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Focused Counterfactuals*

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Abstract. It has long been noticed that focus is able to influence the truth-conditions of counterfactual conditionals. Namely, stressing different parts of a counterfactual leads to distinct interpretations. However, existing theories, such as those by von Fintel and Rooth, fail to adequately account for this phenomenon. In this paper, I exposit the drawbacks of these theories and then propose a novel account, i.e. the Good Question-Answer (GQA) view. The GQA account posits that focus triggers question-answer pairs, and pragmatic pressures concerning the adequacy of such question-answer pairs in contexts are able to affect the truth-conditions of counterfactuals. I also argue for the GQA account by appeal to its theoretical virtues.

1 Introduction

By compositionality, the meaning of a whole sentence is determined by the meanings of its parts and the way they are combined. However, here is an example where compositionality is apparently violated due to the effect of focus. (Capital words are focused – stress them when you read.)

> [Marriage] Clyde and his girlfriend Bertha don't like close relationships. They see each other only twice a year, and they don't want to get married, etc. However, Clyde found that if he were to get married soon, he would inherit a great amount of money. Then he married Bertha and got the money, while expecting that their "loose" relationship would continue. (Adapted from [7].)

(1) If Clyde hadn't MARRIED Bertha, he wouldn't have inherited the money.

(2) If Clyde hadn't married BERTHA, he wouldn't have inherited the money.

When uttered in the context, (1) sounds true while (2) sounds false, and as a consequence, they have different meanings. This is mysterious – how can focusing on a word, i.e., saying one word with more force, affect the conditions under which either sentence is true?

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This example calls for an explanation of the truth-conditional effect of focus on counterfactuals ("the focus effect" for short).[1] To that end, one must decide between a semantic account and a pragmatic one. The latter is pursued by the majority of extant accounts in the literature. Among them, [12] and [27] are two prominent accounts of the focus effect that specifically address the focus-sensitivity of counterfactuals. Both account propose that the truth-conditional difference exhibited in (1) and (2) is due to a pragmatic effect of focus on the relevant counterfactual situations selected for evaluating those counterfactuals. However, as I will argue, the success of these accounts in dealing with this specific example is a coincidence: they provide correct predictions because (1) and (2) involve negative antecedents; unfortunately, there are minimal pairs of counterfactuals with positive antecedents which also display the focus effect, and neither von Fintel's account nor Rooth's is applicable to them.

Given that, the objective of this paper is to offer a new pragmatic account that works. It is called the Good Question-Answer view (GQA henceforth), which consists of two parts. First, GQA takes every focus-involving clause as answering a certain question, depending on which constituent in the clause is focused, and in that sense each focus-involving clause encodes a question-answer pair. Second, GQA implies that certain pragmatic constraints govern whether the question-answer pair signaled by such a clause stands in a pragmatically adequate relation to the context. Namely, the pragmatic constraints determine whether it is a *good* question-answer pair with respect to the context. Once the pragmatic constraints are clear, it is common place that speakers can assume the pragmatic adequacy of a given utterance of a counterfactual and make inferences about what the context should be like according to those constraints. Consequently, different focus patterns can lead to different resolutions of the context, and thus focus is able to affect truth-conditions in an indirect way, given that the truth-condition of counterfactuals are context-sensitive.

As the focus effect is explained by GQA, this pragmatic account has several desirable features. First, since the account is pragmatic and it is compatible with the standard similarity-based semantics for counterfactuals, it relieves the burden of giving a drastically new semantics for counterfactuals to accommodate the focus effect. Second, GQA is also a conservative augmentation to whatever semantic theory one favors. For the most part, the literature on counterfactuals has been overlooking the effect of focus, and example sentences are put in the written form without explicit

[1]This effect of focus on truth-conditional meanings has been observed in a variety of other expressions as well. To mention some: adverbs of quantification (*always*, *usually*,...), auxiliary modal verbs (*must*,...), attitude verbs (*believe*, *know*...), determiner quantifiers (*many*, *most*,...), exclusives (*only*,...), and additives (*too*, *even*,...). Given the shear diversity, it could be the case that there is no uniform way to explain how focus contributes to truth-conditional content. For example, [2] propose a hybrid model, according to which the focus effect displayed in various expressions is realized by three distinct semantic or pragmatic mechanisms. However, the scope of this paper is restricted to counterfactuals, the focus effect on which presumably deserves a uniform explanation.

focus markings. Indeed, in a vast amount of cases, popular semantic theories, such as the Stalnaker-Lewis semantics, are (arguably) successful in making the truth evaluations correct. One might worry that a further add-on theory of pragmatics would spoil the achievements of these semantic theories. As I will argue, GQA is a conservative augmentation: insofar as counterfactuals in the written form are taken as bearing sentential focus or no focus, this pragmatic theory will preserve whatever truth-value predictions given by the semantic theories. In sum, GQA is a pragmatic theory that is not only able to explain the focus effect, but also fits into a bigger picture that includes the semantics of counterfactuals.

This paper concerns only with minimal pairs that display the focus effect, e.g. (1) and (2). However, I would like to mention here that the proposed account, GQA, has a greater scope of application. For example, in my [8, 9, 10], it is applied to the puzzle about whether counterfactuals with true components invariably true, the puzzle of the validity of Simplification of Disjunctive Antecedent (SDA, $\varphi \vee \psi > \chi \vdash \varphi > \chi$), and the truth-conditional effect of contrast clauses in knowledge attribution sentences. I will not rehearse how GQA works in these issues, while just noting that GQA is not merely an account of this specific phenomenon of the focus effect but a potentially more fruitful pragmatic theory.

The remainder of this paper is organized as follows. In Section 2, I introduce a common theoretic framework that many pragmatic accounts of focus in the literature share (§2.1), examine two extant accounts of the focus effect on counterfactuals (§2.2), and argue that they both fail (§2.3). Section 3 formulates the pragmatic theory GQA (§3.1) and applies it, together with some minimal semantic assumptions about counterfactuals (§3.2), to the explanation of the focus effect (§3.3). Also, I argue for some theoretical virtues of the proposed account (§3.4). In Section 4, I conclude.

2 Theories of Focus and Focused Counterfactuals

2.1 A common ground theory

The common ground theory of focus that I shall present is intended to answer two questions. First, what interpretation does focus induce? Second, how is the focus effect possible, i.e. how could focus be able to influence the truth-conditions of some sentences? In the common ground theory, the first question is answered by Alternative Semantics, the gist of which is that focus serves to induce a set of alternatives. Regarding the second, the common ground theory holds that the truth-conditional effect of focus is realized through a kind of pragmatic reasoning.

A prerequisite step of formulating the interpretation of focus is to specify what kind of syntactic entity focus is. At the syntactic level, it is assumed that focus is

represented as a marking on some constituents in a structure, called F-MARKING.[2] For example, *Carl* in (3) is F-marked.

(3) Alice introduced Bob to [Carl]$_F$.

When such a syntactic structure is formed, semantics takes over and gives out an interpretation. Here I follow the Alternative Semantics approach developed by [25] to formulate the semantic value induced by focus.[3] In what follows, I will present a simplified version of this semantics, which intuitively interprets focus as a device that triggers a set of alternatives, and this set of alternatives constitutes a separate semantic value alongside with the traditional, truth-conditional semantic value.

Formally, for an expression α, it has an ORDINARY SEMANTIC VALUE (OSV henceforth), noted as $[\![\alpha]\!]^O$, which is whatever semantic value α has in the ordinary truth-conditional semantics. (For example, in an extensional semantics, the OSV of a proper name is an individual object, that of a common noun or a one-place predicate is a function from individual objects to truth values, etc.) On the other hand, another interpretation function gives α a separate FOCUS SEMANTIC VALUE (FSV henceforth), noted as $[\![\alpha]\!]^F$, which is a set of alternatives determined by which constituents in α are F-marked. For a simple constituent α (i.e. a terminal node in a parse tree), if it is not F-marked, then $[\![\alpha]\!]^F=\{[\![\alpha]\!]^O\}$; otherwise, $[\![[\alpha]_F]\!]^F$ is a set of all entities that belong to the same semantic type as $[\![[\alpha]_F]\!]^O$. To illustrate, taking **a**, **b**, **c**, and **introduce** as terms in the metalanguage which respectively denote Alice, Bob, Carl, and the ternary relation of introduction, the interpretations of the simple constituents in (3) are as follows.

$[\![\text{Alice}]\!]^O$=**a**	$[\![\text{Alice}]\!]^F$={**a**}
$[\![\text{Bob}]\!]^O$=**b**	$[\![\text{Bob}]\!]^F$={**b**}
$[\![[\text{Carl}]_F]\!]^O$=**c**	$[\![[\text{Carl}]_F]\!]^F$={**a, b, c,**...}
$[\![\text{introduce}]\!]^O$=**introduce**[4]	$[\![\text{introduce}]\!]^F$={**introduce**}

Given that each simple is assigned both an OSV and an FSV, the two dimensions of meaning can be determined compositionally for complex expressions. In particular,

[2] An F-marking in a syntactic structure does not always coincide with the strongest pitch accent – the phonetic realization of the structure may not put strongest pitch accents on the whole F-marked component in the structure. See [4] for an introduction to the relation between focus and pitch accent. As what concerns us here is the semantic/pragmatic properties of focus, I will take F-markings in syntactic structures as given, while ignoring the relation between F-markings and their phonetic realizations.

[3] By taking the Alternative Semantics as a part of the common ground theory, I do not mean that everyone agrees that it is "the correct" semantics of focus-induced interpretation. In particular, other theories of focus-induced interpretation include the Structured Meanings approach developed by [6, 21, 32, 33] and others, as well as the event-based semantics by [3, 16]. See also [2] for a comparison between them and the Alternative Semantics.

[4] Assume that the lexical meaning of *introduce* is **introduce**= $[\lambda x.\lambda y.\lambda z.z$ introduced x to $y]$.

for any α whose daughters are β and γ, if $[\![\beta]\!]^O$ takes $[\![\gamma]\!]^O$ as argument such that $[\![\alpha]\!]^O=[\![\beta]\!]^O([\![\gamma]\!]^O)$, then $[\![\alpha]\!]^F=\{x(y)\colon x \in [\![\beta]\!]^F \text{ and } y \in [\![\gamma]\!]^F\}$.[5] This, on the one hand, straightforwardly entails that any focus-free complex constituent's FSV is the singleton set of its OSV. In contrast, if it involves an F-marked constituent, its FSV is a non-singleton set of alternatives.

$[\![\text{introduced Bob}]\!]^O$=**introduce(b)**
$[\![\text{introduced Bob to [Carl]}_F]\!]^O$=**introduce(b)(c)**
$[\![(3)]\!]^O$=**introduce(b)(c)(a)**

$[\![\text{introduced Bob}]\!]^F$={**introduce(b)**}
$[\![\text{introduced Bob to [Carl]}_F]\!]^F$={**introduce(b)(a)**, **introduce(b)(b)**, **introduce(b)(c)**,...}
$[\![(3)]\!]^F$={**introduce(b)(a)(a)**, **introduce(b)(b)(a)**, **introduce(b)(c)(a)**,...}

The above is a stepwise illustration of how the OSV and the FSV of (3) are compositionally determined, respectively. Note that the FSV of (3) is the set collecting all the propositions expressible by *Alice introduced Bob to x*, where *x* denotes any individual or plurality of individuals.

This completes the part about what semantic interpretation focus induces. However, since what really concerns us is the truth-conditional effect of focus, as shown in (1)/(2) above as well as (4)/(5) below, we also need to explain how the truth-conditional semantics interacts with focus-induced FSVs.

(4) Alice only introduced $[\text{Bob}]_F$ to Carl.

(5) Alice only introduced Bob to $[\text{Carl}]_F$.

Potentially, an FSV can be integrated to the truth-conditional content either directly in semantics or through a pragmatic detour. The former is to assume that some expressions or constructions, such as *only*, take the FSVs of constituents embedded in their scopes as arguments. For example, this approach would be committed to a semantics of (preverbal) *only* along the lines of the following:

Semantics of *only*. *NP only VP* is true iff
(i) $[\![\text{VP}]\!]^O([\![\text{NP}]\!]^O)$=**true**,
(ii) $[\![\text{VP}]\!]^F \neq \{[\![\text{VP}]\!]^O\}$, and
(iii) for all $f \in [\![\text{VP}]\!]^F$, if $f([\![\text{NP}]\!]^O)$=**true**, then $f = [\![\text{VP}]\!]^O$.

[5] This covers only constituents whose OSVs are determined by function application in the truth-functional semantics. But it can be easily generalized to other cases. For example, if $[\![\beta]\!]^O$ and $[\![\gamma]\!]^O$ are of the same type and thus determine $[\![\alpha]\!]^O$ by predicate modification such that $[\![\alpha]\!]^O=[\![\beta]\!]^O \cap [\![\gamma]\!]^O$, then the members of $[\![\alpha]\!]^F$ are generated by applying predicate modification to any pair formed by one member in $[\![\beta]\!]^F$ and one in $[\![\gamma]\!]^F$: $[\![\alpha]\!]^F=\{x \cap y\colon x \in [\![\beta]\!]^F \text{ and } y \in [\![\gamma]\!]^F\}$.

As to (4) and (5), 2.1 correctly captures their truth-conditions: (4) is true just in case Alice introduced Bob but no one else to Carl, but (5) is true just in case Alice introduced Bob to Carl but no one else. This theory belongs to what [26] calls WEAK THEORIES. In particular, weak theories are those which are committed to the following hypothesis.

> **Weak Hypothesis.** The focus effect on truth-conditions is due to the fact that some expressions are semantically sensitive to the FSVs in their scope, so that the FSVs participate in the composition of truth-conditional meaning.

However, I will not pursue this option, due to three concerns. First, such theories are not general, in the sense that we have to pack some semantic clauses referring to FSVs into the lexical semantics of a term once we find it displaying the focus effect. Second, weak theories make a radical move, i.e. a drastic change that makes the truth-conditional meaning (OSV) of some terms refer to the non-truth-conditional dimension (FSV). This is not appealing if we want the truth-condition of a whole to be compositionally determined by the truth-conditional semantic values of its parts. Third, an even more serious problem is that weak theories fail to appreciate the optionality of the focus effect, and thus wrong predictions ensue.

(6) Alice always takes $[\text{Bob}]_F$ to movies.
Alice always takes Bob to $[\text{Movies}]_F$.

(7) Mary always remembers to go to $[\text{church}]_F$. ([1])

(6) shows that *always*, somehow similar to *only*, displays the focus effect. But if we follow the Weak Hypothesis to build focus sensitivity into the semantics of *always* in a similar way as what we did above for *only*,[6] (7) is predicted to mean that whenever Mary remembers to go somewhere, it is a time when she remembers to go to church. This, however, is not what (7) intuitively means.[7] Examples like (7) illustrate the optionality of the focus effect: even when an F-marked constituent is in the syntactic scope of *always*, as in (7), the truth-condition of the sentence might not display the focus effect. Consequently, weak theories are unattractive, as they would make the terms like *always* and *only* be obligatorily sensitive to focus.[8] Although it might be questionable whether the three reasons conclusively defeat the weak hypothesis, they

[6] For example, *NP always VP* is true iff, if at any time there is an $f \in [\![\text{VP}]\!]^F$ such that $f([\![\text{NP}]\!]^O)$=**true**, then it is a time when $[\![\text{VP}]\!]^O([\![\text{NP}]\!]^O)$.

[7] It seems that, in (7), the focus effect on the domain of the quantifier *always*, predicted by weak theories, is trumped by the effect brought about by the presupposition triggered by *remember*.

[8] Although [1] use (7) and other examples to argue that the weak hypothesis does not apply to *always*, they nevertheless show that parallel arguments are *not* applicable to *only*: the focus sensitivity of *only* seems indeed non-optional. However, this does not jeopardize my rejection of the weak hypothesis, so long as terms behaving like *only* (including, arguably, *even* and *also*; cf. [2]) do not concern us here – my project is mainly on counterfactuals.

suffice for us to prefer a different approach.

We now need to develop a STRONG THEORY with the commitment to the following hypothesis.

> **Strong Hypothesis.** For any expression or construction in natural languages, its truth-conditional semantics does not refer to focus.[9] (cf. [26])

Although the Strong Hypothesis is a negative claim, it implies that the focus effect has to be explained by appeal to some pragmatic mechanisms beyond the realm of compositional truth-conditional semantics. A general assumption accepted by many theories in the literature is that the truth-conditional effect of focus should be explained by i) the context sensitivity of certain expressions and ii) a pragmatics of how focus is able to influence the resolution of some contextual parameters. Thus, focus only affects truth-conditions indirectly, through inferences based on certain pragmatic principles. A main task of such a strong theory is to postulate a certain pragmatic relation, call it F-RELATION, between context and focus.

At this point, it is worth pointing out that an F-marking in a sentence in fact induces multiple FSVs at various levels. For example, although there is only one F-marking on *Carl* in (3), multiple FSVs are generated respectively by the noun $[Carl]_F$, the VP *introduced Bob to* $[Carl]_F$, and the complete sentence *Alice introduced Bob to* $[Carl]_F$. Due to this fact, let an F-DOMAIN be an expression (a word, a phrase, a clause, etc.) at which level an FSV is generated.[10] This implies that any constituent in a sentence is an F-domain. Therefore, an F-marking by itself does not uniquely determine an FSV; rather, an FSV is determined only if an F-domain is selected. The F-relation we are interested in, then, is defined as a relation between a context and an F-domain. In the literature, different strong theories endorse different assumptions about what F-domains are required to be F-related to contexts: for some (e.g. [25, 26]), an F-marking in a sentence is pragmatically licensed once there exists *any* F-domain containing the F-marked constituent – be it a word, a phrase, or a complete clause/sentence – that stands in the F-relation to its context of utterance; for some others (e.g. [24]), the F-domains that are required to be F-related to contexts are always complete sentences. Regardless of the difference between the two (or even more) options, a common ground of them is that, when a sentence is uttered, contexts can be resolved based on the F-markings involved, given the pragmatic requirement that an/the F-domain must be F-related to its context.

For now I am going to leave the F-relation unspecified, because the current goal is just to lay out a common ground framework. Indeed, various different strong theories following the above line of explanation formulate the F-relation in different ways.

[9] This formulation of the Strong Hypothesis might be excessively strong regarding my purposes, because whether some expressions, such as *only* and *even*, are semantically sensitive to focus does not matter to my current goal of explaining only the focus effect displayed by counterfactuals.

[10] *F-relation* and *F-domain* are jargons borrowed from [4].

To sum up, the common ground framework is committed to the following two general theses.

> **Context Sensitivity.** The semantic interpretation of a focus sensitive expression or construction depends on certain parameters whose values are contextually determined.
>
> **Pragmatic Constraint.** An utterance of a sentence is felicitous only if a certain F-relation holds between its context of utterance and an/the F-domain involved in the sentence.

The two theses combined imply that focus could have an truth-conditional effect in the following way: given a focus-involving utterance, a hearer, in order to preserve felicity, may accommodate (in the sense of [23]) into the context whatever it takes for the F-relation to hold (or equivalently, for the above pragmatic constraint to be satisfied), and thus the truth-conditional content of the utterance is affected due to the context sensitivity of the uttered sentence. Theories built on the common ground framework can be found in [12, 17, 24, 26], and (partially) [1, 2]. Lastly, it is worth noting that these strong theories allow the optionality of the focus effect because they appeal to accommodation, a pragmatic process that is optional and might be defeated by various pragmatic reasons.

2.2 Two accounts

Turning back to the focus effect on counterfactuals, the current goal is to show that the two extant theories provided by [12] and [27] respectively, both of which are particular theories following the common ground framework above, are not able to properly explain the data. The first data point, introduced at the beginning, is repeated in (8) and (9).

(8) If Clyde hadn't [married]$_F$ Bertha, he wouldn't have inherited the money.

(9) If Clyde hadn't married [Bertha]$_F$, he wouldn't have inherited the money.

In what follows, I will briefly lay out the two accounts in turn, and then point to a problem for both.

The account provided by [27] uses a pragmatic theory of focus anaphoricity to explain the focus effect. First, this account relies on a semantics which assumes that some contextual parameter is part of what determining the truth-condition of relevant expressions (i.e. counterfactuals for the current discussion), and uses some pragmatic principles governing the F-relation between this contextual parameter and focus in order to explain how focus can have its truth-conditional effect. The semantics assumed by [27] closely follows Kratzer's premise semantics ([19, 20]). Let $>$ stand for the natural language counterfactual construction *If...would...*.

> **Premise Semantics.** An ordering source, H, is a contextually determined set of propositions that jointly characterize the actual world (i.e. $\bigcap H = \{w\}$, where w is the actual world). A counterfactual $\varphi > \psi$ is true if and only if for every H' that is a maximal subset of H that is consistent with $[\![\varphi]\!]$, $\bigcap H' \cap [\![\varphi]\!] \subseteq [\![\psi]\!]$.

Simply put, a context determines an ordering source H, which is a set of propositions that are jointly true only at the actual world. Propositions in H can be understood as descriptions of all the facts in the actual world. Then, in order to assess a counterfactual $\varphi > \psi$, we consider some counterfactual situations. Such counterfactual situations may be different from the actual world, as φ should be true in them. Thus, we need to abandon some propositions in H in order to describe these counterfactual situations. On the other hand, we do not want these counterfactual situations to deviate too much from the actual world. Thus, in describing the counterfactual situations, we choose the maximal subsets of H that are consistent with φ, together with the proposition expressed by φ itself – these sets of propositions are taken to be what describe the relevant counterfactual situations. Thus, the counterfactual is true just in case ψ is true in all these situations.

What is important for our purposes is that this semantics specifies what contribution the context makes to the truth-condition of a counterfactual that is uttered in it. In particular, the truth-value of a counterfactual is sensitive to the contextually supplied ordering source H. Thus, it follows that if focus is able to affect H, then it can affect the truth-condition of a counterfactual as well, which explains the focus effect. The account by [27] does exactly this. According to the account, focus is understood as an anaphoric feature, which has to be licensed by some antecedent in the context. Specifically, Rooth suggests that, in a counterfactual, focus involved in the antecedent is anaphoric on the contextual parameter H, in the following way:

> **Focus Anaphoricity in Counterfactuals.** For a counterfactual $\varphi > \psi$ that is uttered in a context, the focus involved in φ is licensed just in case the focus-triggered FOCAL CLOSURE is a member of the ordering source H that is determined by the context, where the focal closure is the union of the focus-triggered FSV.

This pragmatic principle can explain why (1) and (2) have different truth-values, with the assumption that the relevant F-domains for the pair of counterfactuals are the clauses embedded under negation in the antecedents, i.e. (10) and (12), of which the FSVs are (11) and (13), respectively.

(10) Clyde had [married]$_F$ Bertha.

(11) $[\![(10)]\!]^F$=$\{p : p$ is a proposition expressible by a sentence of the form *Clyde x'ed Bertha*$\}$

(12) Clyde had married [Bertha]$_F$.

(13) $[\![(10)]\!]^F$=$\{p : p$ is a proposition expressible by a sentence of the form *Clyde married x*$\}$

Given the above FSVs, the focal closures of the two clauses are derived: for (10), it is the proposition that Clyde did something to Bertha, and for (12), it is the proposition that Clyde married someone. Then, by the anaphoricity requirement, the ordering source H for (2) has to include the proposition that Clyde married someone. If this pragmatic constraint is satisfied or accommodated, in a resulted maximal subset H', the proposition is likely to be a member as well.[11] If that is correct, Clyde married someone in all the counterfactual situations that are relevant to the assessment of the counterfactual, which means that he inherited the money in all these situations as well. Therefore, (2) comes out false, as its consequent says that Clyde wouldn't have inherited the money. Similarly, for (1), the pragmatic principle also requires the ordering source to include the focal closure, but in this case, the focal closure is the proposition that Clyde did something to Bertha. Plausibly, adding this to H will have little effect: it does not make the counterfactual situations described by H' situations where Clyde married anyone at all. Presumably, minimizing the deviation from the actual world, situations where Clyde did not marry Bertha are ones in which he did not marry anyone and thus did not get the money. Therefore, the consequent is true in all these situations, which means that (1) is true.

On the other hand, [12] treats counterfactuals as having a tripartite structure: a quantifier *would*, an *if*-clause that restricts the domain of the quantifier, and a main clause that is the nuclear scope of the quantificational structure. According to him, the quantifier *would* has a covert argument, i.e. a *resource domain*, that is determined by the context. Let us take this resource domain to be a set R of possible worlds.[12] Then, the semantics of counterfactuals is as follows.

> **Quantificational Semantics.** Uttered in a context in which the resource domain is R, a counterfactual $\varphi > \psi$ is true if and only if $R \cap [\![\varphi]\!] \subseteq [\![\psi]\!]$.

Thus, *if*-clause, say, φ, restricts R by intersection, resulting in a set of possible worlds $R \cap [\![\varphi]\!]$ that serves as the domain of quantification for *would*: if all the worlds in it are worlds where the consequent is true, the whole conditional is true; otherwise, the conditional is false.

The focus effect is explained by a pragmatic constraint on the F-relation between the focus and the contextually supplied resource domain R. Very roughly, von Fintel's

[11] This depends on what else is in H. According to the premise semantics, it is not guaranteed that all the maximal subsets of H will preserve this focal closure. However, we may expect that in a normal context, the focal closure is kept in every maximal subset, as it should not be a threat to the consistency of such a subset with the antecedent of (2): if a subset of H that does not include the focal closure is consistent with the antecedent, then adding the focal closure should not break the consistency.

[12] It should be noted that [12] uses the Situation Semantics framework, and thus *would* is a quantifier over situations rather than possible worlds. But this does not matter for our purposes here.

claim is that the focal closure triggered in the antecedent of a counterfactual *restricts* the resource domain through some pragmatic mechanism.

> **Focus as Q-Domain Restriction.** For a context with a resource domain R and a counterfactual $\varphi > \psi$ uttered in it, R is a subset of the focal closure triggered in φ.

In other words, the resource domain is restricted to the effect that the focal closure of the antecedent is true at every possible world in it. Given that, the focus effect is explained. On the one hand, for (2), as the focal closure is the proposition that Clyde married someone, it follows that Clyde married someone in all the possible worlds in the domain of quantification for *would*. Consequently, Clyde inherited the money in such worlds and thus the counterfactual (2) comes out false. In contrast, the focal closure triggered in the antecedent of (1) is the proposition that Clyde did something to Bertha. Again, as Clyde presumably wouldn't marry anyone except Bertha, the worlds in the domain of quantification are such that Clyde didn't marry anyone and didn't inherit the money. This explains why (1) comes out true.

2.3 Why do we need a new theory?

Although the two accounts assume different semantics and propose different pragmatics, they tackle the problem almost in the same way. Simply put, they both imply that the focal closure can restrict the set of relevant counterfactuals situations. But this way of explaining the focus effect crucially relies on the fact that the two counterfactuals have negative antecedents. However, counterfactuals with positive antecedents can also exhibit the focus effect, while the two accounts above cannot explain it. This point is illustrated in (14) and (15), uttered in the context [Alcohol].

> [Alcohol] Beer makes people burp but whisky does not. Being a fussy drinker, Clyde likes the taste of beer but only the odor of whisky. Having a glass of beer and a shot of whisky on his table, Clyde drank the beer but only sniffed at the whisky. After a while, he burped.

(14) If Clyde had drunk [the whisky]$_F$, he wouldn't have burped.

(15) If Clyde had [drunk]$_F$ the whisky, he wouldn't have burped.

This pair of counterfactuals displays a difference in truth-value, similar to (1) and (2). In particular, (14) appears to be true, as the relevant counterfactual situations seem to be situations where Clyde drank the whisky but not the beer. In contrast, (15) seems false: in the relevant counterfactual situations, Clyde drank the whisky rather than sniffed at it, but presumably, Clyde still drank the beer as he actually did.

But this difference is not explained by Rooth's or von Fintel's account. The two accounts both propose that the focal closure triggered in the antecedent should restrict the set of relevant counterfactual situations. However, in this case, such a restriction is vacuous, as it does not make a difference to the truth-value of the above sentences. Specifically, the focal closures triggered by the two antecedents are the following propositions.

$FC(14)$: Clyde drank something.
$FC(15)$: Clyde did something to the whisky.

We can see that the two focal closures are entailed, respectively, by the antecedents in (14) and (15). Thus, no matter whether the set of counterfactual situations is restricted by such a focal closure, the antecedent is to select only worlds where the focal closure is true. For (14), the antecedent guarantees that all the counterfactual situations we use to evaluate the consequent are such that Clyde drank the whisky – and thus Clyde drank something. For (14), the antecedent guarantees that all the counterfactual situations are situations where Clyde drank the whisky – and thus Clyde did something to the whisky. Therefore, the requirement imposed by the focal closure, in this example, is vacuous and does not have an effect on the truth-conditions. But given that focus indeed has an effect on the truth-conditions of this pair of counterfactuals, we need a new theory.

3 GQA and Focused Counterfactuals

3.1 Focus: the good question-answer view

As many other pragmatic theories of focus, GQA amounts to a specification of the F-relation. Before formulating the view in detail, it is worth pointing out upfront that GQA only concerns with the F-domains which are *complete clauses*. Consequently, the FSVs I am going to consider can only be sets of alternative *propositions*, rather than sets of properties, individuals, or others. This restriction is due to the limited goal of this project concerning only the focus effect on counterfactuals, where relevant FSVs are supposedly obtained at the clause level.

The specification of the F-relation I propose is called THE GOOD QUESTION-ANSWER VIEW because it claims that the F-relation holds between a clausal F-domain and its context just in case the F-domain encodes a question-answer pair that is pragmatically adequate (good) with respect to the context. The notions of QUESTION and ANSWER are thus crucial to GQA, and they are defined in a way following [13].

> **Question.** A question Q is a set of propositions, i.e. a set of sets of possible worlds.[13]

[13] Throughout this paper, the term *question* refers to semantic objects, i.e. sets of propositions, rather

Answer. A proposition p is an answer to Q iff $p \in Q$.

The two notions naturally relate to Alternative Semantics introduced in §2.1, since for any clausal F-domain, its FSV and OSV are identified with a question and an answer to that question, respectively. In particular, for any clause S, its FSV $[\![S]\!]^F$ is a question (i.e. a set of propositions) and its OSV $[\![S]\!]^O$ is an answer to the question (i.e. $[\![S]\!]^O \in [\![S]\!]^F$).

In what follows, I will present GQA in three steps. First, the F-relation is re-characterized in terms of presupposition – the assumption is that a clausal F-domain *presupposes* that the F-relation holds between it and its context. Second, I will use the framework of context change semantics (*à la* [14]) as a formal representation of presuppositions. Finally, based on the framework, I will be able to specify what kind of presupposition is triggered by focus and what the F-relation is, as well as what kind of pragmatic inference is made possible by this view of the focal presupposition.

Starting with the first step, recall that the F-relation between a context and an F-domain, according to Pragmatic Constrait, amounts to a felicity condition of utterances: a sentence can be felicitously uttered in a context only if the F-relation holds. Then, if we follow a broad interpretation of presupposition found in [14, 18, 30], a presupposition that a sentence carries amounts to a requirement imposed by the sentence on the contexts in order for it to be felicitously uttered in the context. Thus, a presupposition amounts to a felicity condition. This allows the F-relation to be expressible in terms of presupposition. Specifically, we say that an F-domain carries a FOCAL PRESUPPOSITION that the F-relation holds between the F-domain and its context. Further, we say that the focal presupposition of an F-domain is *satisfied* in a context if the F-relation holds between them, and otherwise the focal presupposition *fails*. In this way, specifying what the focal presupposition is, i.e. what kind of presupposition focus triggers, is sufficient for the goal of specifying the F-relation.

As the second step, since the objective is transformed into specifying the focal presupposition, a formal system capturing presuppositions should come in handy. Here I follow the context change semantics framework provided in [14] to treat presuppositions as derivable from the CONTEXT CHANGE POTENTIALS (CCP henceforth) of sentences or clauses.[14] In particular, for any sentence/clause S, its meaning in this

than interrogative sentences in the syntactic sense, though it is quite natural to assume that the semantic value of an interrogative sentence is a question.

[14]Presuppositions can also be captured in non-dynamic frameworks, e.g. [15]. The reason why I use the context change semantics is that it provides not only a formal representation of presuppositions but also a theory of presupposition projection – a theory of how the presupposition of a compound sentence is determined by the presuppositions of its constituent clauses and the lexical meaning of the involved operators/connectives. This feature of the context change semantics is desirable because counterfactuals are compound sentences. Besides, the context change semantics gives a clear sense of local contexts – contexts to which a clause in a compound is directly related. Later in §3.3, the notion of local context will be important because it makes local accommodation available, which is crucial to the explanation

framework is represented not by what proposition it expresses but by how it is able to change contexts: the meaning of S is identified with the context-changing role it plays, represented by a mapping from contexts to contexts. For a sentence/clause S, let $[S]$ stand for its CCP, which is defined as a function from contexts to contexts. In particular, let us follow [29, 31] to take every context to be an information state shared by the relevant speakers, which captures what they commonly take for granted. Formally, a context is represented by a CONTEXT SET c, which is a set of possible worlds, each of which stands for a live possibility given what the speakers commonly take for granted in the context. Generally, in such a context, when a sentence S is uttered, it contributes a piece of information to the context by ruling out some live possibilities from the context set – it narrows down the context set in a certain way. Thus, the CCP function $[S]$ of sentence S, given the Stalnakerian representation of contexts, is to take a context set c as input and output a (potentially) smaller context set, noted as $c[S]$.

What is crucial to my purposes is that this semantic framework provides a systematic way to represent presuppositions, by allowing CCPs to be *partial functions*: the contexts for which a clause's CCP is defined are all and only the contexts that satisfy what the clause presupposes. Thus, the presupposition carried by a clause is represented by the definedness condition of the CCP of the clause. To illustrate, consider (16), which is a typical presupposition-carrying sentence.

(16) Alice stopped smoking.

As (16) presupposes that Alice used to smoke, its CCP then is a partial function which is defined only for the contexts that entails that Alice used to smoke. For example, if a context c is such that every world $w \in C$ is a world where Alice used to smoke, the presupposition of (16) is satisfied by c and thus $c[(16)]$ is defined. Otherwise, if there is a $w \in c$ such that the presupposition is false at w, $c[(16)]$ is undefined.

The second step – a general framework of presupposition representation – is completed. Now the third step is to make use of this framework to specify what presupposition focus triggers. In particular, the focal presupposition carried by a clause can be given by specifying what contribution focus makes to the definedness condition, i.e. what necessary conditions focus brings up for a context to be one for which a clause's CCP is defined.

Thus, it is to specify how the definedness condition of the CCP of a clause is related to focus, i.e. to the FSV of the clausal F-domain. This expected definedness condition is as follows:

Focal Presupposition. For a clause S and a context c, $c[S]$ is defined only if
i) $[\![S]\!]^F$ is a GOOD QUESTION with respect to c, and
ii) $[\![S]\!]^O$ is a GOOD ANSWER to $[\![S]\!]^F$ with respect to c.

of the focus effect.

This definedness condition for $c[S]$ obviously calls for a further specification of what count as good questions and good answers. Given that a clause encodes a question-answer pair by having its FSV and OSV, whether each component is good in a context depends on what goal it is to accomplish. Starting with questions, the core idea is that a question is a specification of the possible ways that contexts could change. For example, consider a context c which contains all the possible worlds that are live possibilities given what a group of speakers commonly take for granted. Suppose (3), repeated as (17), is uttered in c.

(17) Alice introduced Bob to $[\text{Carl}]_F$.

The FSV-question of (17) is the set of all the propositions of the form *Alice introduced Bob to* x. Intuitively, by uttering (17), it seems that the speaker is addressing that FSV-question, namely, the question of to whom Alice introduced Bob. By addressing such a question in the given context, the speaker signals that the current interest of the discourse is to pick out one among the many answers to the question and to add it into the information state shared by all the participants. In other words, the immediate goal at the point in the conversation is to change the shared information state c by updating it with one of the answers to the question. Thus, for each proposition $p \in [\![(17)]\!]^F$ (i.e. each answer to $[\![(17)]\!]^F$), it is a possible candidate for the next piece of information to be added into c that results in a new information state $c \cap p$, i.e. the set of all the p-worlds in c.

In effect, an FSV-question determines a set of possible ways that the current information state could evolve at a point in a conversation, as each answer to the question corresponds to a possible update. In this sense, in a context, the goal a question is to accomplish is to specify all the possible ways of the context could change. Consequently, whether a question is good with respect to a context should be assessed in terms of how suitable it is as such a specification of possible context changes.

There might be various aspects concerning this suitability, but there is an obvious way in which a question is *not* suitable for specifying possible context changes. By characterizing this kind of bad questions, we can they obtain a necessary condition for what counts as a good question. The bad cases I have in mind are ones where a given context involves a live possibility which is incompatible with every answer to the given question. Specifically, considering a context/information state c and a question Q, my claim is that Q is not a good question with respect to c if there is $w \in c$ such that for every $p \in Q$, $w \notin p$. To see that, it is first to note that for each $w \in c$, it is a live possibility that is compatible with what the relevant speakers commonly take for granted. If $w \notin p$ for every $p \in Q$, then every answer to the question Q is false at w. Therefore, updating the information state c with any answer will result in a new information state that excludes w – that is, every answer will rule out the possibility w. However, if w will ultimately be ruled out by every possible update given by the

question Q, how could it be included as a live possibility in c at the first place? In this sense, the question Q cannot be an adequate specification of all the possible updates of the context c, which means that Q fails to properly play the role of a question in the context, and thus it is not a good question with respect to c.[15]

Given this consideration, a necessary condition for good question is as follows, which essentially requires a question not to preclude any currently live possibility in a given context.

> **Covering.** For a set Q of propositions and a context c, Q covers c only if $c \subseteq \bigcup Q$.

Pictorially speaking, the condition is satisfied when the answers to a question jointly cover a given context. Then, taking covering as a necessary condition, it is to say:

> **Good Question.** A question Q is a good question with respect to a context c only if Q covers c.

Next, it is to specify what a good answer is. Recall that an FSV-question is a set of propositions, each of which corresponds to a possible way of updating contexts. From this perspective, all the answers are equally good, in the sense that every answer serves to pick out a possible update out of many. However, when a specific information-laden context is considered, some answers to an FSV-question may turn out to be contextually equivalent to each other, meaning that they would update the context in the same way. In such cases, those answers may not be equally good. To illustrate, consider the following example.

(18) [It's common knowledge that Clyde goes to a party whenever Bertha goes. Suppose the person who answers the question Q wants to express that both Bertha and Clyde will go to the party.]
Q: Who will go to the party?
A1: # Bertha will go.
A2: Bertha and Clyde will go.

Given that (18Q) denotes the set of all the propositions of the form x *will go to the party*, both (18A1) and (18A2) are answers to it. Moreover, since the information state of the context entails that Clyde will go to the party if Bertha goes, (18A1) and (18A2) are contextually equivalent: if (18A1) is true at some w in the information state, so is (18A2), and *vice versa*. Given that, both answers have the same effect of updating the given context, as they both restrict the current information state to the worlds where both Bertha and Clyde will go to the party. However, the two sentences intuitively do not equally well serve the purpose of achieving that update effect. In particular, (18A1) does not sound good if the speaker wants to restrict the information

[15] A similar argument can be found in [5, p. 21].

state to only the both-go worlds, as the interlocutor may have to ask a further question – *Will Clyde go as well?* – in order to make sure if the common knowledge in the prior information state needs to be nullified or corrected. Given that (18A2) is logically stronger than but contextually equivalent to (18A1), we might think that (18A2) is providing more information than needed. But the bit of "redundant" information nonetheless serves as a confirmation of the current information state in the context, which explains why dropping it is not pragmatically adequate.

The above example shows how contextually equivalent but logically inequivalent answers may have a difference in their pragmatic adequacy. Then, for an answer to be good, the idea is that it cannot be logically weaker than any of its contextually equivalents. The following condition captures this requirement.

> **Logical Strongness.** For a set Q of propositions and a proposition $p \in Q$, p is a Logically Strong answer to Q with respect to a context c only if for all $q \in Q$ such that $p \cap c = q \cap c$, it is not the case that $q \subset p$.

In other words, an answer satisfies this condition just in case it is one of the logically strongest among its contextually equivalent answers to a given question. Logical Strongness, based on the above consideration, is taken as a necessary condition for good answer, because, as shown in the above example, we pragmatically prefer, among contextual equivalents, those which carry most redundant information in order to confirm the prior information state as much as possible.

Besides, there is another pragmatic concern about the informativeness that good answers should have. In the literature, it is a common practice to distinguish *complete* answers from merely partial answers. A complete answer is an answer which contextually entails the truth or falsity of every answer to a given question, while a partial answer only contextually settles the truth value of some answers. Given that each answer to a question entails at least itself, then merely being an answer is both necessary and sufficient for being a partial answer. However, not every answer is complete:[16]

> **Completeness.** For a question Q and an answer p to Q, p is a Complete answer to Q with respect to a context c iff $p \cap c \subseteq q$ or $p \cap c \subseteq \neg q$ for every $q \in Q$.

Given this distinction, it is obvious that complete answers are more informative than merely partial answers in the sense that it does not only provide *an* answer to a given question but also gives information about whether other answers are true or false. Provided the pragmatic consideration that more informative answers are generally

[16] This definition of partial and complete answers is, however, slightly different from the common practice. For example, [24] defines these notions in the way that even non-answers (according to the above definition of answers) can be partial or complete answers. But here I restrict partial and complete answers to only answers as defined above.

preferred, I assume that being Complete is also necessary for good answers.[17]

> **Good Answer.** For a question Q and an answer $p \in Q$, p is a good answer to Q with respect to a context c only if p is a *Logically Strong* and *Complete* answer to Q with respect to c.

So far, combining the three thesis of Focal Presupposition, Good Question, and Good Answer, we have a relatively more detailed characterization of what presupposition focus triggers. However, it is not a complete formulation, as the above conditions for good questions and good answers are merely necessary conditions. Yet I will not to try to make a complete list of necessary conditions that are jointly sufficient, because it might be the case that a complete list of the good question/answer conditions has to refer to other aspects of context than information states. After all, as the Stalnakerian representation only reflects the informational component of context, the notion of good question/answer is only given in terms of how a good question/answer should be related to information states, while requirements stemming from other components of context are omitted. Also, even if only the informational aspect of context is under consideration, it is probable that there are other necessary conditions for a question/answer to fit in well pragmatically with information states, as what questions and answers are good may be subject to other pragmatic reasons or conversational goals. Therefore, the GQA approach to the focal presupposition is left to be programmatic, and it is open to further augmentations.

According to the first step of laying out the GQA approach, it is said that the F-relation between clausal F-domains and contexts, as a felicity condition, is reduced to the focal presupposition. Now it is straightforward to recover the F-relation from the focal presupposition.

> **F-Relation.** For a clause S and a context c, the F-relation holds between them only if $[\![S]\!]^F$ is a good question, as defined in Good Question, and $[\![S]\!]^O$ is a good answer to $[\![S]\!]^F$, as defined in Good Answer, with respect to c.

[17] Completeness, on its own, is apparently an excessively strong condition for good answers in general. One problem is that in some occasions we do not prefer complete answers over merely partial answers. For example, considering the question *Who has two dollars?*, the answer *I have two dollars* is often an answer as good as, if not better than, a complete answer such as *I have two dollars, so do Alice, Bertha, Clyde, ... and no one else has*. Besides, even in contexts where complete answers are preferred over incomplete ones, it might be the case that some incomplete answers should still count as good answers, even though the complete ones are better – the threshold for goodness may not be that high, after all. Despite these concerns, I submit that Completeness is nevertheless an adequate requirement on counterfactual antecedents: the antecedent of a counterfactual is expected, *ceteris paribus*, to be a Complete answer to its FSV-question, because the FSV-question it addresses is about *counterfactual* situations and thus it is hard to know what the intended counterfactual situations are like in relevant aspects unless a Complete answer is provided. Thus, Completeness should be taken as applicable to counterfactual antecedents.

Based on the Strong Hypothesis we have seen in §2.1, the explanation of the focus effect will appeal to the process of accommodating whatever it takes to make the F-relation hold between a clause and its context, as well as the effect contexts could have on the truth-conditional content of counterfactuals. Thus, before seeing how this explanation applies to counterfactuals, let us turn to some semantic assumptions about how the truth-condition of counterfactuals is related to contexts.

3.2 Counterfactuals: some semantic assumptions

Regarding the semantics of counterfactuals, the strategy here is to assume something relatively uncontroversial without having too much commitment to particular semantic theories, so that the pragmatic explanation provided by GQA can be compatible with various different semantics. Let's take the truth-condition of counterfactuals, as mentioned previously, to be this: a counterfactual $\varphi > \psi$ is true just in case ψ is true at every φ-world in a set R of RELEVANT worlds. More precisely:

> **Semantics of Counterfactuals.** A counterfactual $\varphi > \psi$, uttered in a context $c*$, is true at w iff $[\![\varphi]\!]^O \cap R_{\langle c*,w,\varphi\rangle} \subseteq [\![\psi]\!]^O$.

Formulated in this way, the semantics appears to assume the strict conditional analysis – that a counterfactual is true just in case its corresponding material conditional is true at every world within a certain domain of quantification. If that were the case, then the semantics would only be compatible with semantic theories following the strict conditional analysis, e.g. [11]. However, in the semantics formulated above, the set of relevant worlds is allowed to be determined by the context $c*$ of utterance, the world w of evaluation, and/or the antecedent φ. Given that, the semantics is compatible with various particular semantic theories, in the sense that a particular theory can be taken as a specification of how $R_{\langle c*,w,\varphi\rangle}$ is derived from the parameters among $\langle c*, w, \varphi\rangle$. For example, the premise semantics *per* [19, 20] implies that the context $c*$ determines a set H of propositions, i.e. an *ordering source*, for the world of evaluation w, and $R_{\langle c*,w,\varphi\rangle}$ collects all the worlds which admits the truth of all the propositions in a maximally consistent subset of $H \cup \{[\![\varphi]\!]^O\}$. For the Stalnaker-Lewis semantics in [28] and [22], the context $c*$ determines a closeness ordering centered on the world w, and $R_{\langle c*,w,\varphi\rangle}$ contains all the worlds that are at least as close to w as the closest φ-world to w. For yet another example, as [11] treats counterfactuals as strict conditionals, $R_{\langle c*,w,\varphi\rangle}$ for him is just the contextually determined set of worlds over which the necessity modal quantifies.

Although the semantic assumption does not specify in what way the three parameters determine the set R and leaves that to particular semantic theories, what is important here is that R is at least partially determined by the context of utterance, which allows the set to be adjusted by pragmatic reasoning. Besides, the notation $c*$, rather than c, is used to denote contexts, because here the context should not be sim-

ply identified with the Stalnakerian context set (the notation for which is c throughout this paper), given that the context set represents only one aspect in the context – i.e. it only represents what is taken for granted by the speakers – while the set of relevant worlds might depend on other aspects.

To apply GQA, it is not enough to have only a semantic assumption about the truth-condition of counterfactuals. Since GQA is a theory about focal presupposition, we also have to know in what way presuppositions carried by a counterfactual antecedent can be satisfied. One advantage of the context change semantic framework is that it represents of presuppositional properties of sentences. Thus, by transforming the semantic assumption into the context change semantic framework, we will be able to capture the presupposition properties of counterfactuals. Starting with the natural understanding that the CCP of a counterfactual is to rule out the worlds at which it is false from the context set c, the CCP of counterfactuals amounts to the following:

> **CCP of Counterfactuals (1st Pass).** $c[\varphi > \psi] = \{w \in c :$ every φ-world in $R_{\langle c*,w,\varphi\rangle}$ is a ψ-world $\}$.[18]

In other words, for a context set c, every world $w \in c$ is mapped onto a set $R_{\langle c*,w,\varphi\rangle}$ of relevant worlds, and a counterfactual $\varphi > \psi$ serves to rule out every $w \in c$ whose corresponding R-set contains some φ-but-not-ψ worlds.

However, the semantics so formulated does not altogether fit the context change framework, since it does not define the CCP of a counterfactual based on the CCPs of the antecedent and consequent. In order to avoid that problem, we need to further translate the sentence "every φ-world in $R_{\langle c*,w,\varphi\rangle}$ is a ψ-world" into the context change framework. A straightforward translation consists of two steps: first, all φ-worlds in an R-set is just the resulted set of updating the R-set with the CCP of φ; second, that every world in that resulted set of worlds is a ψ world is tantamount to the condition that updating the set with the CCP of ψ would invoke no changes, which is to say that every resulted set of worlds SUPPORTS ψ, defined as follows.

> **Support.** For a set p of possible worlds and a clause S, p supports S, noted as $p \models S$, if and only if $p[S] = p$.

Thus, to say that every φ-world in R is a ψ-world is just to say that $R[\varphi] \models \psi$.

> **CCP of Counterfactuals.** $c[\varphi > \psi] = \{w \in c : R_{\langle c*,w,\varphi\rangle}[\varphi] \models \psi\}$.

This formulation of the CCP of counterfactuals is of course incomplete, in the sense that, again, it does not specify how an R-set is determined by a context, a world, and/or the antecedent in question. Therefore, there might be semantic properties that it fails

[18] [27, p. 238] transforms particularly the Kratzerian premise semantics into the context change framework in a similar way.

to capture.[19] However, I will proceed with this rudimentary semantic assumption because it is sufficient for our purposes here.

3.3 The focus effect explained

According to the last version of the semantics, a counterfactual can successfully update an information state c just in case its antecedent CCP is applicable to the set of relevant worlds $R_{\langle c*,w,\varphi\rangle}$ for each world in the information state, and the consequent's CCP is applicable to each of the subsequent set of worlds resulted from the update done by the antecedent. Thus, the definedness condition of the CCP of a counterfactual is as follows:

> **Definedness of Counterfactuals.** $c[\varphi > \psi]$ is defined if and only if i) for every $w \in c$, $R_{\langle c*,w,\varphi\rangle}[\varphi]$ is defined, and ii) for every $w \in c$, $(R_{\langle c*,w,\varphi\rangle}[\varphi])[\psi]$ is defined.

This definedness condition, combined with the GQA view on the focal presupposition proposed above, is able to explain the focus effect displayed by the pair (14) and (15) uttered in the context [Alcohol].

As a preliminary step, the antecedents (19) and (21) are assumed to be the relevant F-domains and thus their FSVs, (20) and (22), constitute the basis on which the focal presuppositions are derived.

(19) Clyde had drunk [the whisky]$_F$.

(20) $[\![(19)]\!]^F = \{p : p$ is a proposition expressible by a sentence of the form *Clyde had drunk x* $\}$

(21) Clyde had [drunk]$_F$ the whisky.

(22) $[\![(21)]\!]^F = \{p : p$ is a proposition expressible by a sentence of the form *Clyde had x'ed the whisky* $\}$

Then, the explanation of the focus effect comes in three steps. First, it is to specify what focal presuppositions the above F-domains carry, according to GQA. Second, it is to figure out what it takes for these focal presuppositions to be satisfied in (14) and (15) given the context. In particular, I will argue that the focal presuppositions in the examples are accommodated by making different changes to their respective set of relevant possible worlds. Finally, the difference between the pair of counterfactuals

[19] For example, the semantic property of *weak centering*, which serves to validate counterfactual *modus ponens*, has to be captured by adding the following constraint on $R_{\langle c*,w,\varphi\rangle}$: $w \in R_{\langle c*,w,\varphi\rangle}$ for any w, $c*$, and φ. With this constraint, a plausible presupposition projection property is derivable: if φ presupposes a proposition p, then p has to be entailed by the context set c, which means that the antecedent position of counterfactuals is a presupposition *hole*, as predicted by many prominent theories of presupposition projection (e.g. [14, 18, 30], *inter alia*).

in their truth values is explained in terms of the difference results of accommodating their respective focal presuppositions.

According to GQA, each of the relevant F-domains (19) and (21) presupposes that the proposition it expresses (i.e. its OSV) is a good answer to its FSV-question, with respect to the immediate context that the F-domain directly updates.[20] According to Good Answer, this means that $[\![(19)]\!]^O$ must be a Complete and Logically Strong answer to $[\![(19)]\!]^F$ with respect to the context that (19) updates, and similar for (21).

Second, given the focal presupposition carried by the antecedents, now it is to specify what it takes to satisfy this focal presupposition. According to the definedness condition of counterfactuals, given a context set c, every live possibility $w \in c$ is mapped onto a set $R_{\langle c*,w,\varphi\rangle}$ of relevant worlds, and a counterfactual's CCP is defined in the context only if its antecedent's CCP is defined in each of those R-sets corresponding to the worlds in c. As the satisfaction of focal presupposition is necessary for the antecedent's CCP to be defined, this requires that the OSV of the antecedent has to be a Complete and Logically Strong answer to the FSV with respect to each of those R-sets. Imposing this requirement on the counterfactual (14), whose antecedent is (19), we are able to see what its R-sets must be like in order to satisfy the focal presupposition involved.

Note that the following three propositions are contained in $[\![(19)]\!]^F$, where p is the OSV of (19).

(23) p: Clyde had drunk the whisky ($p = [\![(19)]\!]^O$).

(24) q: Clyde had drunk the beer.

(25) $p \wedge q$: Clyde had drunk both the whisky and the beer.[21]

Suppose R is a set of possible worlds with respect to which the focal presupposition of (19) is satisfied. We can see how such an R must be like by appeal to following inference.

(P1) $[\![(19)]\!]^O$ (i.e. p) is a Logically Strong answer to $[\![(19)]\!]^F$ w.r.t. R assumption
(P2) $[\![(19)]\!]^O$ (i.e. p) is a Complete answer to $[\![(19)]\!]^F$ w.r.t. R assumption

[20] Although GQA also implies that the FSVs must be good questions with respect to the context, this part of the focal presupposition is not relevant to this case – satisfying the good question presupposition does not contribute to the difference in truth values between (14) and (15).

[21] The proposition $p \wedge q$ is derivable as a member in the FSV of (19) if we treat "the whisky and the beer" as denoting the mereological sum of the whisky and the beer. Similar treatment can be found in [26] when he explains the effect of focus on scalar implicatures.

(P3) $p \in [\![(19)]\!]^F$, $q \in [\![(19)]\!]^F$, and $p \wedge q \in [\![(19)]\!]^F$	definition of FSV
(P4) $p \wedge q$ logically entails p but not *vice versa*	logic
(C1) p and $p \wedge q$ are not contextually equivalent w.r.t. R	P1, P3, P4
(C2) p does not contextually entail q w.r.t. R	C1
(C3) p contextually entails either q or $\neg q$ w.r.t. R	P2, P3
(C) p contextually entails $\neg q$ w.r.t. R	C2, C3

According to the conclusion (C), R must be a set of worlds with respect to which p contextually entails $\neg q$, which means that for every $w \in R$, if Clyde drank the whisky at w, he didn't drink the beer at w – there is *no drinking-both-world* in R. Thus, for the counterfactual (14), in order to make the focal presupposition carried by its antecedent satisfied, the R-set of relevant worlds must contain no drinking-both-world. In contrast, this is not the case for (15). Because the focus in (15) is on the word *drunk*, if we make an inference similar to the above one, we can see that the good answer condition only requires the set of relevant world for (15) to exclude all the drinking-and-sniffing-the-whisky-worlds – this set might well contain some drinking-both-worlds.

The takeaway point in this reasoning is that, supposing that both (14) and (15) are felicitously uttered in the context – i.e. the CCPs of them are defined in the context, all the R-sets for (14) are sets which do not contain any drinking-both-worlds, but the R-sets for (15) may contain some drinking-both-worlds. Now we are in the position to explain why (14) and (15) appear different in their truth values. In a nutshell, as (14) is felicitous uttered in a context set, say, c, then every world in c is mapped onto an R-set which does not contain any drinking-both-worlds. Thus, it will not contain such worlds after being updated by the antecedent that Clyde had drunk the whisky, which means that the resulted set contains only worlds where Clyde had drunk the whisky but not the beer, so that it supports the consequent that Clyde wouldn't have burped. Therefore, no world in c will be ruled out by the counterfactual (14) – this explains why (14) sounds true.[22]

[22] The current view is expected to apply to other kinds of focus-involving counterfactuals as well. As an anonymous reviewer points out, there are examples where the whole verb phrase of the antecedent is focused, such as the following. Suppose Clyde wouldn't burp unless he had done either or both of these two actions: drinking the beer and sniffing at the whisky. Now Clyde actually drank the beer and sniffed at the whisky, and therefore, he burped. Someone says:

(*) If Clyde had [sniffed at the beer]$_F$, he wouldn't have burped.

As the reviewer points out, (*) could be interpreted as saying that Clyde wouldn't have burped if he had sniffed at the beer and *done nothing else*, on which reading it is true.

GQA is able to account for the focus effect in this example. As the whole verb phrase is focused, the FSV of the antecedent is the question *What had Clyde done?*, which is a set containing the following propositions (and more, of course):

In contrast, for (15), the relevant R-sets are not required to exclude drinking-both worlds. Furthermore, there seems no reason, given the context [Alcohol], to exclude such worlds as irrelevant. Thus, I submit that for the context c where (15) is uttered, most (if not all) worlds in c are mapped onto some R-sets which contain some drinking-both-worlds. Hence, updating such an R-set will result in a set containing some drinking-both-worlds, which means that the resulted set will not support the consequent – Clyde would have burped if he had drunk both! Therefore, most if not all worlds in c are to be ruled out by the CCP of (15), and that is the reason why people tend to treat (15) as false.

The difference in truth values is explained based upon the assumption that the counterfactuals are felicitously uttered in [Alcohol] and thus the counterfactuals involve different R-sets in order to satisfy their respective focal presuppositions. But it is still not clear *how* the two counterfactuals, uttered in the same context [Alcohol], can have different R-sets. This is to be explained by appeal to accommodation: it is pragmatic inferences which result in the difference in their respective R-sets, because different focal presuppositions are carried by the two antecedents, and because the R-sets are the "immediate contexts" which have to satisfy those presuppositions. In other words, upon hearing either of (14) and (15) being uttered, a hearer, if possible, treats it as felicitous and thus accommodates, by making adjustments to the context, whatever it takes for the presupposition involved to be satisfied. As the two counterfactuals differ in focus, different adjustments to the context are made in order to accommodate the focal presuppositions, and finally different truth value judgments ensue since they depends on the resolution of contextual parameters, which is, in this case, the R-set parameter.

3.4 Theoretical conservativity

The goal of this subsection is to show that the above GQA-based view on counterfactuals is theoretically conservative in the sense that it preserves desired aspects of existing pragmatic and semantic theories. First, I will show that the view, while successfully accounting for the alcohol example which other pragmatic theories of

SB: Clyde sniffed at the beer. (OSV of the antecedent)
SW: Clyde sniffed at the whisky.
$SB \wedge SW$: Clyde sniffed at both.

According to Completeness, with respect to the intended R-set, SB has to contextually entail either SW or its negation. Namely, either $R \cap SB \subseteq SW$ or $R \cap SB \subseteq \neg SW$. However, if $R \cap SB \subseteq SW$, then SB and $SB \wedge SW$ are contextually equivalent answers with respect to R, which makes SB not Logically Strong. Therefore, $R \cap SB \subseteq \neg SW$ must be the case, which means that in R, there is no world in which Clyde sniffed at both the beer and the whisky. This explains why the antecedent in (*) in effect only selects worlds in which Clyde sniffed at the beer but not the whisky. As he didn't burp in such worlds, (*) comes out true.

focus fail to explain, preserves their good results regarding the marriage example. We have seen how Rooth and von Fintel explain the marriage pair in §2.2. The basic idea there is that focus has a pragmatic effect so that, paraphrased with the framework we are working with now, all the relevant worlds for (8) are worlds where Clyde did something to Bertha, while those for (9) are worlds where Clyde married someone. It is straightforward that the same effect can be achieved by appeal to the Good Question condition, which takes Covering as a necessary condition for good questions. In particular, Covering requires a clause's FSV to be a set of propositions which jointly cover the immediate context the clause updates. For (8), it means that the set of propositions of the form *Clyde x'ed Bertha* jointly cover all the relevant R-sets. Thus, all the worlds in such R-sets must be worlds where Clyde did something to Bertha. On the other hand, for (9), the relevant R-sets have to be covered by propositions of the form *Clyde married x*, meaning that all the worlds in those R-sets are worlds where Clyde married someone. Therefore, by appeal to the Good Question condition in GQA, the marriage pair is explained in a similar manner as in the theories of Rooth and von Fintel.

Second, I shall also show that the current view preserves truth value predictions made by various existing semantic theories of counterfactuals. Specifically, when a counterfactual involves no focus, the pragmatic theory GQA is only idle and not adding anything to the interpretation of counterfactuals. This claim, however, is based on an revision of Alternative Semantics introduced in §2.1. Previously, it was assumed that, according to Alternative Semantics, a focus-free expression's FSV is the singleton set of its OSV. Thus, in a counterfactual, if its antecedent clause does not involve focus, the FSV of it is just the singleton set of the OSV, i.e. the singleton of the proposition the antecedent expresses. However, this set-up is at odds with some basic ideas of GQA. A clause, according to GQA, is interpreted as a question-answer pair, where the question – the FSV of the clause – is defined by the set of all its possible answers. But what kind of question can a singleton set be? A question allowing only one possible answer is not a question at all, just as an election with only one candidate is not an election.

To correct this, a simple revision will do: for a focus-free clause, we suppose that its FSV is a set containing two members – the OSV of the clause and its negation. Formally,

(26) For a focus-free clause S, $[\![S]\!]^F=\{[\![S]\!]^O, W-[\![S]\!]^O\}$, where W is the set of all possible worlds.

This revision captures the intuition that a focus-free clause encodes a polar question (a yes/no question), and it serves to pick out an answer out of the two candidates.

With this change, we can see that all the above requirements in the Good Question condition (i.e. Covering) and the Good Answer condition (i.e. Logical Strong-

ness and Completeness) are vacuously satisfied in focus-free cases. First, it is straightforward that any set of possible worlds is covered by any polar question, since every polar question covers the whole set of all possible worlds. Second, the Logical Strongness condition is satisfied, because the two answers in a polar question never compete in their Logical Strongness: because they complement each other, they cannot be contextually equivalent at all (assuming that the absurd context set – the null set – can never be in a context). Finally, Completeness is also satisfied, as each of the two answers always determines that the other is false. The three points combined show that, whatever semantic theory one holds for counterfactuals, truth value predictions made by the theory on its own are compatible with the pragmatic theory of GQA, given i) that predictions are all about focus-free counterfactuals, ii) that the necessary conditions for good questions and answers are limited to those proposed in §3.1, and iii) that the derivation of FSV is determined by Alternative Semantics, modified with (26).

4 Conclusion

In this paper, the focus effect on counterfactuals is explained by the pragmatic theory GQA. A consequence of this account is that the phenomenon of the focus effect is not a call for a new semantics. In a broad sense, the current approach can be taken as a sort of Grice's razor that resists semantic revolutions: the reasons provided in §2.1 suggest that the focus effect should be explained in a pragmatic way, and GQA is a promising option for such a pragmatic approach.

That being said, GQA is admittedly only a tentative proposal that is far from being fully justified. First, as a pragmatic theory of focus, it is expected to explain the focus effect in general – not only the focus effect *on counterfactuals*. Thus, it should be further tested with various other expressions of which the truth-conditions vary according to focus. Second, as it stands, GQA does not have a systematic or compositional account of how connectives such as *or* determine FSVs, and the well-established Alternative Semantics does not help. (Recent works in Inquisitive Semantics might be promising, as the approach implies that, in addition to the truth-conditional "informative content", every clause involves some "inquisitive content" that is captured by a set of alternative propositions. See [5], among others.) Third, if such a connection between connectives and FSVs is ultimately obtained, GQA will predict that the effect resulted from the pragmatic reasoning based on the goodness of question-answer pairs is pervasive: expressions that display the *focus* effect are in general expected to display the parallel "connective" effect, because they presumably stem from the same source, i.e. the pragmatic constraints on the relation between contexts and question-answer pairs induced by focus- and connective-involving clauses. All these considerations need to be addressed from both theoretical and empirical per-

spectives; however, as a single paper cannot do justice to any of them, I will leave them to future explorations.

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带有焦点的反事实条件句

樊达

摘　要

学者很早就注意到，语言焦点可以影响反事实条件句的真值条件：给一个反事实条件句中的不同成分加上重音，会导致对其不同的理解。然而，现有的理论（包括范•芬特尔和鲁斯的理论）都不能恰当地解释这一现象。本文将考察这些理论的缺点，并提出一个新的解释，即好问题–好答案解释（Good Question-Answer，GQA）。根据这一观点，焦点的功能在于激发问题–答案对，而涉及问题–答案对在语境中恰当性的语用压力会影响反事实条件句的真值。本文也将从理论优势的角度来支持这一解释。

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