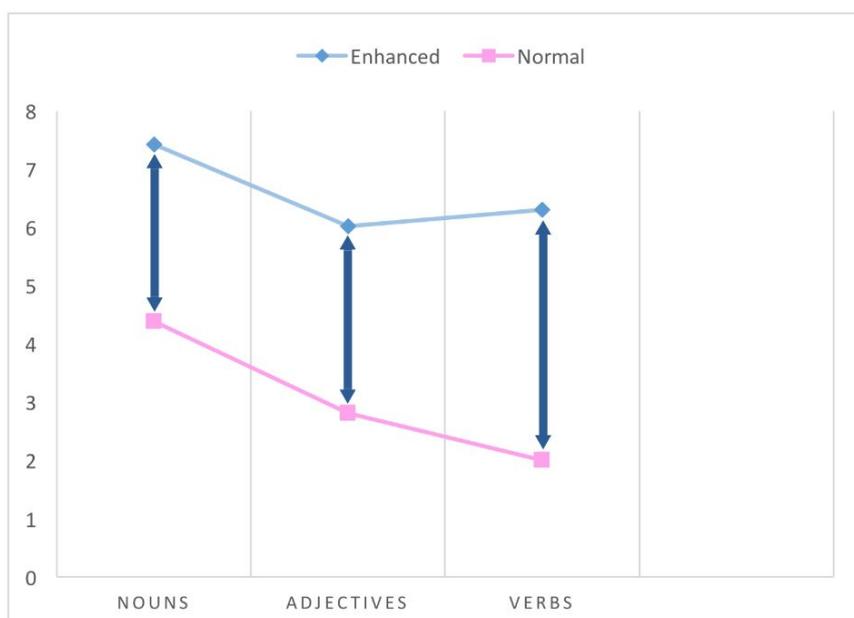
enhancement (1995). His study did mention the difference in think-aloud protocols between the learners, who did not notice the target forms and the learners that did notice the target forms. The think-aloud protocols showed that the learners, who did notice the target forms learned more (Alanen, 1995). Radwan also found non-significant results of textual enhancement on the acquisition of English dative alternation. This research focused on syntax rather than morphology (2005). In contrast to this non-significant results, Jourdenais et al. (1995) found a significant result of typographical enhancement. This study showed “an increased quantity and greater accuracy of the target feature in immediate and delayed post-tests” (cited in Svalberg, 2007, p. 292). All these studies focused on the acquisition of grammar by means of typographical- or input enhancement rather than vocabulary acquisition. The study conducted in this thesis, however, shows a significant result on vocabulary acquisition, in the form of vocabulary recognition. The students were asked to mark the words that they had remembered from reading a few minutes before, rather than reproducing the words, thus only needed to recognise them. As the aforementioned literature stated, word production is more difficult than recognition, because the processing of words involves more than just recognising them (Harley, 2010). To investigate whether typographical enhancement actually has a significant effect on L2 vocabulary acquisition in the form of vocabulary reproduction, further research needs to be provided in this field. However, the research conducted in this thesis is a good starting point for the investigation of the effect of typographical enhancement on L2 vocabulary acquisition.

Besides the significant main-effects of typographical enhancement and lexical category, the ANOVA Repeated Measures Design also conducted a significant interaction-effect of typographical enhancement\*lexical category, which means that the difference between the results of the participants on different lexical categories significantly

## TYPOGRAPHICAL ENHANCEMENT

differs depending on whether the words are typographically enhanced or not. This study shows that the difference between the enhanced and normal verbs is significantly bigger than the difference between enhanced nouns and normal nouns remembered, and that the difference between the enhanced and normal verbs remembered is significantly bigger than the difference between the enhanced and normal adjectives remembered.

This research therefore shows that apparently verbs benefit best of the language awareness technique typographical enhancement, because the difference between the normal verbs remembered and the enhanced verbs remembered is bigger than the difference between the enhanced nouns and normal nouns remembered and the enhanced adjectives and normal adjectives remembered. This difference might be difficult to understand in written form, therefore Figure 3 below functions as a visual aid to display the interaction-effect. This Figure 3 is almost the same as Figure 2 displayed in the results section, however, in Figure 3 below the interaction-effects are emphasised by the blue arrows. Figure 3 clearly shows that the difference between the enhanced verbs and the normal verbs remembered is the biggest.



## TYPOGRAPHICAL ENHANCEMENT

*Figure 3. A visual representation of the interaction-effect typographical enhancement\*lexical category.*

The post-hoc analysis does not show whether the difference between the enhanced nouns and normal nouns remembered is significantly bigger than the enhanced adjectives and normal adjectives remembered. Figure 3 above, however, clearly shows that these differences barely differ from one another, and we can therefore say that this difference between the enhanced nouns and normal nouns remembered and enhanced adjectives and normal adjectives remembered is not significant, and nouns and adjectives benefit equally of typographical enhancement.

This study takes into account several demographic characteristics of the individuals that participate in the experiment, because the study wants to make sure that the group sample consists of students with roughly corresponding demographic features to limit the external variables that could influence the study. One of those characteristics is their L1. The students' L1 needed to be Dutch in order to participate in this study. However, their L1 being Dutch does not mean that the knowledge of English among these individuals will not vary. Some of the individuals may have known several – or many - of the 72 words that occurred in the text beforehand, and will therefore recognise them more easily than the individuals, who had never seen that particular word before.

This phenomenon is explained by priming. Priming is an experimental technique, which shows that whenever a stimulus is presented more than once, the neural activity of the brain decreases. This means that an individual, who has seen the stimulus before, will more easily recognise the stimulus the second time (Snijders, 2016). So if participants had already seen or read the word before participating in this study, chances are that they will

## TYPOGRAPHICAL ENHANCEMENT

recognise and remember that certain word better than other words. There was no pre-test conducted to measure the knowledge of English of the participants – as far as this knowledge can be ‘measured’ - before the experiment started. As mentioned by Johnson and Newport, exposure is important for learning a second language (1989). This would indicate that the students, who were more acquainted with the English language, probably would have been more exposed to it, which could potentially explain the differences between individuals. This study does not account for the possible knowledge of English that the students had before this experiment, and therefore does not account for the individual differences between the participants’ results.

An external factor that does influence the remembering of the words that this study does not explain is the capacity of one’s short-term memory. This study clearly not only focuses on L2 vocabulary acquisition, but also considers one’s short-term memory, because the students were tested which of the words they could remember immediately after reading the text. Short-term memory rather than long-term memory is tested in this study, because there was no post-test. A post-test would have shown what and if the students had remembered any of the 72 words that occurred in the text after a certain amount of time. A post-test however is hard to conduct in the scope of a bachelor thesis, whereas it is hard to find secondary schools willing to participate with one experiment for a bachelor thesis, let alone if this experiment would have involved several moments of testing. Knowledge of the short-term and long-term memory however, is luckily not within our field of expertise, and would be a different research concerning typographical enhancement and memory conducted by, for instance, neuropsychologists.

Another demographic question that the students had to answer is whether they are dyslectic or not. Of the 47 participants, 3 are dyslectic. This study does not investigate the

## TYPOGRAPHICAL ENHANCEMENT

influence of dyslexia on the outcomes of the experiment since the number of participants with dyslexia is so small, it cannot make a significant difference. However, the combination of dyslexia and typographical enhancement is an interesting topic that has not yet been investigated. It might be interesting for further research to investigate whether typographical enhancement also has a significant effect on the words remembered by participants with dyslexia. This experiment might be difficult to conduct, whereas finding a big enough group of dyslectic participants with roughly the same demographic features is not easy. However, nothing is impossible. There are institutions in the Netherlands, who are specialised in improving the teaching of students with dyslexia. This research can be conducted in collaboration with for instance RID (Regionaal Instituut Dyslexie). Although this kind of research is not easy to achieve, it remains an interesting topic for future research.

The participants in this study attend different schools. Of the 47 students that participate in the study, 23 of these students attend Het Rhedens Lyceum and 24 of these students attend Het Heerbeek College. This study does not focus on the different results between schools, because school is a between-subjects factor and therefore not possible to take into account when conducting an ANOVA Repeated Measures Design. These different results between the two schools can be measured when conducting an ANOVA Mixed Design with school as the between-subjects factor. However, this study wanted to focus on the effect of gender on the remembered words rather than the effect of school on the remembered words. This study's preference for gender over school does not mean that this is not an interesting topic to explore, whereas there might be a significant difference between the outcomes of the different schools. The differences between the results of the two schools would be a good follow-up question, and might be interesting to explore in the future.

## TYPOGRAPHICAL ENHANCEMENT

The word list in this experiment consists of 90 words in total, and 72 of these words actually occur in the text and 18 of these words are fillers. This study does not explore how many individuals believed that certain fillers occur in the text, however, when analysing the marked words, a lot of participants believed that the fillers actually occurred in the text. The fillers are carefully chosen words that are all remotely related to the topic of the text. It is interesting to see that individuals believed that they had read a word, which in fact did not occur in the text. An explanation for believing that the fillers actually occurred in the text is semantic priming. Semantic priming means that "it is easier to identify a word if it is preceded by one related in meaning" (Harley, 2010, p. 147). Because the fillers were all remotely related to the subject of the text, this might have been the reason for individuals to think that they had actually read the fillers in the text. Semantic priming is in line with VanPatten's research that suggested that learners notice meaning before form (1990).

It is important to keep in mind that this study only examined 47 students. This number is not too small for an ANOVA Repeated Measures Design, but it is not very large either. The outcomes of this particular study might be significant, but will the results remain significant when the sample size increases? The more participants, the more reliable a study becomes. This study gives us great insights in the acquisition of L2 vocabulary by means of typographical enhancement. However, a lot more research with a larger number of participants needs to be conducted before we can safely conclude that the language awareness technique typographical enhancement actually improves L2 vocabulary acquisition.

## ***6. Conclusion***

The study conducted in this thesis investigated whether typographically enhanced nouns, adjectives and verbs were remembered better than nouns, adjectives and verbs that were not typographically enhanced. This study also investigated whether there was a significant difference between these three lexical categories and if gender had a significant effect on the outcomes of this study. This study showed that typographical enhancement appeared to have had a significant effect on the words remembered. This study also showed that there was indeed a significant difference between the three lexical categories. Nouns were significantly remembered better than adjectives, and nouns were also significantly remembered better than verbs. There was no significant difference between the adjectives and the verbs remembered. There also seems to be a significant effect of whether or not a word was typographically enhanced and the lexical category. The difference between the results of the participants on different lexical categories significantly differed depending on whether the words were typographically enhanced or not. The difference between the enhanced and normal verbs is significantly bigger than the difference between enhanced nouns and normal nouns, and that the difference between the enhanced and normal verbs remembered is significantly bigger than the difference between the enhanced and normal adjectives remembered. The results did not show whether the difference between the enhanced nouns and normal nouns remembered is significantly bigger than the enhanced adjectives and normal adjectives remembered. Therefore, this study showed that verbs is the lexical category that benefits the most from typographical enhancement, and that nouns and adjectives benefit equally of typographical enhancement.

The outcomes in this study are a way to revive the research in the field of typographical enhancement and second language acquisition. Former research conducted in

## TYPOGRAPHICAL ENHANCEMENT

this field all focused on grammatical acquisition rather than vocabulary acquisition, and showed various results Alanen (1995), Radwan (2005), Jourdenais et al. (1995). This study, however, investigated the role of typographical enhancement on L2 vocabulary acquisition instead of grammatical acquisition. Despite the fact that this study shows significant results of the effect of typographical enhancement on L2 vocabulary acquisition, it is not safe to say that typographical enhancement improves the acquisition of L2 vocabulary, because this study only investigated the effect of typographical enhancement on word recognition rather than the effect on word processing as a whole. Further research in the field of typographical enhancement and L2 vocabulary acquisition is necessary before any such statement can be concluded. This study, however, takes a first step in investigating the effect of typographical enhancement on L2 vocabulary acquisition, and hopefully future research in this field will follow.

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### *Appendices*

#### *Appendix 1. Demographic information and instructions*

Vul onderstaande gegevens in en sla deze bladzijde **niet** om.

Naam:

## TYPOGRAPHICAL ENHANCEMENT

Leeftijd:

Geslacht: man / vrouw

Dyslectisch: ja / nee

Moedertaal:

Lees onderstaande instructies, die net mondeling zijn toegelicht, nogmaals nauwkeurig door.

Op de volgende pagina staat een tekst. Deze tekst is ongeveer 1 pagina lang. Jullie krijgen 7 minuten om deze tekst te lezen.

Ik geef jullie een seintje wanneer jullie dit vel mogen omslaan en mogen beginnen met lezen. Als de 7 minuten verstreken zijn, sla dan zo snel mogelijk de bladzijde om naar de volgende pagina. Deze pagina is leeg en daar staat dus niks op. Het is de bedoeling dat jullie wachten tot ik het volgende sein geef om wederom de bladzijde om te slaan naar de volgende pagina.

Deze pagina bevat een lijst met woorden. Jullie krijgen 5 minuten om de woorden die in de tekst genoemd zijn te omcirkelen op dit blad. Ik geef jullie weer een sein als de tijd verstreken is. Als dit sein gegeven is, moeten jullie gelijk je pennen neerleggen. Dit is tevens het einde van het experiment.

Tijdens het omcirkelen van de woorden mogen jullie **niet** terugbladeren naar de tekst.

Als er nog onduidelijkheden zijn over het onderzoek, vraag dat mij dan gerust voordat we aan het onderzoek beginnen.

Succes!

### ***Appendix 2. Original text***

'Age is just a number', teenage race ace Max Verstappen says with a very serious expression on his face. 'I don't see myself as an 18-year-old'. The Dutch driver is the youngest-ever racer in the history of Formula One – with only 18 years on the clock. After Red Bull junior team

## TYPOGRAPHICAL ENHANCEMENT

Toro Rosso announced his signing last summer, ex-drivers and experts had lined up to say he was too young to enter the F1 races, the top level of world motorsport. To make matters worse, Verstappen, who owns an F1 super license but was still too young to drive a road car in the Netherlands, crashed a Red Bull show car trying to do a daring manoeuvre a few months later. 'Of course it looked really stupid,' Verstappen admitted in an interview with CNN. But Verstappen is no ordinary boy racer and, to prove his point, he delivered a coolly confident debut on Melbourne's unpredictable Albert Park circuit. Verstappen was on course to become F1's youngest points scorer, running well inside the top-10 cars in Australia, before he had to stop his smoking Toro Rosso on lap 34 because of an engine problem. 'It was a disappointing way to end my first Formula One race,' Verstappen summed up. 'It's a real shame because I was feeling good and the car was working well.' It may not have been a perfect start for F1's young gun but it was pretty close and at least he got one job done – proving his doubters wrong. Self-belief doesn't appear to be a problem for the 18-year-old Verstappen, who started racing go-karts at the age of four. The son of F1 racer Jos Verstappen, who partnered Michael Schumacher at Benetton in 1994, and a go-karting mum Sophie Kumpen, he was destined to become a winner. 'Racing is in our blood', Verstappen tells me. 'When I grew up I saw only karts or something with an engine on that was making noise. It was obvious that I was going into racing. I won my first ever race when I was seven years old. For two years I won everything I competed in. Sometimes I made some mistakes, but generally I won everything. This was something I have wanted since I was four and I still enjoy it as much as the first time I went racing.' It was this raw talent, a speed in his genes mixed with his own inner determination, which persuaded Red Bull to sign him to their junior team in 2014. It was remarkably Verstappen's first season racing single-seater cars, but by the end of the year he had finished third in the European Formula Three series – a breeding ground for past F1 champions including Ayrton Senna. Schumacher and Lewis Hamilton – winning 10 races. 'It's a high level in F3' explains Verstappen. 'If you can score 10 victories in the end, then you have had a really good season. Red Bull said at the Norisring in Germany I had a great race in the wet so all in all I think that made their decision. 'World champion Mercedes were also interested in signing Verstappen, who has already been compared to late three-time champion and Brazilian icon Senna. 'Yeah, we had some conversations', Verstappen says. 'We have had some good chats but that was that really. I've been talking to Red Bull since 2010 and in the end they gave me a good offer to drive in F1.' Verstappen's path to the top of motorsport might have been paid for him by his parents but he says that he was still surprised – although perhaps not as much as the watching world – when Red Bull decided to put him straight into an F1 cockpit. 'Of course, it was a big surprise,' he says. 'But I always make big steps and I think from F3 to F1 is a smaller step than karting to F3'. Being a teenager means that F1's history-maker still lives at home with his Dad, in the small Belgium town of Bree. His parents are separated but he says he remains close to his mum, who's just a 50-minute drive away. It is his tight family unit that Verstappen credits with his rise through the racing ranks. When asked why he thinks his is just so good, he replies: 'Because my dad prepared me so well from a young age. He was focusing on the right stuff, to have fun in the race but to also be concentrated. Every day, from when I was four, we were together preparing the go-karts and preparing the engine. We did everything together. But the first time I drove an F1 car he was really nervous, because it's still your son driving an F1 car, going above 300 kph...' Verstappen Sr. ran from the Toro Rosso garage after seeing his son grind to a halt in a plume of smoke in Australia. A veteran of more than 100 F1 grand prix Jos Verstappen, who plans to travel to all the races with his son, was known for being a hard-nosed racer. His son describes his own style as a

## TYPOGRAPHICAL ENHANCEMENT

blend of both his parents when it comes to inherited race craft. 'I'm more calm. Like my mum.' Verstappen explains. 'When I need to be aggressive I do have it from my dad, but I'm more of a mix.' There is another Verstappen, who could yet complete the racing dynasty – and she's even younger than F1's record breaking youngster. 'My little sister Victoria, she's 15, and has started go-karting as well,' Verstappen reveals with a glow of pride. It's a topic he is animated about. 'I'm helping her out a bit if I have the time. 'I think she has more the character of my dad. She's more aggressive when she's driving. It's quite funny to see.' Could we see Victoria Verstappen break ground like her brother and become the first female racer on the F1 starting grid for more than two decades? 'That's something that is still very far away,' says Verstappen. 'She first has to start with races, she is still practicing. First we go to karts and see what's going to happen. For sure, it's not easy for a woman to reach F1 but I think one time it needs to change.' For now, Verstappen is focusing on his own burgeoning career, of which things are now expected after his promising debut. 'It's nice to be the youngest driver but it doesn't make any difference', Verstappen muses. It's my dream to get here and once you are in, you want to do your best. This season I will just try to be consistent, not to make mistakes and to be a good help to the team.' Verstappen says family is very important to him and there is a sense that familie ties are what will help the 18-year old star navigate his way through the fickle fortunes of F1. 'You have to stay yourself and that's very important', he says. 'You have to be friendly. Just because you're doing a good job on track doesn't mean you have to be arrogant to other people. You have to have a good life outside of F1. When you feel happy at home you can perform better on track'. At 18, Verstappen has identified two ingredients for a successful formula on and off the track. 'Maybe a bigger apartment where I can have my own space but still together with Dad,' he explains. 'To try to become world champion, and from there to win it another time'. Red Bull and Mercedes glimpsed the serious steel of this mature young man – and after his rookie race there are few doubters left to bet against him going further.

**Appendix 3. Edited text**

'Age is just a **number**', teenage race ace Max Verstappen says with a very **serious expression** on his face. The Dutch driver is the youngest-ever racer in the history of Formula One – with only 18 years on the clock. After Red Bull junior team Toro Rosso announced his signing last summer, ex-drivers and experts had lined up to say he was too young to **enter** the F1 races, the top level of world motorsport. To make matters worse, Verstappen, who owns an F1 super license but was still too young to drive a road car in the Netherlands, **crashed** a Red Bull show car trying to do a **daring manoeuvre** a few months later. 'Of course it looked really stupid,' Verstappen **admitted** in an interview with CNN.

But Verstappen is no ordinary boy racer and, to prove his point, he delivered a coolly confident debut on Melbourne's unpredictable Albert Park **circuit**. Verstappen was on course to become F1's youngest points scorer, running well inside the top-10 cars in Australia, before he had to stop his smoking Toro Rosso on lap 34 because of an engine problem. 'It was a disappointing way to end my first Formula One race,' Verstappen summed up. 'It's a real **shame** because I was feeling good and the car was working well.' It may not have been a perfect start for F1's young gun but it was pretty close and at least he got one job done – proving his doubters wrong. Self-belief doesn't **appear** to be a problem for the 18-year-old Verstappen, who started racing go-karts at the age of four.

The son of F1 racer Jos Verstappen, who partnered Michael Schumacher at Benetton in 1994, and a go-karting mum Sophie Kumpen, he was destined to become a winner. 'Racing is in our blood', Verstappen tells me. 'When I grew up I saw only karts or something with an engine on that was making **noise**. It was obvious that I was going into racing. I won my first ever race when I was seven. For two years I won everything I **competed** in. This was something I have wanted since I was four and I still **enjoy** it as much as the first time I went racing.' It was this **raw** talent, a speed in his genes mixed with his own **inner determination**, which **persuaded** Red Bull to sign him to their junior team in 2014. World champion Mercedes were also interested in signing Verstappen, who has already been compared to Brazilian **icon** Senna.

Verstappen's path to the top of motorsport might have been **paid** for him by his parents but he says that he was still surprised when Red Bull decided to put him straight into an F1 cockpit. 'Of course, it was a **big** surprise,' he says. Being a teenager **means** that he still lives at home with his dad, in the small Belgium town of Bree. His parents are separated but he says he **remains** close to his mum. It is his **tight** family that Verstappen credits with his rise through the racing ranks. When asked why he **thinks** his is just so good, he replies: 'Because my dad prepared me so well from a young age. He was focusing on the **right stuff**, to have fun in the race but to also be concentrated. However, the first time I drove an F1 car he was really **nervous**, because it's still your son driving an F1 car, going above 300 kph...'

Verstappen describes his own style as a blend of both his parents when it comes to **inherited** race craft. 'I'm more calm. Like my mum. When I need to be aggressive I do have it from my dad, but I'm more of a mix.' There is another Verstappen, who could yet complete the racing **dynasty**. 'My little sister Victoria, she's 15, and has started go-karting as well,' Verstappen reveals with a **glow** of pride. It's a **topic** he is animated about. 'I'm helping her out a bit if I have the time. Could we see Victoria Verstappen break ground like her brother and become the first female racer on the F1 starting grid for more than two decades? 'That's something that is still very far away,' says Verstappen.

For now, Verstappen is focusing on his own **burgeoning** career, of which things are now expected after his promising debut. This season I will just try to be consistent, not to make

## TYPOGRAPHICAL ENHANCEMENT

mistakes and to be a good help to the team.' Verstappen says his parents are very **important** to him and there is a sense that they will help the 18-year-old star **navigate** his way through the fickle fortunes of F1. When you feel **happy** at home you can better on track'.

## TYPOGRAPHICAL ENHANCEMENT

**Appendix 4. Word list**

determination	supported	reveals	appear
little	crashed	small	right
blood	important	history	helmet
interview	hopeless	unbelievable	replies
remains	perfect	inner	engine
tight	path	understood	air
expected	competed	enjoy	expectations
went	consistent	serious	self-belief
circuit	fickle	number	seatbelt
credits	enter	paid	worse
raw	delivered	navigate	aggressive
interested	dynasty	glow	daring
mistakes	nervous	license	dumb
possess	lost	flag	looked
thinks	admitted	ordinary	burgeoning
fragile	discipline	perform	stop
means	calm	last	big
pride	improve	inherited	stuff
topic	female	happy	season
blind	genes	unexpected	ride
asked	family	decided	persuaded
confident	icon	expression	manoeuvre
noise	shame		

TYPOGRAPHICAL ENHANCEMENT