

# The Influence of Focus on Conditional Perfection\*

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**Abstract** This paper is a replication of the study on the influence of focus on Conditional Perfection (CP) by [Farr \(2011\)](#). The hypothesis by Farr regarding focus influencing CP was tested in an online-experiment.

## 1 Introduction

Conditional Perfection (CP) is described by many researchers as the interpretation of a conditional sentence as a biconditional if specific conditions are met ([Cariani & Rips 2016](#), [Farr 2011](#), [Herburger 2016](#)). Those conditions cover the inference from an utterance (1-a) to either utterance (1-b) or (1-c) as shown in (1).

- (1) a. If you sleep enough, you will be rested tomorrow.
- b. Only if you sleep enough, you will be rested tomorrow.
- c. If you do not sleep enough, you won't be rested tomorrow.

As [von Fintel \(2001\)](#) notes, *if p, q*, *if not p, not q*, and *if and only if p, q* are part of the meaning conveyed by sentences with CP. Even though [Horn \(2000\)](#) concludes his paper by saying that he spoke the last words on CP and hence, according to his view, everything is said, there are still other observations and other research regarding CPs.

As an example, Farr furthermore investigates CP, as a pragmatic phenomenon and as a scalar and quantity implicature.

### 1.1 Pragmatic Phenomenon

[Farr \(2011\)](#) argues that in order to not change the semantics of the present conditionals, it has to be assumed that CP is a pragmatic rather than a semantic phenomenon.

One evidence is the use of Biscuit Conditionals (BC) ([Sano & Hara 2015](#), [Siegel 2006](#), [Farr 2011](#)). BCs are described by [Elder \(2019\)](#) as a special form of conditionals, where consequent and antecedent are conditionally independent. Farr

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\* We thank ...

also states that those conditionals arise in two conditionally unrelated statements as in (2).

- (2) a. If you are hungry, there is food on the table.
- b. If you are not hungry, there is no food on the table.

Whether or not there is food on the table has nothing to do with the hunger of the addressee (Siegel 2006), therefore, as Farr states too, (2-a) and (2-b) are unrelated and no inference is invited. That is, the antecedents (i.e., '*If you are hungry*' and '*If you are not hungry*') are independent from the respective consequents (i.e., '*there is food on the table*' and '*there is no food on the table*'). As furthermore noted by von Fintel (2011) BCs do not specify any condition inferring the truth of the consequence.

Another evidence pointed out is that there exists a usually cancelable inference between conditionals such as in (3).

- (3) a. If study for the exam, you will pass the course.
- b. But also if you do all homework.

The introduction of a second condition for passing the course, cancels the inference in (3-a) such that it does not remain the only condition fulfilling the requirement.

The aforementioned statements are listed by Farr to underline the hypothesis that CP falls under pragmatic inferences.

## 1.2 Scalar Implicature

Implicatures are described by Papafragou & Skordos (2016) as the parts of the meaning that are meant but not directly said such as in (4-a)—where (4-a) implies (4-b), otherwise the utterance present in (4-a) would not be informative enough (Spychalska et al. 2016). The term 'scalar' moreover only adds a scale of information such as the quantifiers *some* and *all* as shown in (4). Additionally, both truths are compatible with one another since the meaning of *some* infers that possibly *all* things are meant (Spychalska et al. 2016). Scalar implicatures (SIs) can therefore be drawn from the amount of expressed information Farr (2011).

- (4) a. Peter did some homework.
- b. Peter did not do all homework.

In (4) the SI is present in (4-b) with an informational scale from *all* and *some* (Papafragou & Skordos 2016). Furthermore, the usage of *some* in (4-a) is interpreted as '*not all*' (Panizza & Chierchia 2011) and the implicature can directly be canceled if another phrase is added stating that Peter did all homework. Nevertheless, the

utterance of the weaker statement, containing *some*, expresses the fact that the speaker does not actually believe in the stronger statement Farr (2011), Papafragou & Skordos (2016). This would then be the opposite effect of what is happening in CP Farr (2011).

In order to state that CP is no SI, Farr discussed the attempts of Atlas & Levinson (1981), van der Auwera (1997), and Horn (2000). Farr criticises (Atlas & Levinson 1981)'s scale showing that *if and only if p, q* is the stronger statement to *if p, q*. Reasons for this are the complexity of the statement placed on top (i.e., *if and only if p, q*), as well as the fact that other scalar terms such as those discussed above (i.e., *some but not all*) exclude the given statement and hence the same should happen for CP.

Furthermore, the attempt by van der Auwera (1997) shown in Table 1 is ruled out as well due to its weakness. Farr states that for every antecedent in a statement, it would have to be justified that they will not cause q which is not suitable to present the argumentation in the context of CP.

	...
	<i>if p, q and if r, q and if s, q</i>
	<i>if p, q and if r, q</i>
	↑ <i>if p, q</i>
<b>Table 1:</b>	van der Auwera (1997)'s approach (cf. Farr (2011))

Lastly, (Horn 2000) proposes an approach based on pragmatic strengthening (cf. Table 2).

	<i>q /Whatever the case, q</i>
	↑ <i>if p, q</i>
<b>Table 2:</b>	Horn (2000)'s approach (cf. Farr (2011))

According to Farr, this proposal only shows that *q* is not absolutely true, but leaves out whether there exist conditions yielding the truth of *q*.

Therefore, the above-mentioned examples conclude that CP is no SI.

### 1.3 Quantity Implicature

Farr furthermore states that CP is a quantity implicature (QI) following van Rooij & Schulz (2004)'s and Schulz & Rooij (2006)'s theory of a *closed world assumption* for an exhaustive reasoning using minimal models.

- (5) a. Q: Who eats?  
A: Gregory and Maisy eat.

- b. Gregory and Maisy but no one else eats.

$M_1$	$M_2$
Individuals = {Gregory, Leo, Maisy, Ted}	Individuals = {Gregory, Leo, Maisy, Ted}
$\llbracket \text{eat} \rrbracket^{M_1} = \{\text{Ted}\}$	$\llbracket \text{eat} \rrbracket^{M_2} = \{\text{Leo}\}$
$M_3$	$M_4$
Individuals = {Gregory, Leo, Maisy, Ted}	Individuals = {Gregory, Leo, Maisy, Ted}
$\llbracket \text{eat} \rrbracket^{M_3} = \{\text{Gregory, Maisy}\}$	$\llbracket \text{eat} \rrbracket^{M_4} = \{\text{Gregory, Maisy, Leo}\}$

**Table 3:** Minimal models following the examples given by Farr (2011)

Table 3 shows potential models for the given context in (5-a) while only  $M_3$  provides the desired exhaustive interpretation. Attention is furthermore drawn to the focus, i.e., that exhaustification only applies to the focused terms. This in turn leads to different models being minimal for various backgrounds (Farr 2011).

#### 1.4 Conditional Perfection Predictions

The above-mentioned examples pose different conditions and predictions for CP. Following the last point mentioned, referring to QI, CP is related to exhaustification and hence minimal models. This stresses the exhaustificational and non-exhaustificational interpretation of contexts.

Referring to the example given in Table 4, the following contexts would be part of the interpretation of focus.

- (6) a. Friend: What happens if you have an A average?  
b. Marie: If I have an A average, **I get 50€**.
- (7) a. Friend: When will you get 50€?  
b. Marie: **If I have an A average**, I get 50€.

The situation given in (6) (i.e., the ‘*what-if-p*’-condition) puts the focus on the consequent (marked in bold). The corresponding minimal model would simply contain a situation where reaching the A average only results in earning 50€. In the situation in (7) (i.e., the ‘*when-q*’-condition) instead, the focus lies on the antecedent (marked in bold) which means the minimal model refers to a situation in which 50€ are only earned with an A average—in this case CP is expected.

## 2 Inspection of the Experiment

The purpose of the experiment was to replicate the study conducted by Farr (2011) and to investigate the corresponding assumption that focus influences CP.

The experiment in the form of a truth-value judgment task (TVJT) consisted of six minimal context pairs representing an everyday situation and only differing in the question posed. Following Farr’s experimental design, the questions were asked in the form *what-if-p* or *when-q*, i.e., the German counterparts *was-wenn-p* or *was-falls-p* and *wann-q* respectively. Moreover, the questions following the *when-q*-condition did not contain temporal markers in any case to raise a conditional reading (cf. (Farr 2011)). This should make sure to not confuse the reader, i.e. contexts following the construction ‘If p, q’ should not surprise the reader.

The survey contained six test items which were split into two parts with three items asking *what-if-p* questions, the other three *when-q* questions.

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Marie is about to graduate from elementary school. Marie’s grandfather has promised her that she will receive €50 if she gets an A average. When Marie visits her aunt, the two negotiate that if she gets an A average, they will go on a trip to the amusement park together, and if she gets a B average, Marie will get 50€ as a gift.

Her best friend curiously asks Marie about the reward.

<i>what-if-p</i>	<i>when-q</i>
Friend: What happens if you have an A average?	Friend: When will you get 50€?

Marie: If I have an A average, I get 50€.

Is Marie’s answer true? [Yes] [No]

**Table 4:** Example for test item with both *what-if-p* and *when-q* answer

Table 4 shows an example for a context followed by the corresponding question used in the experiment<sup>1</sup>. In the given example construction, the antecedent is present in the phrase ‘*If I have an A average*’, i.e., the *p*-part of the *what-if-p*-construction, while the consequence is represented as the phrase ‘*I get 50€*’, i.e., the *q*-part of the *when-q*-construction.

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<sup>1</sup> The contexts given in Table 4, Table 5, and Table 6 are only direct translations of the real context and question—the original items were still given in German. One of the contexts used was a translation of the example given by Farr.

No further distinction was made between questions posed in German with *was-wenn-p* or *was-falls-p* constructions. Whether or not a subject received a question with either *what-if-p* or *when-q* construction was randomly assigned.

Furthermore, six fillers were provided checking whether the subjects in general understood the conditional answer to the proposed question—three of those fillers were *conditional fillers*, three were *exhaustification fillers*. Compared to the test items, the conditional fillers contained only one antecedent for each consequent present in the text. True fillers correctly corresponded to the situation described in the context, while false fillers gave the wrong antecedent for the given consequence. The items were shuffled in a way that no more than two test items and two fillers were presented in a row.

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Ahmad, Stephan and Elena want to go to the cinema together. Anna would also like to come, but she can only confirm or cancel tomorrow. There is a choice between a comedy and a horror film. Anna hates horror movies and the group has agreed that they will watch a horror movie without Anna and choose the comedy with Anna.

Stephan asks again.

Stephan: When do we watch the horror movie?

<i>true</i>	<i>false</i>
Ahmad: If Anna doesn't come to the, movies with us we watch a horror movie.	Ahmad: If Anna comes with us, we watch a horror movie.

Is Ahmad's answer true? [Yes] [No]

**Table 5:** Example for conditional filler with both *true* and *false* answer

Table 5 gives an example situation for a conditional filler. As shown in the given example, the response '*If Anna comes with us, we watch a horror movie*' clearly gives the wrong antecedent, since Anna does not like horror movies.

The fillers were intentionally provided with clear statements to ensure the effect they should have to check whether subjects understand conditional readings properly.

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Rachel is a big fan of her home soccer club, which currently plays in the 2<sup>nd</sup> league. But she rarely goes to games, they are often too boring for her in the 2<sup>nd</sup> league. However, if her club were to be relegated, she would show solidarity and buy a season ticket for the stadium in support. Rachel hopes that her club will eventually be promoted to the 1<sup>st</sup> league. She would also buy a season ticket then, because games

in the Bundesliga are bigger and the atmosphere in the stadium is more exciting.

Her friend inquires with Rachel.

Friend: When are you going to buy a season ticket?

<i>true</i>	<i>false</i>
Rachel: Only if the club is promoted or relegated I buy a season ticket.	Rachel: Only if the club gets promoted, I will buy a season ticket.

Is Rachel's answer true? [Yes] [No]

**Table 6:** Example for exhaustification filler with both *true* and *false* answer

Table 6 furthermore shows an exemplary situation for an exhaustification filler.

Exhaustification fillers contained two conditions leading to the same consequent. In the true filler, both condition are provided while in the false filler only one condition is given.

Furthermore, the distribution of true and false fillers was evenly distributed with three true and three false fillers.

On every separate question, the participants were asked to simply answer the question in a TVJT manner, i.e., judge whether the given statement appropriately describes the situation described in the context (*true* or *false*) (Gordon & Crain 2005).

## 2.1 Experimental Procedure

As in the original experiment by Farr (2011) the experiment was carried on in German. Overall, the experiment took around 15 minutes in total—the subjects were nevertheless free to process the study in their own pace.

A blinding in form of a within-participants manipulation was used<sup>2</sup>. Furthermore, the participants who took part in the experiment received a link<sup>3</sup> to the experiment conducted in an online environment. There was no direct contact between experimenters and subjects. In addition, the experiment is designed within-subjects with one factor, but two levels of the question type (i.e., *when-q* and *what-if-p*). Moreover, the items were pseudo-randomized beforehand such that no more than two fillers or test items appeared consecutively and the question types '*when-q*' and '*what-if-p*' were assigned pseudo-randomized per test item. Nevertheless, all participants see all experimental items.

<sup>2</sup> The participants were not informed about this manipulation.

<sup>3</sup> <https://zen-dubinsky-bd6191.netlify.app/>

The first two slides of the experimental setup contained general information regarding the procedure and written instructions for the proceeding of the whole experiment. Other than in the original paper, no oral instructions were given since the experiment was completed online only. Inside the questionnaire itself, there were four steps per slide. With the first click on each slide, the text describing the experimental situation appeared. The second and third click revealed the internal question and answer respectively. In the last step, the overall true-false-answer appeared. Every information appearing on the slide lasted until the question was answered. At the end of the whole experiment, participants were provided with a slide asking for background information on knowledge of logic and pragmatics as well as whether the participants were native speakers of German. In addition, there was a text field for comments.

Furthermore, data collection was stopped at midnight of the **14<sup>th</sup> DAY—possibly change** after starting the collection through announcements via email.

## 2.2 Participants and Preprocessing

All participants were contacted privately and did not receive any expense allowance. Furthermore, no restriction on age, profession, gender, sexuality or anything else was made. Participants are allowed to take part only once. There were **INSERT NUMBER** participants in total.

Prior to the final analysis the participants' data was checked for exclusion of individual subjects or items. **INSERT NUMBER** participants were excluded due to prior knowledge of logic or pragmatics. Moreover, **INSERT NUMBER** subjects had to be precluded since they were no German native speakers. **INSERT NUMBER** participants did not answer three or more fillers correctly and were therefore excluded. In addition, a time restriction was set internally such that items answered in less than 10s, independent of the participant, were precluded too. Due to this restriction, **INSERT NUMBER** items were ruled out. Therefore, the data of **INSERT NUMBER** subjects and **INSERT NUMBER** items was evaluated.

## 2.3 Analysis Procedure

The question type of each test item was manipulated and treated as a 2-level factor with the default/reference level as '*when-q*'. It was furthermore measured whether the given answer to the TVJT was *positive* or *negative*, i.e., '*yes*' or '*no*'.

For the analysis, a Bayesian logistic regression model (Octaviani et al. 2019) which is based on Bayes' theorem (Berrar 2018) was run in R. The corresponding independent variable was assigned to the question type (i.e., '*when-q*' and '*what-if*-



$p'$ ) to analyze the effect on the dependent binary variable representing the response on the TVJT given by each participant (i.e., ‘yes’ and ‘no’).

Moreover, the analysis is based on the ‘*brms*’ package<sup>4</sup> which provides functionalities to specify many single- as well as multi-level Bayesian models and a framework concentrating on multi-level regression models (Bürkner 2018).

## 2.4 Results

## 2.5 Discussion

## 3 Conclusion

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