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Acceptability of sentences in which the Dutch word 'er' holds multiple functions

Bachelor's Project Thesis

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Abstract: The Dutch pronoun *er* can be used in four different ways. It can be translated as 'there', but is often not translated at all. *Er* is unique in that one occurrence can relate to multiple aspects of the sentence and therefore hold multiple functions and meanings. It has been theorised that *er* can hold as many as four functions. This experiment was set up to confirm whether native Dutch speakers agree with this or whether there is actually a maximum number of functions *er* can hold. Participants were asked to evaluate sentences where the *er* held four or five functions. The same sentences but with only one function for *er* were also evaluated. The latter ones where judged much more acceptable than the equivalent sentences where *er* held multiple functions, indicating a limit on the number of functions er can hold. This contradicts the claim that *er* can hold four functions. Differences between combinations of functions were found as well, suggesting that other factors might have an influence on the acceptability as well.

1 Introduction

The Dutch word *er* is a very commonly used word and most native Dutch speakers would not think of it as a weird or difficult word. However, its behaviour is actually quite complex. *Er* is part of the R-pronoun family. This family consists of *er* and six other pronouns: hier ('here'), daar ('there'), ergens ('somewhere'), nergens ('nowhere'), overal ('everywhere'), waar ('where') (Odijk, 1993). These pronouns share a few unique syntactic properties, which make them very interesting to investigate. *Er* can in some cases be translated as 'there', but it can be used in many more situations and can take on multiple functions. These functions are existential, pronominal, locative and quantitative, which can be indicated with er_X, er_P, er_L, and er_Q respectively. These different types of *er* are explained below.

The existential *er* most commonly occurs in sentences that have no subject, like in passive sentences, or in sentences where the subject occurs more to the right, which for example tends to happen when the subject is indefinite (Odijk, 1993). This way, *er* fills the empty subject position. This *er* can be translated with 'there', but it is often rephrased in English, for example by filling in an indefinite subject or moving the subject to the subject position. An example of such a sentence can be seen in (1a).

The pronominal *er* is used instead of pronouns like *het* and *ze*, which mean 'it' and 'them', when they appear after a preposition. The *er* is then moved in front of the preposition. This is only possible when these pronouns refer to inanimate objects, because pronouns that refer to animate objects are not replaced and are positioned after the preposition (Donaldson, 2008). This means that 'next to it' would become *ernaast*, while 'next to her' would become *naast haar*. *Er* does not always necessarily have to be attached to the preposition or even appear directly in front of it. However, it does have to be positioned somewhere to the left of the preposition, as in (1b). It cannot be placed behind it.

The locative *er* is used to refer to a location and is the unstressed form of *daar*, which means 'there'. Some verbs require a location. If a location is not specifically stated, a locative *er* must be present, as in (1c). This type of *er* will be left out of this experiment. The reasons for this will be discussed in the next section.

The final type of *er* is the quantitative *er*. This

type is used in combination with numerals or adverbs of quantity when the noun phrase that the quantity describes is not explicitly stated, as shown in (1d). This *er* is generally not translated, but it means 'of them' or 'of it'. (Donaldson, 2008)

(1) a. Er_X was eens een koning zonder
There was once a king without
kasteel.
castle
"Once upon a time there was a king without a castle."

b. Hij liep er_P langzaam doorheen.
He walked there slowly through
"He walked through it slowly."

c. Hij woont er_L.
He lives there
"He lives there"

d. Hij heeft er_Q twee.
He has there two
"He has got two of them."

It is not uncommon that more than one of these functions occur in a sentence. It is also possible to have one function occur more than once. However, it is not possible to have more than two *er*s in one clause, and in most constructions only one is allowed (Donaldson, 2008). It is therefore not possible to use a separate *er* for each function. Instead, one *er* is used for all of them, and the other *er*s disappear. To explain this behaviour, a deletion rule has been proposed.

The deletion rule says that an *er* can take on multiple functions, because weak pronouns, which all have different functions, tend to all be placed in the same position, and there is a strong tendency to leave out adjacent occurrences, leaving all functions to the remaining *er* (Neeleman and van de Koot, 2006). However, this rule is not sufficient to explain all of *er*'s behaviour. Such deletion is not possible, for example, in the case of an er_P and an er_L. Odijk (1993) explains that these two types of *er* have meaning. They serve as variables that can take on the meaning of the initial phrases they substitute. If you delete one of the occurrences of *er*, this meaning would be lost. On the other hand, it is possible for one *er* to hold multiple pronominal functions, as is shown in (2), an example taken from Webelhuth and Bonami (2019).

(2) a. Jan heeft de sleutel [**met een**
Jan has the key with a
tang] [**uit het slot**] gehaald.
pair.of.tongs out.of the lock taken
"Jan took the key out of the lock with pliers."

b. Jan heeft er_{PP} de sleutel [**mee**] [**uit**] gehaald.

Clearly, the behaviour of *er* is very complex and cannot be captured in a single rule. This makes modelling it and theorising about it very difficult, even with advice from experts. Rules should capture all ways in which *er* can behave, but they should not be too broad either. For example, all combinations of functions, apart from er_L and er_P, seem to be possible. If in all those cases deletion would always be possible, it would seem that an *er* could take on any number of functions to prevent having adjacent *er*s in a clause. It seems likely though, that there are in fact some limits to this, to prevent sentences from becoming completely incomprehensible. If there are limits to the number of functions *er* can hold, it is important to explore these limits, so that proper assumptions can be made and used for theories and analyses.

The first step in exploring the limits is to be able to analyse the grammar to see whether it restricts the number of functions in any way. One clause can only contain one subject, for example, restricting the number of existential functions to one. A good model that can help with analysing this further is Lexical Functional Grammar (LFG). LFG provides a way to model sentences in a way that is not specific to only one particular language, but does capture all linguistic information that native speakers get from that sentence (Börjars, Nordlinger, and Sadler, 2019). One very important bit of information within LFG is the grammatical function of particular phrases within a sentence. These grammatical functions can be assigned to phrases that are dependent on the verb. They can be roughly divided into the categories arguments and adjuncts.

When a verb specifically requires certain phrases in order for the sentence to be grammatical, those phrases are arguments. The verb 'to love', for example, needs someone that loves and someone or something that is being loved. If either of those is omitted, the sentence becomes ungrammatical. The most important arguments in this study are the

subject (SUBJ), the object (OBJ), the restricted object (OBJ_θ), and the oblique (OBL_θ). The latter two are semantically restricted to a specific thematic role, which will be explained below. The OBL_θ is usually a PP in English (and Dutch). Each type of argument can only occur once in every clause.

Adjuncts (ADJ) can provide some extra information about the verb, but can be left out without any problems. Adjuncts include adverbs and prepositional phrases among other things, and a clause can contain multiple adjuncts. There are also arguments that can be omitted without a problem like adjuncts, but are still entailed in that case. These are called optional arguments. This occurs, for example, when someone says 'I am eating'. They do not explicitly say what they are eating, but it is inferred that something is being eaten, which is therefore an optional argument.

Beside the structure in sentences, the meaning (semantics) is also an important aspect of LFG. Different dependents of a verb will have different roles with respect to the semantics of the verb. These roles are thematic roles. There is not a clear agreement on the types of roles that exist and their definition. For this study, the following definitions were used. An AGENT is the causer or initiator of an action. A THEME is an entity which undergoes a change of state, location or possession or whose location is specified. A BENEFACTIVE is an entity that benefits from an action or event. An INSTRUMENT is an inanimate entity used by some participant to perform an action. A LOCATION is a spatial reference point of event or entity (Börjars et al., 2019). Finally, a PURPOSE is the reason for which an action is performed (Jackendoff, 1990). With this information, it is possible to take a closer look at the possible limits of the number of quantitative and pronominal functions in a clause.

Webelhuth and Bonami (2019) mention that all *er*s seem to be dependents of the verb of a clause, which causes the noun phrases and prepositional phrases to which the er_P and er_Q refer to carry a thematic role. As each thematic role cannot be assigned to more than one dependent of a verb (Chomsky, 1993), this would theoretically limit the combined number of pronominal and quantitative *er*s to the total number of thematic roles. This number can be different for different verbs or sentences.

The limit on the number of thematic roles would tell us more about the restrictions on verbs than it does about the restrictions on *er* itself. It is still important to realise, though, because if we want to explore possible restrictions of the behaviour, it is wise to start within the limits of the whole clause, so to make sure that any limits that are found are not due to violation of any other restrictions.

Before the limits of languages can be explored, a second aspect must be considered. Even if a language allows for a certain theoretical number of functions that *er* can hold, it might be that native speakers might actually reach a limit at a number that is smaller than the theoretical number, simply because they cannot keep track of all of *er*'s functions. If, for example, a limit would be found, but could then be extended by adding prosody to the sentences, it would suggest that the limit is not due to linguistic restrictions on *er*, but to limitations of language processing in the brain.

It is clear that there is still a lot to unveil with regard to the behaviour of *er*. This could never be done with one single experiment, so the current study set out to make a start in that. A number of assumptions have been made in analyses about *er*. Webelhuth and Bonami (2019) for example explain how one overt *er* can have four functions at once. They give sentence (3) as an example to support their claim:

(3) a. dat er_X [**twee studenten**] [**drie boeken**] [**uit de boekenkast**] gehaald hebben.
that there two students thre books out.of the bookcase fetched have
"that two students got three books out of the bookcase."

b. dat er_{XQQP} [**twee**] [**drie**] [**uit**] gehaald hebben.

This sentence has only one pronominal *er*, while they also show that two are possible as was shown before in sentence (2). We could now combine these two sentences to make a sentence where *er* even has five functions, as in (4). Using the method of first building up sentences with all noun phrases and prepositional phrases filled in and then replacing them with *er* one by one provides a good way

to push the number of functions to the limit (if there is one) without violating the constraints of the whole clause. However, this is all a theoretical way of looking at it, and it does not say anything about whether this is actually accepted by native speakers.

(4) a. dat *er*$_X$ [**twee studenten**] [**drie boeken**] [**met die grijper**] [**uit de boekenkast**] gehaald hebben.
that there two students three books with that grabber out.of the bookcase fetched have
"that two students got three books out of the bookcase with that grabber."

b. dat *er*$_{XQQPP}$ [**twee**] [**drie**] [**mee**] [**uit**] gehaald hebben.

As most of the theory about *er* is based on reasoning and judgements made by experts, it is difficult to predict how native Dutch speakers would evaluate sentences like (3) and (4). It seems likely that sentences where *er* holds five functions are less acceptable than sentences where *er* holds four functions. Every function that *er* holds is something that a reader needs to process and keep track of, so even if grammar would allow it, five functions would probably still make the sentence more difficult to follow. It is also possible that beside the number of functions, the combination of functions might also have an influence on the acceptability of sentences.

As mentioned before, all *er*s can be seen as dependents of the verb. However, up to two noun phrases associated with the quantitative *er*s are generally very clearly arguments. In the case of three quantitative functions, one of them tends to be an optional argument. Also, up to one prepositional phrase associated with the pronominal *er* is an argument. When there are more pronominal functions, these are generally adjuncts. When a part of the sentence is optional, a person might assign the wrong function to it when reading the sentence for the first time. This may cause them to not fully understand a sentence and thus evaluating a sentence as not acceptable. If this is the case, then it would be expected that sentences where an *er* has two optional functions are accepted the least, and sentences where *er* has no optional functions are accepted the most. However, at this point these are still speculations.

For this reason, the primary goal of this study was to explore whether or not there is a limit on the number of functions of a single overt *er* that native Dutch speakers find acceptable. Additionally, it set out to shed some light on possible underlying factors, like the ones mentioned above, that might influence the acceptability of sentences containing *er*. To do this, native speakers were asked to evaluate a number of sentences that contained an *er* that held either four or five functions, as those were argued to be grammatically correct in theory. One of these functions would always be existential. The remaining functions were pronominal or quantitative. All combinations were included, apart from those containing a locative *er*.

2 Methods

In order to explore the limits of the number of functions of *er*, an online survey was designed. The survey was entirely in Dutch, since the opinion of native Dutch speakers was required. The participants were instructed to find a quiet place with as little distractions as possible and that their goal was to evaluate each sentence that was presented. It was stressed that for this evaluation they should simply think about whether they thought the sentence was well constructed (*een goedlopende zin* in Dutch), and that therefore the content of the sentence was not important. However, the sentences were reviewed by some native Dutch speakers beforehand to make sure the sentences were semantically acceptable. If participants completed the survey, they got a compensation of five euros.

The test sentences all contained an *er* holding either four or five functions. In all sentences, one of these functions was an existential function. Aside from the number of functions, the distribution of the remaining functions was also manipulated. They were either quantitative or pronominal. There was no category where more than three of the same functions were used, but other than that, all combinations were included. This led to seven categories in which *er* holds multiple functions. The categories where *er* holds four functions are: XQQQ, XPPP, XQPP, and XQQP, where X stands for the existential function, Q for the quan-

Table 2.1: This table shows which roles were chosen in each category and whether that NP or PP served as an argument or as an optional argument or adjunct. The positions indicate the order in which each part appeared, and do not indicate a specific location in a sentence.

Category		position 1	position 2	position 3	position 4
XQQQ	thematic role	AGENT	BENEFACTIVE	THEME	-
	type	argument	optional argument	argument	-
XPPP	thematic role	INSTRUMENT	PURPOSE	LOCATION	-
	type	adjunct	adjunct	argument	-
XQPP	thematic role	AGENT	INSTRUMENT	LOCATION	-
	type	argument	adjunct	argument	-
XQQP	thematic role	AGENT	THEME	LOCATION	-
	type	argument	argument	argument	-
XQPPP	thematic role	AGENT	INSTRUMENT	PURPOSE	LOCATION
	type	argument	adjunct	adjunct	argument
XQQPP	thematic role	AGENT	THEME	INSTRUMENT	LOCATION
	type	argument	argument	adjunct	argument
XQQQP	thematic role	AGENT	BENEFACTIVE	THEME	INSTRUMENT
	type	argument	optional argument	argument	adjunct

titative function, and P for the pronominal function. The categories where *er* holds five functions are: XQPPP, XQQPP, and XQQQP.

The locative *er* was left out in this study, because it is very hard to make sure people actually read the *er* as locative. As explained before, the locative *er* is unstressed. Therefore, when using *er* to refer to a location, this location is generally not very important and could often easily be left out. Consequently, if *er* already represents other functions, it would not be obvious to the reader that a location is also inferred. It is possible to force the presence of a locative *er* and therefore ensure that the reader is aware of this function. This could be done by using verbs that require a location, such as *wonen* ('to live'). However, these verbs generally do not allow for multiple other arguments, making it very difficult to generate enough functions for *er*. Also, the locative *er* cannot be combined with the pronominal *er*, so including a locative function would greatly decrease the number of possibilities.

After determining the categories, a framework was made for the test sentences. It was stated before that the quantitative and the pronominal functions can be associated with thematic roles. These were determined for each category. The combination of thematic roles were chosen on the ground that they allowed for creating multiple test sentences without using the same verb twice. Table 2.1 shows per category which thematic roles were chosen for the NP or PP to be used in each position and whether that phrase can be seen as an argument or as an adjunct or optional argument.

Four sentences were constructed for every category in the following way. For each sentence, a verb was chosen that could accommodate all the thematic roles that were assigned to the category. Then, a sentence was created that contained only an existential *er*, and all the noun phrases and prepositional with the appropriate thematic roles, as in (5a). The first NP in this example is the AGENT, the second NP is the THEME, and the PP is the LOCATION. (5b) is now used as a test sentence, but (5a) is also tested, in order to create minimal pairs that can be compared.

(5) a. Emma zei dat er$_X$ [$_{NP}$**twee meisjes**] [$_{NP}$**drie snoepjes**] [$_{PP}$**uit de kom**] gepakt hebben.
Emma said that there two girls three sweets out the bowl taken have
"Emma said that two girls took three pieces of candy from the bowl."

b. Emma zei dat er$_{XQQP}$ [$_{NP}$**twee**] [$_{NP}$**drie**] [$_{PP}$**uit**] gepakt hebben.

Table 2.2 shows an example sentence for every category. To create the existential function and to

Table 2.2: This table has an example of a sentence that was used in each category, where the first of each pair is the sentence with only an existential *er*, which matches the second sentence of the pair, where all NPs and PPs have been altered, so that *er* now holds multiple functions.

Category	Example sentence
XQQQ	Ik hoorde dat er [twee studenten] [een aantal bibliotheken] [een paar boeken] hebben geschonken. Ik hoorde dat er [twee] [een aantal] [een paar] hebben geschonken.
XPPP	Ik hoop dat er iemand [met die stok] [voor het terughalen van de bal] [over de sloot] kan springen. Ik hoop dat er iemand [mee] [voor] [overheen] kan springen.
XQPP	Ik geloof dat er [een paar jongens] [met de grasmaaier] [over het veld] rijden. Ik geloof dat er [een paar] [mee] [overheen] rijden.
XQQP	Hij dacht dat [er twee mensen] [een aantal stenen] [tegen het raam] hadden gegooid. Hij dacht dat er [twee] [een aantal] [tegenaan] hadden gegooid.
XQPPP	Op het nieuws zeiden ze dat er [300 soldaten] [met de speciale wapens] [voor het bevrijden van de gevangenen] [op de legerbasis af] zijn gestormd. Op het nieuws zeiden ze dat er [300] [mee] [voor] [op af] zijn gestormd.
XQQPP	Ik geloof dat er [drie kinderen] [een heleboel rozen] [met jouw handschoenen] [uit de tuin] aan het trekken zijn. Ik geloof dat er [drie] [een heleboel] [mee] [uit] aan het trekken zijn.
XQQQP	Peter zegt dat er [een leraar] [een paar studenten] [een aantal foto's] [met die projector] liet zien. Peter zegt dat er [één] [een paar] [een aantal] [mee] liet zien.

make sure the er_X was in the same place as the other *er*s would normally be placed, the sentences were created in the form of a subclause or a question.

As is visible from example (5), the *er* in the matching sentence still has an existential function. This function is left in, since removing the *er* completely would make the subject definite instead of indefinite, and it would in some cases be necessary to change the word order or remove some words. This would create a lot of extra factors that might influence the evaluation, so the results of the test sentence could then no longer be compared to the results of its matching sentence.

The survey consisted of 84 sentences. 28 of these sentences were test sentences, which all had a matching sentence (see appendix). They were divided into two blocks to make sure a test sentence would not appear right after its matching sentence. First, the test sentence was randomly assigned to one of the blocks and then the matching sentence was placed in the other. The sentences were randomised within the blocks.

The remaining 28 sentences were all filler sentences. They used the same verbs as were used in the test sentences, but did not contain *er*. It was attempted to use an approximately equal amount of acceptable and and unacceptable sentences to avoid creating a bias. If all filler sentences were completely unacceptable, the test sentences might appear more acceptable in comparison. Half of these filler sentences were made either awkward to read by changing the valency (i.e. the number of arguments) of the verb, or really unacceptable by translating the sentence back, word for word, from a language that uses verb-subject-object as the basis of its word order. The most unacceptable filler sentences were used to check whether participants were paying attention during the survey.

Every participant was asked to evaluate all of the 84 sentences. One sentence was shown per page, and participants could not proceed to the next sentence unless they had answered the current one. This was to ensure that no sentences were skipped. They also could not go back to change previous answers, since this might lead to them making a judgement that is relative to other sentences, instead of judging the sentence in itself.

The participants were able to evaluate the sentences using a 4-point Likert scale. They were asked whether they thought the sentence was "proper Dutch" (*Vind je dit een goede Nederlandse zin?*). The possible answers were: *Ja, ik zou deze zin zelf ook gebruiken* ('Yes, I would use this sentence'), *Op zich wel, maar ik denk dat ik de zin zelf niet zou gebruiken* ('I think it is, but I would not use the sentence'), *Niet echt, de zin klopt niet helemaal* ('Not really, the sentence is a bit awkward'), and *Nee, dit is geen goede Nederlandse zin* ('No, this is not a good sentence').

There was no middle option, or 'I don't know' option. There are a number of reasons for this. First, including a midpoint is generally only desired when it is very important that participants get a chance to express a true neutral opinion. This experiment asked them about their opinions on the presented sentences. Evaluating sentences is very unlikely to put someone under the pressure of providing a socially desirable answer. Therefore, forcing them to have an opinion on the matter should not make people uncomfortable or pose any other problems in that respect.

In addition to that, it should be considered that participants do not know whether a sentence is acceptable or not. In this case, an 'I don't know' option could be added outside the scale, but not as a midpoint, as it is not an answer that truely lies between 'yes' and 'no'. Not providing this option forces participants to make a decision. This is not unreasonable, since they were asked to evaluate based on there intuition, and not whether or not they thought the sentence was correct according to all the grammatical rules. Since all participants were native Dutch speakers, it seems reasonable to assume that everyone would have at least some type of feeling about the sentence.

Moreover, the danger of a midpoint is that it can be used as a dumping ground. The survey was estimated to take 30 minutes to fill in and this was made clear to participants. Especially when there are few options as on a 5-point scale, people tend to show satisficing behaviour. If they do not care enough and want to finish it as quickly as possible, a midpoint is an easy way to provide a minimally acceptable answer, while not having to put time and effort into finding the optimal response. (Chyung, Roberts, Swanson, and Hankinson, 2017)

With all this in mind, a 4-point scale was chosen. Having many more options or having participants grade a sentence on a scale from one to ten, for example, might result in participants spending a lot of time trying to fine-tune their opinion. This could create boredom after a while and does not encourage them to follow their intuition. Also, in investigating whether or not a sentence is found acceptable, these little discrepancies are not really important. Four options provide a clear way to say 'yes' or 'no' while still giving participants the chance to express some doubt.

After collecting responses, the answers of participants were grouped to get the frequencies of the four possible answers per category. As the goal was to find out whether or not the sentences are acceptable, and not how acceptable they are, these frequencies were grouped together further in the following way. 'Yes, I would use this sentence' and 'I think it is, but I would not use the sentence' were combined into the answer 'Yes'. 'Not really, the sentence is a bit awkward' and 'No, this is not a good sentence' were combined into the answer 'No'. The answers to the sentences with only the existential *er* were processed in the same way, to make sure those sentences could be compared within a category with their matching sentences where *er* had taken on multiple functions. Since there was now one categorical independent variable with two levels ('Yes' and 'No'), the chi-square test was applied to the frequencies.

3 Results

The objective of this study was to test whether there is a limit on the number of functions *er* can hold according to native Dutch speakers. To do this, participants were asked to evaluate a number of sentences. They got a small monetary reward if they completed the survey. In total, 20 people between the age of 18 and 64 participated. Of these twenty participants, thirteen were female and seven were male.

None of the data was excluded, since all participants seemed to have filled in the survey with care. This judgement is based on the fact that every participant evaluated the filler sentences that had an incorrect word order as unacceptable. Figure 3.1 shows the data. The rest of this section will discuss this data in more detail. First, the main results are

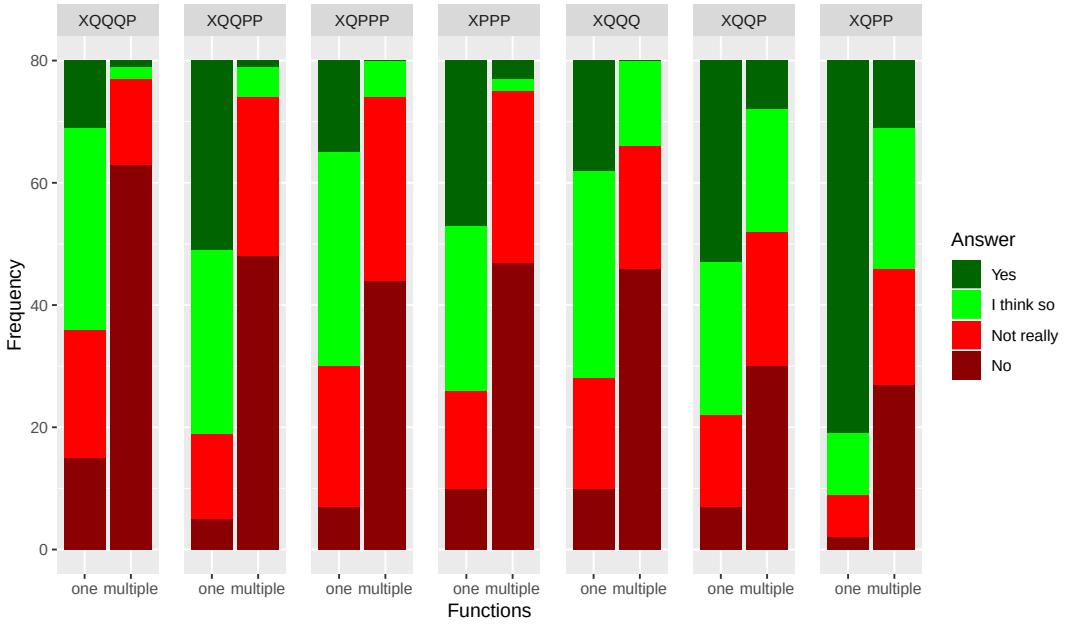

Figure 3.1: This figure shows the number times the sentences in a category were evaluated as unacceptable (in red) versus acceptable (in green) for both the sentences where *er* held multiple functions and the sentences where *er* held one function

presented and discussed. After that, some peculiar cases within categories are examined. The section concludes by taking a closer look at the patterns of acceptability and what factors might be generating them.

The data was processed in the following way. For each category, the frequencies of the four possible answers were determined. As mentioned before, four sentences were constructed in every category, so the total frequencies are the combined frequencies of all four sentences within that category. To see whether there is a limit on the number of functions *er* can hold, the most important thing was to look at whether the sentences where *er* held multiple functions were acceptable, and not necessarily whether people would actually use the sentences. Therefore, the frequencies of 'Yes, I would use this sentence' and 'I think it is, but I would not use the sentence' were combined to get the frequency for 'Yes', and the frequencies of 'Not really, the sentence is a bit awkward' and 'No, this is not a good sentence' were combined to get the frequency for 'No'. The resulting frequencies are shown in table 3.2.

As is visible from figure 3.1, in each category, the sentences where *er* held multiple functions were a lot less accepted than the sentences where *er* held only the existential function. To make sure these differences were significant, chi-square tests were performed. The results of this are shown in table 3.1. For all categories, it was the case that $p < .001$. This suggests that there is indeed a significant association between whether *er* held multiple functions and the acceptability of the sentence. These results

Table 3.1: The results of chi-square tests for the differences between the frequencies for the categories on whether *er* held multiple functions or one

Category	df	χ^2	P
XQQQ	1	37.24	<.001
XPPP	1	64.47	<.001
XQPP	1	37.93	<.001
XQQP	1	22.627	<.001
XQPPP	1	53.19	<.001
XQQPP	1	77.68	<.001
XQQQP	1	50.64	<.001

Table 3.2: The frequencies for every category that have been used for chi-square tests

Category		Yes	I think so	**Acceptable total**	Not really	No	**Unacceptable total**
XQQQ	er	0	14	14	20	46	66
	filled in	18	34	52	18	10	28
XPPP	er	3	2	5	28	47	75
	filled in	27	27	54	16	10	26
XQPP	er	11	23	34	19	27	46
	filled in	61	10	71	7	2	9
XQQP	er	8	20	28	22	30	52
	filled in	33	25	58	15	7	22
XQPPP	er	0	6	6	30	44	74
	filled in	15	35	50	23	7	30
XQQPP	er	1	5	6	26	48	74
	filled in	31	30	61	14	5	19
XQQQP	er	1	2	3	14	63	77
	filled in	11	33	44	21	15	36

indicate a limit on the number of functions a single overt *er* that native Dutch speakers find acceptable.

The number of functions do not seem to be the only thing driving the acceptability, however. Figure 3.1 shows that the acceptability for the category XPPP is much lower than for the category XQPP, for example, even though *er* holds four functions in both categories. Figure 3.1 also shows that, even though their is a large difference in acceptability within categories, this difference varies between categories. The possible explanations will be explored later on in this section.

Before trying to explain the patterns of acceptability, the frequencies per sentence were examined to see if the behaviour of the separate sentences in a category differed from the combined behaviour of those sentences. The separate sentences within a category generally showed very little divergence from the general pattern. The differences between the version of the sentence where *er* held one function and the version where *er* held multiple functions for each sentence within a category were very similar to each other. There were two exceptions to this. These sentences are shown in (6).

(6) a. Zijn er afgelopen week vijf mensen
Are there last week five people
met een helikopter op het dak van
with a helicopter on the roof of
dat gebouw geland? (S45)
that building landed?

"Did five people land a helicopter on the roof of that building last week?"

b. Zijn er afgelopen week vijf mee op geland? (S46)

c. Zij dachten te zien dat er een
They thought to see that there a
kind een paar knikkers tussen de
child a few marbles between the
deur en de stoel liet vallen. (S51)
door and the chair let fall

"They thought they saw a child drop a few marbles in between the door and the chair."

d. Zij dachten te zien dat er één een paar tussen liet vallen. (S52)

The first exception can be seen in figure 3.2. One sentence in the category XQPP was fully acceptable when *er* had one functions (S45), and was almost completely unacceptable when *er* held multiple functions (S46). The second exception can be seen in figure 3.3. A sentence in the category XQQP showed almost no difference between one (S51) and multiple (S52) functions for *er*. In both cases, the sentences behaved notably differently than the other sentences in that category. This is important to look at, in case there is an important reason behind it that might explain the behaviour of *er*. Both the thematic roles and the grammatical functions

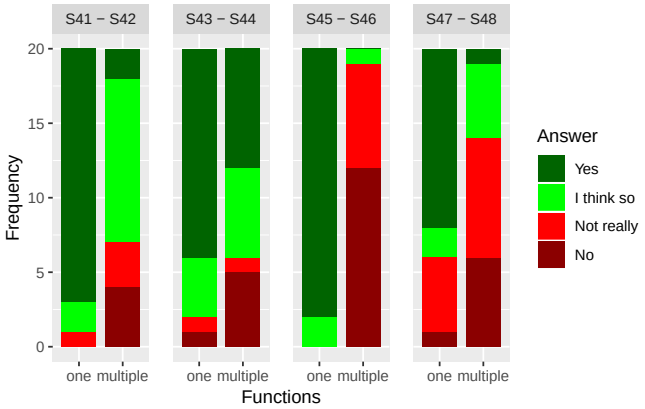

Figure 3.2: This figure shows the divergent behaviour of sentences number 45 and 46 in the category XQPP.

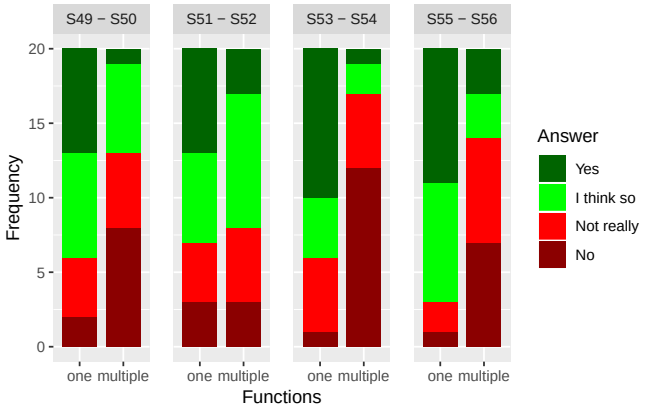

Figure 3.3: This figure shows the divergent behaviour of sentences number 51 and 52 in the category XQQP.

were checked again for these categories, which are summarised in table 3.3.

Firstly, the thematic roles used in the sentences in the category XQPP were all the same. The quantitative NP was the AGENT, the first PP was the INSTRUMENT, and the second PP was the LOCATION. Sentences 45 and 46 did not differ in this. The same goes for the sentences in the category XQQP. The first quantitative NP was the AGENT, the second quantitative NP was the THEME, and the PP was the LOCATION. Again, sentences 51 and 52 did not differ in this.

Secondly, the grammatical functions used in the sentences in the category XQPP were also all the same. The quantitative NP was the SUBJ, the first PP was an ADJ, and the second PP was an OBL_θ. This was the case for sentences 45 and 46 as well. The grammatical functions used in the sentences in the category XQQP were the following. The first quantitative NP was the SUBJ, the second quantitative NP was an OBJ_θ, and the PP was an OBL_θ. Sentences 51 and 52 did not divert from this.

Sentences 45 and 46 did differ from the rest in that the existential function was caused by turning it into a question rather than using a subclause. Sentences 51 and 52 differed in that their subclause was put in past simple, while the subclauses in the other sentences were put in a perfect tense. However, these differences were also present in other categories, but they did not cause any difference in behaviour there.

The sentences were checked again for possible mistakes as well, but none were found. Also, both of these sentences had their version where *er* held one function in the second half of the survey, and the version where *er* held multiple functions in the first half. As the two sentences showed opposite behaviour, this seems very unlikely to be a contributing factor. Finally, the verbs used in sentences 45/46 and 51/52 were not used in any of the other test sentences. The observed differences therefore seem to be due to lexical differences.

The results discussed so far have primarily been about differences in acceptability within categories.

Table 3.3: This table shows which thematic roles and which grammatical functions were chosen for the categories XQPP and XQQP.

Category		**Q**	**Q**	**P**	**P**
XQPP	thematic role	AGENT		INSTRUMENT	LOCATION
	grammatical function	SUBJ		ADJ	OBL_θ
XQQP	thematic role	AGENT	THEME		LOCATION
	grammatical function	SUBJ	OBJ_θ		OBL_θ

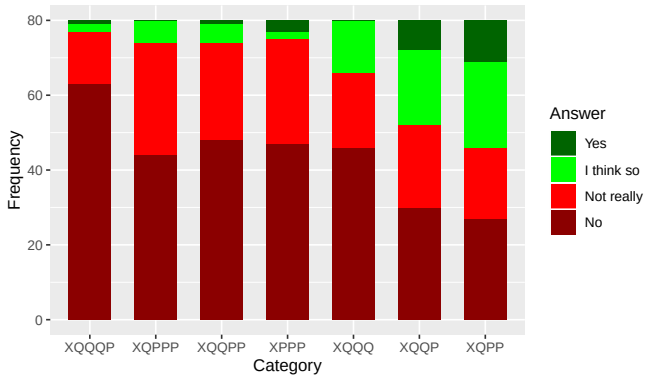

Figure 3.4: This figure shows how the sentences where *er* held multiple functions were evaluated.

However, as this study meant to make a start in uncovering the way *er* behaves, it is worth looking at the differences between categories as well. First, all categories were compared based on the sentences where *er* held multiple functions (see figure 3.4). These comparisons showed that the frequencies for the categories where *er* held either five functions (XQQQP, XQQPP, and XQPPP) in total or three of the same functions (XPPP, and XQQQ) were comparable and different from the remaining two categories (XQPP, and XQQP), which themselves had comparable frequencies. Every category was compared with every other category using a chi-square test. The results can be seen in table 3.4 and table 3.5.

From these tables, a few things can be observed. Adding a quantitative function does not always yield the same effect. There is almost no difference between XPPP and XQPPP, while there are significant differences between XQPP and XQQPP, and between XQQP and XQQQP. It is therefore difficult to tell what kind of influence a single quantitative function has. Adding a pronominal function always seems to make the sentences less acceptable, as can be seen from the comparisons XQQQ-XQQQP, XQPP-XQPPP, and XQQP-XQQPP. However, the difference between XQQQ and XQQQP is not as big as the other two differences. Also taking into account that one more function in general makes the sentence more complex and therefore expected to be less acceptable, the results of this study do not seem to be a reliable indicator of the influence of a single pronominal function either.

A possible reason for the differences in acceptability was the number of adjuncts and optional arguments. The results seem promising at first. The category with no adjuncts or optional arguments (XQQP) was significantly more acceptable than the categories with one adjunct or optional argument (XQQQ, XQPP, and XQQPP), $\chi^2(1) = 4.919$, p = .02656, which in turn are more acceptable than the categories with two adjuncts and/or optional arguments (XPPP, XQQQP, and XQPPP), $\chi^2(1) = 27.413$, p > .001. However, looking at the individual comparisons in table 3.5, XQPP, which has one adjunct, does not have a significantly different distribution from XQQP, which has no adjuncts, and XQQPP, which has one adjunct, does not have a significantly different distribution from the categories with two adjuncts and/or optional argu-

Table 3.4: The results of chi-square tests for the pairwise comparisons between the categories for the sentences in which *er* held multiple functions. The categories in bold are the more unacceptable categories.

Compared categories	df	χ^2	P
XQQQ - **XPPP**	1	4.838	.02785
XQQQ - XQPP	1	11.905	<.001
XQQQ - XQQP	1	6.328	.01189
XQQQ - **XQQQP**	1	7.964	.004772
XQQQ - **XQQPP**	1	3.657	.05583
XQQQ - **XQPPP**	1	3.657	.05583
XPPP - XQPP	1	28.515	<.001
XPPP - XQQP	1	20.196	<.001
XPPP - **XQQQP**	1	0.5263	.4682
XPPP - XQQPP	1	0.09762	.7547
XPPP - XQPPP	1	0.09762	.7547
XQPP - **XQQP**	1	0.948	.3302
XQPP - **XQQQP**	1	33.79	<.001
XQPP - **XQQPP**	1	26.133	<.001
XQPP - **XQPPP**	1	26.133	<.001
XQQP - **XQQQP**	1	25.006	<.001
XQQP - **XQQPP**	1	18.077	<.001
XQQP - **XQPPP**	1	18.077	<.001
XQQQP - XQQPP	1	1.0596	.3033
XQQQP - XQPPP	1	1.0596	.3033
XQQPP - XQPPP	1	0	1

Table 3.5: The p-values of chi-square tests for the pairwise comparisons between the categories for the sentences in which *er* held multiple functions. The arrows indicate which category was more unacceptable.

Category	**XQQQ**	**XPPP**	**XQPP**	**XQQP**	**XQQQP**	**XQQPP**	**XQPPP**
XQQQ	-						
XPPP	← .02785*	-					
XQPP	↑ <.001*	↑ <.001*	-				
XQQP	↑ .01189*	↑ <.001*	← .3302	-			
XQQQP	← .004772*	← .4682	← <.001*	← <.001*	-		
XQQPP	← .05583	↑ .7547	← <.001*	← <.001*	↑ .3033	-	
XQPPP	← .05583	↑ .7547	← <.001*	← <.001*	↑ .3033	1	-

ments. The number of adjuncts and optional arguments also do not provide a consistent pattern.

It should be noted, that even though the sentences where *er* holds one function are preferred over the sentences where *er* holds multiple functions, they were still evaluated as unacceptable a considerable number of times. Also, there are some differences between the sentences where *er* holds one function across the categories. Therefore, it seems important to compare categories based on the size of the difference between the sentences where *er* holds one function and the sentences where *er* holds multiple functions. Both figure 3.1 and the χ^2 values in table 3.1 show that the category XQQPP has the greatest difference, and that the category XQQP has the smallest difference. Interestingly, although XQQQ is significantly more unacceptable than XQPP according to the sentences where *er* holds multiple functions alone, their decrease in acceptability (comparing one function for *er* to multiple functions for *er*) is almost identical.

The main goal of this study was to find out how the number of functions that one *er* holds affects the acceptability of sentences. The expectation was that the number of functions and possibly the number of arguments would play a big role in the acceptability. These two factors were discussed, but they do not seem to explain the results completely. Therefore, other factors might possibly have an influence as well. The next section does provide some possible explanations for the gradient effect in the results, but these are merely speculations. Formal analyses of these speculations are beyond the scope of this project. However, the results of this study, together with the discussion of possible factors in the next section, can serve as a guide for future research.

4 Discussion

This study set out to explore the behaviour of *er* when *er* holds multiple functions. To do this, native Dutch speakers were asked to evaluate sentences where *er* held either one function or four or five functions. The results showed a number of things, which will be discussed in more detail below. First, the research question will be answered. Second, the gradient in acceptability seen in the results will be compared to the expected gradient, followed by another noteworthy aspect of the results. After that, possible methodological issues are discussed. This section concludes by discussing possible implications of this study and future directions.

The results suggest that there is a limit on the number of functions of a single overt *er* that native Dutch speakers find acceptable, as for all categories, the sentences were less often accepted when *er* held multiple functions than when *er* held only one function. In particular, native Dutch speakers do not seem to agree with the notion of Webelhuth and Bonami (2019) that *er* can hold four functions.

The differences in acceptability between categories show that there is in fact a gradient, but it is not quite clear what is driving it. The expectation was that a gradient in the acceptability would occur based on the number of adjuncts and optional arguments in the sentences of each category. If this were the case, the categories where the sentences had two optional arguments and/or adjuncts (XQPPP, XQQQP, and XPPP) would be

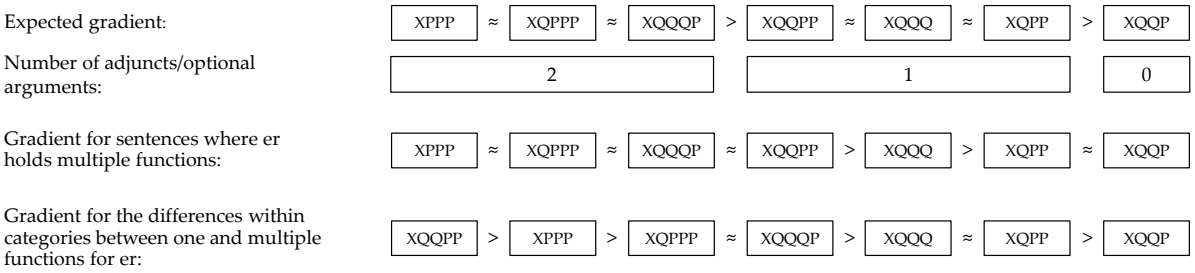

Figure 4.1: Overview of gradient phenomena.

accepted the least, the category where the sentences had no optional arguments and/or adjuncts (XQQP) would be accepted the most, and the categories where the sentences had one optional argument or adjunct (XQQQ, XQQPP, XQPP) would score somewhere in between, as illustrated in the first line of figure 4.1. This is not quite the case, however, as can be seen from comparing the third line with the first in figure 4.1. The sentences in XQPP where *er* held multiple functions were far more accepted than expected, and the sentences in XQQPP where *er* held multiple functions were less accepted than expected.

Another way to judge the gradient is to look at the differences between sentences where *er* held one function and sentences where *er* held multiple functions, which is shown in the fourth line of figure 4.1. This does show the expected gradient a little better, as category XQQP shows the smallest difference, XQQQ and XQPP show differences that are bigger than XQQP and almost identical to each other, and the rest of the categories show even bigger differences than that. However, the category XQQPP still is an exception to the expected gradient, since that category was expected to show results similar to XQQQ and XQPP.

This does not necessarily mean that idea behind the prediction was wrong. However, the fact that the acceptability of all categories where *er* held five functions were very low does suggest that the number of functions in itself is an important factor for acceptability. In line with that, it also seems that categories where *er* held three of the same functions (XQQQ and XPPP) had a very low acceptability despite there being only four functions for *er* to hold.

Another pattern that the results showed is that participants seemed to be more sure of the unacceptability of sentences in the categories with three quantitative functions, so XQQQP and XQQQ, relative to the sentences in other categories. In other words, the sentences in these categories received a 'No' quite often relative to the amount of times they received a 'Not really'. In addition to that, no sentence in the category XQQQ received a 'Yes' as an answer.

A possible explanation is that the sentences in the categories XQQQP and XQQQ require a subject for the first quantity, an indirect object for the second quantity, and a direct object for the third quantity. The first quantity would then be the AGENT, the second quantity would be the BENEFACTIVE (or RECIPIENT), and the third quantity would be the THEME. This can give rise to quite complex sentences. (7) is a simplified example without quantities that shows why these type of sentences can be difficult to understand for people.

(7a) shows how the thematic roles would occur in sentences like the ones that were used in this study. The AGENT is directly followed by the RECIPIENT, which in turn is directly followed by the THEME. However, the RECIPIENT is optional. In (7b), it is removed, but the sentence is still correct. Furthermore, in Dutch it is generally preferred, if the RECIPIENT is included, to move it to the end of the sentence, just like in (7c). In the sentences where *er* has three quantitative functions, all three quantities will appear right next to each other, as in (7a). However, given that the THEME generally follows the AGENT in Dutch, as in examples (7b) and (7c), participants might (initially) read the second quantity as the THEME, but then the third quantity does not fit in the sentence anymore. This possible confusion might be a reason for the preference for the 'I think so' and 'No' answers rather than the 'Yes' and the 'Not really' answers.

(7) a. ... dat zij (AGENT) hem
... that she (AGENT) him
(RECIPIENT) een kaart (THEME)
(RECIPIENT) a card (THEME)
gaf.
gave
" ... that she gave him a card."

b. ... dat zij (AGENT) een kaart
... that she (AGENT) a card
(THEME) gaf.
(THEME) gave
" ... that she gave a card."

c. ... dat zij (AGENT) een kaart
... that she (AGENT) a card
(THEME) aan hem (RECIPIENT)
(THEME) to him (RECIPIENT)
gaf.
gave
" ... that she gave a card to him."

The aim of this study was to get the opinion of native Dutch speakers, and the possibility exists that twenty participants were not enough to capture the opinion of the whole population accurately. Also, the sentences where *er* held only one function were deemed less acceptable than expected. It would therefore be worth exploring whether those sentences can be constructed in such a way that they are (almost) completely acceptable for future research.

Another important goal of this study was to set out some of the factors that might influence the behaviour of *er*. This study has shown that there is a lot more to the behaviour of *er* than theory shows and takes into account, and that *er* is worth exploring further in future research. One thing to note, for example, is that, even though the native speakers do not like it when *er* holds four functions, this idea might still be grammatically correct. It could be that people simply cannot process that amount of functions. If that is the case, then adding prosody to the sentences might help. The implicit prosody hypothesis states that people read sentences with a certain prosody even when they are reading silently (Fodor, 1998, 2002). If this does not match the intended prosody, it might cause them to misread the sentence and evaluate it as unacceptable. Example (8a) shows this phenomenon.

(8) a. I hear that girl who is humming tunes pianos.

b. I hear that girl, who is humming, tunes pianos.

The word 'humming' often takes an argument, namely the thing that is being hummed. When you expect such an argument while reading, you will very likely put the stress on 'tunes' rather than on 'humming'. However, now the word 'pianos' is left, and makes the sentence seem ungrammatical. Also, 'that' can in this case be mistakenly seen as the start of a subclause rather than a demonstrative pronoun. This can also lead to undesired prosody, since 'girl' would not be stressed it the case of a subclause, but should be stressed in order for this sentence to be comprehensible.

Adding the desired prosody, either by having the sentences be read out or by adding punctuation marks, might therefore improve acceptability. In sentence (8b), the commas indicate which words should be stressed and which words belong together. This makes it a lot easier for the reader to understand the sentence the first time they read it.

In addition to that, it could be possible to look more closely into the limit of the number of functions for *er* by also having people evaluate intermediate sentences. In this experiment, matching pairs were used, where *er* held one function in one sentence and four or five in the other. Also asking people to evaluate the same sentence while adding another function for *er* one function at a time could help to understand exactly when and why the sentence becomes unacceptable.

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Appendix

This is a list of all test sentences used in this study. The sentences are ordered by category and the thematic roles chosen for these categories are stated together with the category.

XQPPP: AGENT, INSTRUMENT, PURPOSE, LOCATION

1. Ik zag dat er vijf mensen met de auto voor die aanbieding naar de supermarkt toe zijn gereden.
2. Ik zag dat er vijf mee voor naartoe zijn gereden.
3. Op het nieuws zeiden ze dat er 300 soldaten met de speciale wapens voor het bevrijden van de gevangenen op de legerbasis af zijn gestormd.
4. Op het nieuws zeiden ze dat er 300 mee voor op af zijn gestormd.
5. Is er gisteren een leerling met dit plan voor het terughalen van zijn mobieltje langs de leraren geglipt?
6. Is er gisteren één mee voor langs geglipt?
7. Elk jaar is er een actie waarbij er een paar beroemde mensen zich met deze sleutel voor het goede doel in dit huis laten opsluiten.
8. Elk jaar is er een actie waarbij er een paar zich mee voor in laten opsluiten.

XQQPP: AGENT, THEME, INSTRUMENT, LOCATION

9. Ik geloof dat er drie kinderen een heleboel rozen met jouw handschoenen uit de tuin aan het trekken zijn.
10. Ik geloof dat er drie een heleboel mee uit aan het trekken zijn.
11. Heeft er echt maar één iemand drie paarden met de longeerzweep in de stal gekregen?
12. Heeft er echt maar één drie mee in gekregen?
13. Hij beweert dat er twee vrijwilligers vijf kittens met een mand over de muur hebben getild.
14. Hij beweert dat er twee vijf mee overheen hebben getild.
15. Anna vertelde dat er drie studenten een paar van die grappige briefjes met mijn lijm aan het krijtbord vast hebben geplakt.
16. Anna vertelde dat er drie een paar mee aan vast hebben geplakt.

XQQQP: AGENT, BENEFACTIVE, THEME, INSTRUMENT

17. Paul zei dat er een paar leraren twintig leerlingen een diploma met de kolentang overhandigden.
18. Paul zei dat er een paar twintig één mee overhandigden.
19. Peter zegt dat er een leraar een paar studenten een aantal foto's met die projector liet zien.
20. Peter zegt dat er één een paar een aantal mee liet zien.
21. In de krant stond dat er drie mannen vijftig vrouwen een hele hoop brieven met die postdienst hebben gestuurd.
22. In de krant stond dat er drie vijftig een hele hoop mee hebben gestuurd.
23. Wij hoorden dat er gisteren twee mensen een aantal kinderen een heleboel verhalen met een microfoon hebben voorgelezen.
24. Wij hoorden dat er gisteren twee een aantal een heleboel mee hebben voorgelezen.

XQQQ: AGENT, BENEFACTIVE, THEME

25. Ik weet dat er iemand een paar verpleegsters een heleboel bloemen wil geven.
26. Ik weet dat er één een paar een heleboel wil geven.
27. Ik hoorde dat er twee studenten een aantal bibliotheken een paar boeken hebben geschonken.

28. Ik hoorde dat er twee een aantal een paar hebben geschonken.
29. Kunnen er twee mensen een aantal toeschouwers een hoop t-shirts toewerpen?
30. Kunnen er twee een aantal een hoop toewerpen?
31. Wist je dat er een paar winkels twintig mensen twee gratis tablets gaan aanbieden?
32. Wist je dat er een paar twintig twee gaan aanbieden?

XPPP: INSTRUMENT, PURPOSE, LOCATION

33. Kan er iemand met mijn fiets naar de winkel gaan voor wat wortels?
34. Kan er iemand mee voor naartoe gaan?
35. Hij dacht dat er niemand met een krukje voor het uitzicht op de muur wilde klimmen.
36. Hij dacht dat er niemand mee voor op wilde klimmen.
37. Ik hoop dat er iemand met die stok voor het terughalen van de bal over de sloot kan springen.
38. Ik hoop dat er iemand mee voor overheen kan springen.
39. Er worden pakketten met een krat voor het goede doel naar dat land gestuurd.
40. Er worden pakketten mee voor naartoe gestuurd.

XQPP: AGENT, INSTRUMENT, LOCATION

41. Ik geloof dat er een paar jongens met de grasmaaier over het veld rijden.
42. Ik geloof dat er een paar mee overheen rijden.
43. Het kan zijn dat er een aantal gevangenen met deze kniptang door het hek heen zijn gekomen.
44. Het kan zijn dat er een aantal mee doorheen zijn gekomen.
45. Zijn er afgelopen week vijf mensen met een helikopter op het dak van dat gebouw geland?
46. Zijn er afgelopen week vijf mee op geland?
47. Ik zag dat er drie studenten iets met deze emmer in de put lieten zakken.
48. Ik zag dat er drie iets mee in lieten zakken.

XQQP: AGENT, THEME, LOCATION

49. Emma zei dat er twee meisjes drie snoepjes uit de kom gepakt hebben.
50. Emma zei dat er twee drie uit gepakt hebben.
51. Zij dachten te zien dat er een kind een paar knikkers tussen de deur en de stoel liet vallen.
52. Zij dachten te zien dat er één een paar tussen liet vallen.
53. Iemand zei dat er twee agenten zestien demonstranten in die cel hadden opgesloten.
54. Iemand zei dat er twee zestien in hadden opgesloten.
55. Hij dacht dat er twee mensen een aantal stenen tegen het raam hadden gegooid.
56. Hij dacht dat er twee een aantal tegenaan hadden gegooid.