Article Omission in a Limited-Time Context: A Look at *Overwatch* in-game Chat Communication

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Abstract

By looking at article omissions in a gaming environment, the current study ties into the earlier findings of De Lange (2008) in her study on article omissions in Dutch and Italian headlines. In her study, De Lange found that due to a restricted processing capacity and limited time, normal speakers will omit more articles in specific time-limited contexts than in regular conditions. Data for the current study was collected by playing the online multiplayer shooter *Overwatch* (Blizzard, 2016), a game wherein good communication forms the basis for working well together in a team and capturing objectives. The utterances produced were analysed based on three conditions: (1) definiteness of the article, (2) article position in the sentence, and (3) finiteness of the main verb. Results showed that articles were indeed omitted more in a limited-time context by analysing a total of 65 in-game chat utterances. In addition, the three conditions were of influence on the percentage of articles being omitted. More omissions took place in sentences with a non-finite verb than with a finite verb, in sentence-initial position than sentence-internal position, and indefinite articles were omitted more than definite articles.

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1. Introduction

Since the 1940's, video games have grown in popularity among people worldwide. From simple 2D-games like *Tennis for Two* (Higinbotham and Dvorak, 1958) and *PACMAN* (Namco, 1980) to current popular online multiplayer 3D-games like *Overwatch* (Blizzard, 2016), games have started to find their way into people's everyday lives. This development has resulted in many psychological studies on the effects that games have on human (aggressive) behaviour (Anderson and Bushman, 2001; Anderson, 2004; Anderson, Ihori, Bushman, Rothstein, Shibuya, Swing, Sakamato and Saleem, 2010; Gentile, Lynch, Ruh Linder and Walsh, 2004), as well as on game addiction (Fisher, 1994; van Rooij, Schoenmakers, Vermulst, van den Eijnden and van de Mheen, 2010). Yet, linguistic research on games has been scarce: focusing more on a classroom setting than actual in-game interaction.[1] The current study, therefore, wants to shed a new linguistic light on games by not looking *only* at the English grammar performance of speakers (without wanting to better their competence), but also by changing the environment in which utterances are produced from a second language learning context to in-game chat communication.

The big difference between these two contexts is the amount of time available to a speaker to construct their messages. For example, imagine a group of gamers desperately wanting to play a good match in an online-multiplayer game while at the same time receiving and giving feedback to each other. They do not have the amount of time available to them that they normally have when constructing elaborate messages on paper in a classroom. Nor can they check their spelling or grammar, as time is literally running out while the match takes place. Instead, they wish to convey their messages as quickly and logically possible for them,

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[1] The few studies that have been conducted focus mainly on the manner in which English games can be used as a tool to better a non-native English speakers' English proficiency in a second language learning-context (Aslanabadi and Rasouli, 2013; Bettiol, 2001; Chen and Yang, 2012; Sarıçoban and Metin, 2000; Stojković and Jerotijević, 2011; Tuan and Doan, 2010; Vidlund, 2013; Wang, Shang and Briody, 2011; Yolageldili and Arıkan, 2011). Thus focusing only on a speaker's competence rather than just observing their performance.

as well as the other players, at that moment. Resulting in the most important element, the message itself, forming the basis of the utterance while less important (grammatical) elements are left out.

According to De Lange (2008) then, in her research on article omission in Dutch and Italian headlines, functional categories consisting out of articles, auxiliaries and copular verbs, form the grammatical parts most likely to be omitted by normal speakers when asked to produce utterances in a time-constrained context. In the example given about the gamers wanting to give each other feedback, a sentence like *I am not the best gamer in the world*, will therefore end up being 'compressed' (De Lange, 2008). The way in which the compressed version is constructed can differ depending on the amount of time or the number of processing resources available to the speaker. Possible outcomes, therefore, are plentiful: (1) *am not the best gamer in the world*, (2) *I am not the best gamer in world*, (3) *am not best gamer in world*, etc. However, based on the knowledge that functional categories are the first to be omitted in a limited-time context, examples (2) and (3) are the ones most likely to be produced by gamers as they have left out the articles in their production.

Important to note, however, is that although De Lange's study on article omissions in headlines as a limited-time context forms a major inspiration for the current study, there are some differences between both studies that need to be addressed. Firstly, De Lange focused on Dutch and Italian headlines, while the current study only looks at English. Yet, the English article system functions differently than in Italian and Dutch in two ways: (1) it has no rules for gender agreement, and (2) it knows no partitive articles. Dutch for example knows the genders neuter and common, while Italian discerns between feminine and masculine, English does not have this distinction. Moreover, Italian also makes use of partitive articles to describe a quantity of something, while both English and Dutch do not possess this element (De Lange, 2008). Nevertheless, all three languages have a clear distinction between definite

and indefinite articles, and their distribution takes place in much the same way.[23] For one, a speaker has to take into account not only their own communicative intent (what they wish to achieve with their message), but also the amount of knowledge they already share with their interlocutors about a certain object or event ('general knowledge'). If the knowledge is shared between interlocutors, the referent in question will receive the definite article *the*. For example, two gamers are talking about a specific ability in a game: a bomb. They both share the knowledge regarding this ability as they have played the game for the past couple of hours and the knowledge has become shared between the two. Moreover, they have used this ability themselves and talked about its effects earlier in the discourse. The first gamer may therefore say (1) *I have used the bomb to kill that man*, and the second gamer will know exactly which bomb the other is talking about as it has already come up in their conversations before. This also relates to the second factor that influences which article is selected, namely that both speaker and addressee have to be aware of what has been said prior in the conversation ('discourse knowledge'). So, whenever an object or event has already been introduced earlier in the discourse, it will receive a definite article. If this is not the case, however, and the referent is newly introduced, the referring noun will be accompanied by the indefinite article *a*/*an*. If we apply this knowledge to the example of the two gamers with the ability of using a bomb in a game, and introduce a third gamer into the conversation whom has no prior discourse knowledge and also has never played the specific game before, the first two gamers will initially refer to the ability of the bomb with an indefinite article. Thus, saying to the third gamer (2) *I have used a bomb to kill that man*, as the third gamer does not have the prior discourse knowledge the others share in regards to the bomb, nor does he possess general

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[2] Both Italian and English' speakers also have to take into account the phonetic realisation of the word directly following the article, as both languages contain allophonic variants such as *a*/*an* in English and *l'*/*un'*/*lo* etc. in Italian (De Lange, 2008).

[3] Dutch and English also possess a zero article ($\emptyset_1$) (or a null article $\emptyset_2$)), but these have been disregarded from the study as they have no overt form and therefore cannot be counted as being produced or omitted (Master, 1997).

knowledge regarding the game. Nevertheless, the second time that they use the ability he or she will know, and the referent will thus, once again, receive the definite article *the* as in the first example.

Secondly, the current research differs from De Lange's study in that the limited-time context has been shifted from headlines to a gaming context, which results in a different set of sentences to be looked at. After all, in-game situations are very specific while headlines can relate to (almost) anything. Moreover, in headlines it is the journalist's job to provide information about certain events, which leads to a high rate of present tense verbs being used to refer to past or future events (De Lange, 2008). In in-game chats, however, the speakers usually wants to express some form of ability, possibility or obligation and thus make more use of modal verbs (*can*, *must*, *should*, *would* etc.). Examples of in in-game chat sentences will be discussed in the methodology section.

Lastly, the current study continues with the Information Theoretical approach that De Lange (2008) used in her research. According to Information Theory, limited processing resources can account for the fact that normal speakers omit more articles under time pressure than in normal conditions. Yet, there are also researchers claiming that article omissions take place due to language impairments to the grammatical knowledge of a speaker (Gopnik and Crago, 1991; Rice and Wexler, 1996).[4]

Furthermore, in line with the research on article omissions in relation to the gender of a noun, De Lange focused not only on article omission in general. Instead, she also looked at the position of an article in the sentence, and with what kind of verb the number of omissions

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[4] However, studies which have looked at the omittance of articles by children with SLI have proven that although they omit more articles than their age-matched control group, they nevertheless show grammatical knowledge of the noun's gender (Hansson, Nettelbladt, and Leonard, 2003; Anderson, and Souto, 2005). Their higher rate of article omissions is therefore, according to Avrutin (2010) not due to any language impairment to their grammatical knowledge per se, but rather because children with SLI have less processing resources at their disposal than their peers have.

were more common. At the end of her research she came to the following two conclusions: (1) more omissions took place in sentence-initial than sentence-internal position, and (2) the number of omissions were higher in sentences with a non-finite verb than in sentences with a finite verb. The reason that more omissions took place in utterances with a non-finite verb, according to De Lange, is based on the absence of a case assigner in non-finite verb sentences. A case assigner is needed to realize a correct DP, and without this case assigner the DP cannot produce a noun phrase that functions as argument. Yet, she believes this need for a case assigner to be optional. Thus, whenever normal speakers find themselves in a specific time-limited context they will make use of this optionality: leaving out the case assigner and in addition the determiner that assigns case to a noun.

Moreover, De Lange also examined why more article omissions took place in sentence-initial than sentence-internal position. She among others claimed that this was due to an option of Universal Grammar (UG) that permits the omittance of functional elements from the highest clausal position in a phrase whenever speakers find themselves under time-pressure (Guasti, Lange, Gavarró, and Caprin, 2004). So, whenever normal speakers find themselves in specific contexts, their grammatical competence of this rule of optionality remains unaffected. Thus leading to them unconsciously leaving out the functional elements from the highest clausal position. This, according to De Lange, explains the higher rate of article omission in sentence-initial position compared to sentence-internal position.

Besides looking at the position of an article in the sentence and finiteness of the main verb, the current study will also examine the effect that article-definiteness has on the omission rate. De Lange has not considered this factor in her own study. However, as the gaming environment forms a specific type of limited-time context where articles produced in chat refer mostly to in-game mechanics, definite articles are expected to appear more often

than indefinite articles. This difference in rate of appearance may affect the omission rate and to account for this factor they are therefore, examined independently.

2. Theoretical Background

As mentioned in the introduction, games have grown in popularity over the years and the importance of online in-game chat communication has developed with it. In games like *Overwatch*, where good and clear in-game communications form the basis of good teamwork, gamers like to construct their messages as economically as possible. De Lange (2008) claims that these economical decisions are made, based on a limited amount of time and processing resources available to the speaker under time-pressure. In normal contexts, adult speakers without any language impairments will have enough time and processing resources at their disposal to construct sentences that include all functional categories (articles, auxiliaries, copular verbs etc.). Yet, in specific contexts, this time to construct a message has become limited and a speaker's processing capacity restricted. Thus, resulting in speakers leaving out certain elements, like articles, in their sentences. Their competence in regards to the distribution of articles, however, remains unchanged. It is their performance alone, which is affected by the limited amount of time available to them.

In accordance with De Lange, Avrutin (1999, 2004a, and 2004b) found in his research on speech patterns produced by children and aphasic patients, that omissions of functional categories are due to the specific partitioning of language production and comprehension processes, which take place at the level of the Information Structure. The Information Structure is where syntax and context come together and interact with each other. The Information Structure thus forms the intermediary level between both channels, and transfers

the communicative intention from context into syntax.[5] To make this idea more clear, I will give an example of such a translation process.

Imagine that the Information Structure receives a sentence like *The angry gamer*, this sentence forms a determiner phrase (DP) as it starts with the determiner *The*, which refers to the noun *gamer*. This definiteness means that the gamer in question has already been introduced into the conversation before. After all, according to the English article system, definite articles can only relate to general knowledge or shared knowledge between interlocutors. Thus, to find the referent for *The angry gamer* and to make the DP interpretable for the cognitive system, the Information Structure has to: (1) look back at what has been said prior in the conversation, (2) rely on the context surrounding the utterance, and (3) use the grammatical knowledge of the speaker to use the English article system correctly. Therefore, the use of a definite DP in this case only takes place *if* it can be brought back into an earlier in the discourse named gamer. This process is called 'incorporation' (Heim, 1982). In this way the Information Structure looks back at the context[6] for the information that is needed to construct a syntactic utterance. How the Information Structure can denote which information is needed to construct a syntactical message is based on the File Cards-model of Avrutin (1999, 2004a, and 2004b).

2.1 The Basic Components of File Cards

According to Avrutin (1999, 2004a, and 2004b), the system of File Cards can be compared to a library's catalogue. Each File Card contains the discourse-information needed in order to create a correct grammatical sentence that relates to what has been said prior in a conversation

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[5] The Information Structure at the same time receives any retrieved overt elements from the phonological encoder and translates these into linguistic structures (De Lange, 2008).

[6] Context in this case is described as containing the information about the 'surroundings' of an utterance. These surroundings can be both linguistic (discourse-knowledge or knowledge about what has been said prior in the conversation) and non-linguistic (shared knowledge or worldly knowledge, gestures, event(s) or presence of the denoted individual(s)).

(Heim, 1982). Thus, each DP corresponds with a File Card that contains certain information relating to a specific corresponding entity. At the level of Information structure then, Avrutin argues that the two available channels, namely (narrow) syntax and context, not only interact together to transfer the communicative intention, but also by creating the basic elements of a File Card: (1) heading, and (2) frame (see figure 1).
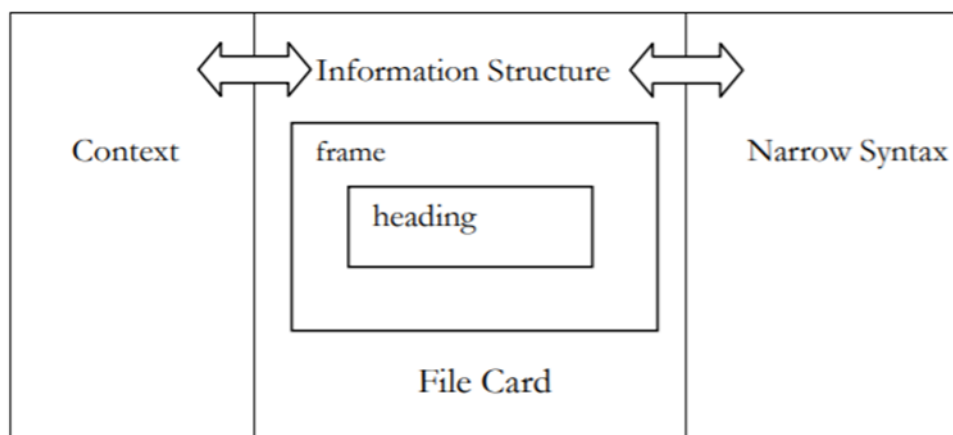

Figure 1. Elements of Avrutin's Syntax-Context Model (1999, 2004a, 2004b).

The heading of a File Card is related to the referent of the information package (place, event, object, person, etc.) in a DP as it provides the referential information for a noun. The heading is therefore, usually formed by a content word: nouns, lexical verbs or adjectives (and some adverbs). The frame of a File Card, on the other hand, makes sure the information package is placed into the right discourse slot: old (definite) versus new (indefinite). It furthermore selects the right content word from the context. In 'normal' speech then, the frame is formed by a word from the functional category earlier selected by (narrow) syntax, which can introduce a new referent or one already known by the interlocutors. In the case of articles, this translates to the heading being formed by a noun, while an article acts as a frame. For example, if the Information Structure would create the following construction: *The player*, it would select the definite article *The* as frame and the noun *player* as heading.

De Lange (2008) roughly adopts Avrutin's thought process[7] while claiming that each

File Card is only interpretable if it contains just *one* heading and *one* frame. Each of which

contains units of information. In English, this unit of information consists of only 1 bit.[8] At

the level of Information Structure then, a competition arises between both the syntactic and

contextual channels. The outcome of this competition is based on the economical

consideration that the channel that requires the lowest processing costs will be the one chosen

if both channels are fully developed, as is the case in normal speakers. Thus, the lower the

resistance of a channel, the more likely it will form the basis for the elements of a File Card.

In the case of normal speakers this means that the channel for (narrow) syntax wins, due to

the syntactical channel being the more economical ('cheaper') option out of the two.[9]

2.3 Article Selection in a Specific Time-Constrained Context

An article is selected based on the properties of the noun that it determines or refers to (De

Lange, 2008). In other words, before an article can be selected the heading of a noun or noun

lemma needs to be activated first. This selection process depends on a few components

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[7] Yet, she also adds her own notion to it claiming that File Cards are created at the level of the Information Structure with the purpose of making a message fully interpretable for the cognitive system, which they do by supplying headings and frames

[8] According to the Information Theoretical formula $\log2(x)$ that determines the number of informational bits per unit with x being the number of options for article selection (de Lange, 2008). The base of this claim comes from the idea that English knows only two options for article production, namely definite or indefinite. In the formula this translates to $\log2(2)$ resulting in 1 bit of information per unit. In Dutch, on the other hand, the number of possible elements is 3, thus leading to $\log2(3) = 1,585$ bits of information.. And in Italian the number of possible elements is 18, resulting in $\log2(18) = 4,169$ bits of information The amount of time needed to process a unit of information is influenced by the number of bits that a unit consists of, and the time necessary to select the correct element from the set. Therefore, more bits will lead to a higher amount of time needed to process the units of information.

[9] In the case of people with Broca's aphasia or other language-impairments, however, the cheapest channel has changed from that of (narrow) syntax into context (Avrutin, 1999, 2004a, 2004b; de Lange, 2008). Due to this weakened system they have, in comparison with normal speakers, only a limited amount of processing resources available to them which results in ungrammatical 'compressed' messages. The normally cheapest route of the syntactical channel has thus become more expensive and has been replaced by context.

according to De Lange: (1) the number of processing resources available, (2) the accessibility status of the referent, (3) the available time, and (4) the need for a functional category as frame *before* the noun can be interpreted by the cognitive system. The search for components (2) and (4) takes place before the activation of the noun lemma and this happens at the level of the Information Structure. The latter will start with automatically searching for a compatible frame from the (narrow) syntax channel, which takes no conscious effort from the speaker. However, it still requires processing resources.

After this searching procedure, the Information Structure starts a functional procedure, which is triggered by the grammatical properties of a noun (gender, definiteness, number). In the case of articles, this means that a noun-lemma has grammatical properties that help specify what kind of frame needs to be selected to produce the right kind of article.[10] During the selection-process, the different elements of each particular set are competing for their spot. This competition leads to a certain amount of processing resources being used: the stronger the competition between elements of each set, the more processing resources are required to retrieve the specific element from a set. Whenever the competition is too strong between elements, as is the case with gamers who have a limited amount of time available to them to craft their messages and thus less processing resources, the syntactic channel will not be able to complete the selection process. This, according to De Lange, explains why omission of functional categories like articles takes place whenever normal speakers are under time-pressure, and why normal speakers end up producing 'compressed' utterances.[11]

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[10] In the case of the English article system, this means that it will look at properties for number and definiteness.

[11] Important to note, however, is that each of these normal speakers still possess the competence regarding grammatical rules and how to produce grammatical elements. Yet, in their performance, they leave out certain grammatical categories due to the time-pressure that the game imposes on them and the influence this limited-time has on their processing capacity. Nevertheless, as mentioned earlier, normal speakers will always use the morphosyntactic channel to construct their messages no matter the context, as it still requires less processing resources than the contextual channel does.

2.3 Overview

In short, article omissions take place under influence of four factors: (1) the number of processing resources available, (2) the accessibility status of the referent, (3) the available time, and (4) the need for a functional category to act as frame. The less time a normal speaker has, the lower their processing resources, thus the higher their rate of articles omissions will be.

In addition, changing the context from headlines to in-game chat communications may lead to a different set of utterances to be looked at in comparison with De Lange's (2008) research, which influences the rate of omissions. Moreover, the current study focuses on the English article system, which differs from the Italian and Dutch article systems in the following three ways: (1) English has no gender rules, (2) English (and Dutch) have no partitive articles, and (3) the number of bits per unit of information. The difference between the article systems of these three languages as well as the change in context is interesting in light of the results found by De Lange. Because, if the current study also finds a high rate of article omissions this would support De Lange's claim that due to a restricted processing capacity normal speakers omit more articles when under time-pressure than in normal conditions.[12]

3. Research Questions and Hypotheses

Based on the results of De Lange (2008) on article omissions in a specific time-limited context, the following research question was devised:

Will Overwatch gamers omit more articles in DP's in a specific context due to limited time?

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[12] Moreover, if the percentage of article omissions in English is higher than in Dutch and Italian, this would suggest that the English article system is affected more by a limited-time context than Italian or Dutch.

In her study, De Lange (2008) found that articles are indeed omitted more in a specific time-limited context, and I thus hypothesise that this will also be the case when changing the context from headlines to games. After all, gamers will have even less time available to them than journalists have to construct their messages, thus resulting in players writing more 'compressed' messages instead (Avrutin, 1999, 2004a, 2004b; de Lange, 2008).

In addition, to support the main question and to examine whether the grammatical elements of definiteness, sentence position, and verb-finiteness influence the rate of article omissions, the following three sub-questions were formulated:

(1) *If these gamers do omit more articles in a specific gaming-context, will the percentage of definite article omissions be significantly higher than the percentage of indefinite article omissions?*

(2) *And when these omissions of both definite and indefinite articles takes place, are these omissions more common in sentence-initial position than sentence-internal position?*

(3) *Lastly, will these omissions happen significantly more in utterances with a non-finite verb than in utterances with a finite verb?*

Based on the results from De Lange's study as well as in the way the English article selection procedure takes place in relation to definite and indefinite articles, I hypothesise that I will find a high rate of *Overwatch* gamers making use of omissions of definite and non-definite articles in *sentence-initial* position. The reason for this hypothesis is based on the optionality of UG to leave out the highest clausal position in a phrase whenever speakers find themselves under time-pressure (Guasti, Lange, Gavarró, and Caprin, 2004).

Moreover, I hypothesise that players will omit the indefinite article more than the definite article, because *Overwatch* already forms a specified discourse setting. The indefinite article will therefore be used less, or omitted completely, as the players all share the same

discourse knowledge regarding game-mechanics. Moreover, the number of new referents that require the indefinite article will be low, and so they will be omitted to a higher degree.

Lastly, I hypothesise to find a higher percentage of article omissions in utterances with a non-finite verb than in utterances with a finite verb. After all, as mentioned in the introduction, DP's that possess a non-finite verb have the option to leave out a case-assigner. Thus whenever speakers find themselves in a limited-time context like in a gaming environment, they use this optionality to spare their processing resources.

4. Methodology

4.1 Participants

Data from 140 participants was analysed. The participants were randomly matched by the European *Overwatch* server, and their identity remained anonymous throughout the study. Their age, gender, language-background and English proficiency were thus unknown to the researcher.[13] Furthermore, the participants have not been checked for any language-impairments and these were therefore not taken into account during the analyses.

4.2 Data Collection and Analyses

Data was collected by playing the game *Overwatch*[14] for approximately ten hours (10:06:21 hours). In *Overwatch* players play six versus six combat matches in which they have to complete or hold certain objectives to win. The game is based around the idea of working together as a team to achieve a specific goal. Good communication is a major factor in this process and chat is thus often used to express one's personal view on the match or to send (negative) remarks to other players.

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[13] The implications that this lack of background information has on the current research and suggestions for further research to change this anonymity will be further explained in the discussion section.

[14] Online-multiplayer first-person shooter (MMOFPS).

Furthermore, *Overwatch* is played on three different continental servers, namely on the servers Asia, Europe, and Americas. For the intended study, I focused solely on the European server, because of two reasons. Firstly, the lingua franca on the European server is English. The European server thus forms the perfect pool for data collection out of the three servers, because it not only produces the English utterances needed for the study, but it also guarantees the highest number of English being used in chat. Secondly, to receive a high number of valuable data it was important that many games could be played in several hours. The more games that were played consecutively, the higher the rate of utterances.[15] The utterances in game were recorded by a Windows 10-game recorder. While recording, I never deliberately started a conversation, but just observed the utterances and played the game.

The total number of utterances collected was 455, of which 271 utterances were excluded from the research as they did not contain any (non-)finite verbs, existed only out of one word utterances, other languages, pre-made sentences or abbreviations: *gg* ('good game'), *ez* ('easy'), *gh* ('good healing'). The specific types of sentences that were excluded from the research can be seen in Table 2 as well as the number of utterances produced for each type.

Table 1

Type and Number of Utterances (+ Inclusion in Research)

Type of Utterance	Number of Utterances	Included in Research
Finite Verb	138	Yes
Non-Finite Verb	46	Yes
Finite Verb + Article (Omission/Production)	45 (24/21)	Yes
Non-Finite Verb + Article (Omission/Production)	20 (14/6)	Yes
Without Verb	264	No

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[15] Let me explain, playing on the European server lead to more players being available at a time due to the small time-zone differences between European countries. This reduced the waiting time in between matches and thus resulted in more games being played per hour.

Abbreviations	84	No
One Word	95	No
Numbers	12	No
Pre-Made	2	No
Other Language	4	No
Total	455	-

The number of viable utterances was counted, based on three considerations: (1) the utterance had to possess a (non-)finite main verb, (2) the utterance had to provide an obligatory context for (in)definite articles, and (3) the utterance had to include a DP. From the total number of 455 utterances, this resulted in 184 utterances with a main (non-)finite verb: 138 finite verb utterances and 46 non-finite verb utterances. From these 184 utterances, only 65 produced DP's with an obligatory context for (in) definite article production. The other DP's were formed by possessives, demonstratives, and/or quantifiers, which were excluded from the research as the focus of this study was on articles only. The data thus resulted in 45 finite verb utterances and 20 non-finite verb utterances, which included a DP and provided an obligatory context for article production.

The 45 finite verb utterances with an obligatory context consisted of sentences like (1) *I got weird feeling*, (2) *they had a good rein*, and (3) *the beam of succ strikes again*. In these examples the finite verb was formed by the singular present tense verb *got*, plural past tense verb *had*, and the singular present tense verb *strikes*. Main verbs were only counted as finite when they agreed in person, number and tense with the subject of the sentence. In addition, when the subject of the sentence was unclear, the utterances were counted as non-finite. Furthermore, the obligatory context for article production was formed by the following combinations of DP's: (1) ((in) definite) article + noun, or (2) ((in) definite) article + adjective + noun. For the examples, this gave the following combinations: (1) omitted (indefinite) article *a* + adjective *weird* + noun *feeling*, (2) produced (indefinite) article *a* + adjective *good*

+ noun *rein*, and (3) produced (definite) article *the* + noun *beam*. The other examples were analysed in the same manner by firstly looking at the type of main verb in the utterance, secondly by deciding which type of obligatory context was presented in the utterance, and lastly whether the articles were actually produced or omitted in these contexts.

The 20 non-finite verb utterances, on the other hand, consisted of sentences like (1) *we need to go full defense next round*, (2) *I should be garbage man irl*, and (3) *work for the team*. The main verb in these sentences could be a modal verb, an infinitive, or verbs ending on *-ing* and *-ed*. I also counted those verbs that had no overt subject as non-finite. Both the verbs *need to go* and *should be* in examples (1) and (2) were included as modal verbs, while *work* in example (3) was counted as non-finite because the utterance possessed no overt subject. Nevertheless, the combinations of obligatory context remained the same: ((in) definite) article + noun or ((in) definite) article + adjective + noun. The combination of obligatory contexts in the examples was therefore analysed as follows: (1) omitted (definite) article *the* + adjective *next* + noun *round*, (2) omitted (indefinite) article *a* + adjective *garbage* + noun *man*, and (3) produced (definite) article *the* + noun *team*.

The reason for looking at finite and non-finite verb utterances independently is based on the findings by De Lange (2008). As mentioned before, she found that utterances with a non-finite verb resulted in more article omissions than in sentences with a finite-verb. The reason she gave for this finding was that DP's with a non-finite verb have the option to not apply a case assigner in limited-time contexts, and thus not necessarily need to possess a determiner to form an utterance. To control for this finding in the current study, it was important to make a distinction between both verb types.

Furthermore, according to De Lange the position of the article in a sentence influences the percentage of omissions: articles in sentence-initial position were omitted at a higher percentage than articles in sentence-internal position. To account for this finding in the

current study and to determine whether a change of context and language influences the percentage of article omissions in a certain position in a sentence, sentence position was included in the analyses. The position of an article in an utterance was calculated, based on the place where the obligatory context for article production presented itself. So, sentence-initial article omissions took place when the obligatory context formed the start of an utterance. For example, in the utterance *Only enemy player who was in fire was the soldier*, the obligatory context combination of omitted (definite) article *the* + adjective *enemy* + noun *player* forms the beginning of the finite verb sentence. Thus *only enemy player* was counted as an omitted article in sentence-initial position in a finite verb utterance. At the same time, when the obligatory context for article production followed the main verb in a sentence, the (in) definite article was counted as being in sentence-internal position. So, in the example *Only enemy player who was in fire was the soldier*, a second obligatory context for article production can be found at the end of the sentence in the form: produced (definite) article *the* + noun *soldier*. The definite article *the* was therefore counted as a produced definite article in sentence-internal position in a finite verb utterance.

Lastly, the percentage of omissions for definite and indefinite articles was analysed independently for sentence position as well as verb-finiteness. De Lange did not include this distinction in her research, yet it is interesting to see which article will be omitted more under time-pressure in a gaming environment. As mentioned earlier, the English article system distributes articles based on whether the corresponding referent is known or unknown to the interlocutors. If the referent is newly introduced into the conversation the indefinite article *a*/*an* is used. On the other hand, if the referent is already mentioned prior in the conversation the definite article *the* is used. Because *Overwatch* players are familiar with the game and its abilities, I believe they will use the definite article more often as they possess prior discourse knowledge even if they are unfamiliar with their conversational partners. To account for this

difference in use of definite and indefinite articles, and to examine which type of article is omitted more, I have counted them separately. The definiteness of an article was based on the obligatory context in which it was produced or omitted. So, if the obligatory context was part of the general knowledge regarding the game, it was counted as a definite article. If the obligatory context made no reference to the game at all, it was counted as a produced/omitted indefinite article. In the case of the non-finite verb example *we need to go full defense next round*, the obligatory context created by *next round* refers to the game-mechanism of playing multiple rounds, thus being counted as an omitted definite article in a non-finite verb utterance. In the finite verb example *I got weird feeling*, however, the obligatory context refers to the unknown feelings of a player and was therefore counted as an omitted indefinite article in a finite verb utterance.

5. Results

The results of the data collection of 65 utterances among 140 participants have shown that in 57.2 percent of the produced utterances an article was omitted as can be seen in Table 2.

Table 2

Mean Percentage of Article Omissions and Number of Obligatory Contexts/Omittance

Mean % omission	Obligatory context/omittance
57.2	65/37

5.1 Finiteness of Verb

Utterances were divided based on finiteness of their main verb. Main verbs that agreed in tense, number and person were counted as finite verbs. Verbs that did not agree in tense, number and person with the subject of the sentence (modal verbs, infinitives, etc.), or when the subject of the sentence was unknown, were counted as non-finite. This resulted in 53.3% of articles being omitted in finite verb utterances, and 65% of articles being omitted in non-

finite verb utterances (see Table 3). Thus, more articles are omitted in sentences with a non-finite verb than in those with a finite verb.

Table 3

Mean Percentage of Article Omissions divided by Finiteness of the Verb

Verb finiteness	Mean % omission
Finite	53.3
Non-finite	70.0

5.2 Definiteness of Article

The definiteness of an omitted article was determined based on whether it referred to general or discourse knowledge regarding game specifics. If it referred to something that had happened in the game it was counted as an omitted definite article. However, if the utterance described something outside the specific discourse of the game, the omitted article was counted as indefinite. Based on this distinction between definite and indefinite articles, 56.8% of definite articles were omitted compared to 61.9% of indefinite articles. This showed that more article omissions took place with indefinite than definite articles (see Table 4).

Table 4

Mean Percentage of Article Omissions divided by Definiteness of the Article

Article definiteness	Mean % omission
Definite	56.8
Indefinite	61.9

5.3 Sentence Position

Article omissions were counted as sentence-initial if the obligatory context was presented before the main verb of a sentence. However, if the obligatory context was placed behind the main verb of the utterance, article omissions were counted as sentence-internal. Analyses showed that 81.8% of the articles was omitted in sentence-initial position in comparison to

51.9% of articles being omitted in sentence-internal position (see Table 5). So, more article

omissions took place in sentence-initial than sentence-internal position.

Table 5

Mean percentage of Article Omissions divided by Sentence Position

Sentence position	Mean % omission
Sentence-Initial	81.8
Sentence-Internal	51.9

5.4 Interaction between Finiteness, Definiteness and Sentence Position

Looking at the interaction between finiteness, definiteness and sentence position in utterances,

the rate of article omissions was influenced by all three factors. The number of obligatory

contexts was counted separately for both finite and non-finite verb utterances. The influence

of finiteness on the omission of articles based on definiteness and sentence position can be
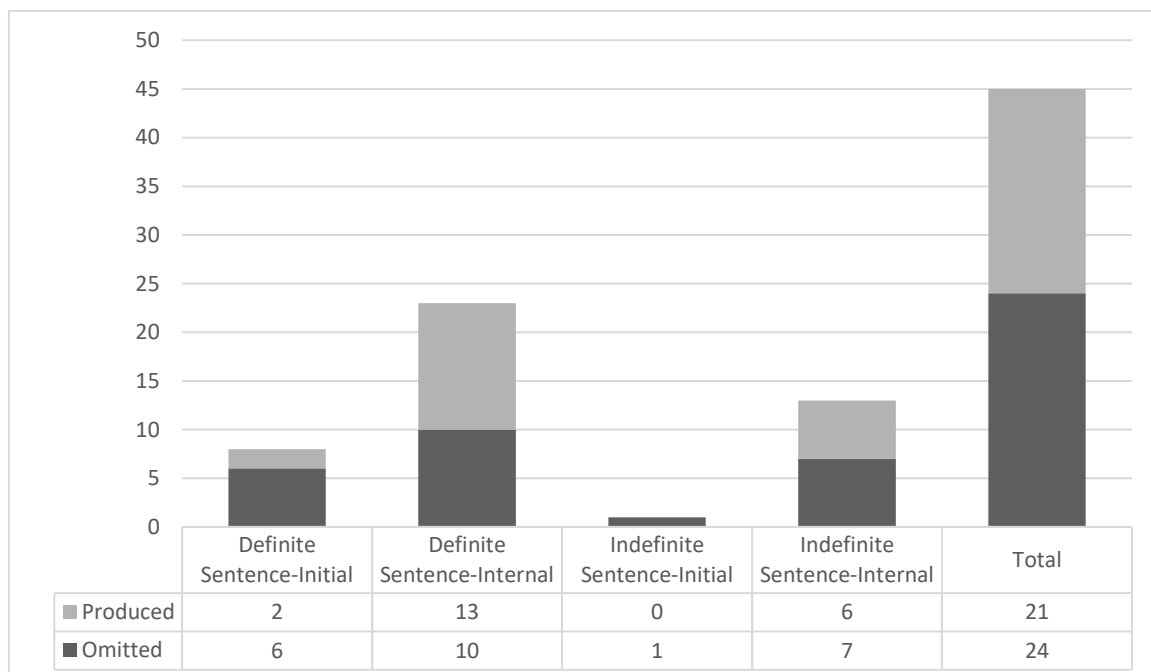
found in figures 1 and 2.

	Definite Sentence-Initial	Definite Sentence-Internal	Indefinite Sentence-Initial	Indefinite Sentence-Internal	Total
■ Produced	2	13	0	6	21
■ Omitted	6	10	1	7	24

Figure 1. Number of articles produced or omitted in utterances with a finite verb based on

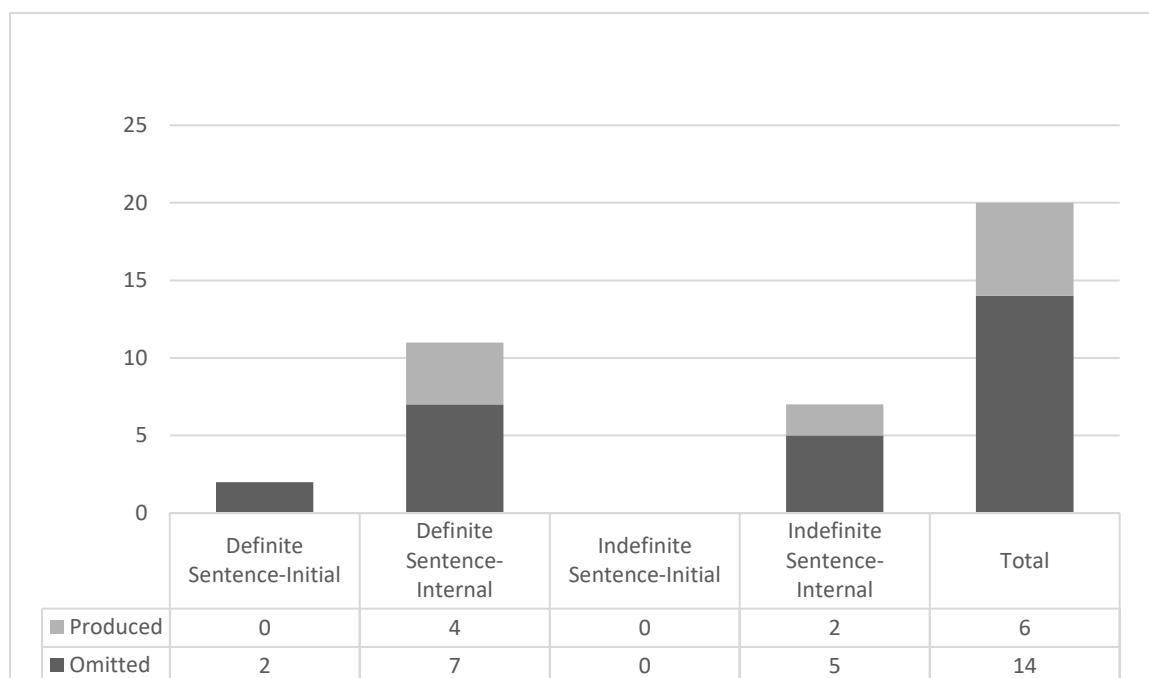sentence position and definiteness of the article.

Figure 2. Number of articles produced or omitted in utterances with a non-finite verb based on sentence position and definiteness of the article.

In the end, indefinite articles were overall omitted more than definite articles in both finite verb and non-finite verb utterances as well as in sentence-initial position (see table 6).

Table 6

Mean Percentage of Article Omissions based on Interaction between Finiteness, Definiteness and Sentence Position

	Finite verb		Non-finite verb	
	Sentence-initial	Sentence-internal	Sentence-initial	Sentence-internal
Definite	75.0	43.5	100.0	63.6
Indefinite	100.0	53.8	-	71.4
Total	77.8	47.2	100.0	66.7

6. Discussion

In the past, the little amount of linguistic research that did look at grammar in games was only concerned with improving the English proficiency level of EFL students (Aslanabadi and

Rasouli, 2013; Bettiol, 2001; Chen and Yang, 2012; Vidlund, 2013). None of them, however, simply examined the English grammar production of gamers in a regular non-educational context without the need to better a speaker's English proficiency. The current study has tried to fill that niche by using the findings of De Lange (2008) in her research on article omissions in headlines and supplying them to a new limited-time context and language. So, to test De Lange's hypothesis that normal speakers do omit more articles under time-pressure, the following research question was devised:

> *Will Overwatch gamers omit more articles in DP's in a specific context due to limited time?*

The research has shown that the answer to this question is indeed yes, *Overwatch* gamers do omit more articles than that they produce. In 57.9 percent of the produced utterances, an article was omitted. Yet the finiteness of the main verb, sentence position *and* definiteness of the article, each individually influence the percentage of omissions as well as interact with each other.

Firstly, as gamers do omit more articles in a limited-time context, the percentage of article omissions in non-finite verb utterances proved higher than in finite verb utterances. Secondly, indefinite articles where omitted more than definite articles and lastly, omissions were more common in sentence-initial than sentence-internal position. To explain why more omissions took place in sentence-initial position and in utterances with a non-finite main verb, we can look at the optionality of UG to leave out the highest position in a clause and a case-assigner in non-finite verb utterances (De Lange, 2008; Guasti, Lange, Gavarró, and Caprin, 2004). This furthermore supports the Information Theoretical idea that due to a restricted processing capacity, normal speakers produce fewer articles in a time-limited context than under normal conditions. However, their grammatical knowledge of the English article system remains unaffected. If not, they would not have been able to use the rules of the English

article system in relation to definiteness, or the optionality rule of UG to leave out articles in sentence-initial position.

Moreover, the difference in omissions between definite and indefinite articles can be brought back to the context in which they are normally produced: definite in the case of a known referent and indefinite in the case of an unknown referent. Overall, more omissions took place with an indefinite article than a definite article. This might be explained by a gamer wanting to say something as quickly as possible and in the case of an indefinite referent, not feeling the need to specify as everyone is playing the same game (same discourse-situation). Therefore, sparing the limited amount of processing resources available to them under time-pressure while still creating a sentence that is interpretable for their interlocutors.

Also, although the hypothesis has been proven correctly, there are two major factors that should be taken into consideration: (1) the amount of data, and (2) the (linguistic) background of the participants. After all, the ten hours of data collected, resulted in only 65 viable article utterances, with an obligatory context for article production, out of a total of 455 utterances.[16] Moreover, out of these 65 sentences, not all utterance types were met.[17] To avoid making false assumptions about the effect of limited-time on article omissions in a gaming context due to a small set of data, no major linguistic conclusions could be made. Likewise, percentages in a small data set will be easier influenced by small disruptions than a bigger data set. Future research should therefore collect more data to control for the findings of the current study and test whether the effect of limited-time remains the same when the number of utterances increases.

Secondly, the (linguistic) background of the participants of the current study was unknown. Therefore, no suggestions could be made about possible cross-linguistic influences

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[16] Forming only 14.2% of the total number of utterances.
[17] No instances of indefinite sentence-initial articles in non-finite verb utterances were found in the data. Conclusions in relation to indefinite sentence-initial article omission in non-finite verb utterances were therefore, also not made.

from the participants' native language article systems into the English article system.[18] In the case of participants' with a native language that does not possess any articles,[19] for example, this could influence the way in which the English articles were used in the study. So, article omission might have taken place: (1) because the participants had difficulty with producing articles under time-pressure due to a limited processing capacity as the results suggest. Or (2) due to them not possessing the grammatical knowledge regarding the rules of article production in English as they have no use for these rules of article production in their native languages. To control for the influence of the participants' native language article system on the rate of omissions, as well as other factors such as age,[20] gender and educational level, future research should include a questionnaire that requires participants to fill in their personal information before participating in the study.

7. Conclusion

In short, the current study ties into the findings of De Lange (2008) concerning article omissions in specific time-limited contexts. The findings showed that 57.9 percent of articles were omitted in sentences under time-pressure. It has also shown a higher percentage of indefinite articles being omitted in comparison to definite articles. In addition, more articles were omitted in utterances with a non-finite verb than in utterances with a finite verb, and in sentence-initial position than sentence-internal position.

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[18] Or whether the participants' native language was indeed English.

[19] Think of Slavic languages like Slovak and Czech (Chamonikolasová & Stašková, 2005).

[20] Children already possess less processing resources than adults, and will thus, hypothetically speaking, omit even more articles under time-pressure than their adult counterparts.

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