

Causal networks in discourse: A case of Mandarin negative conditionals*

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1. Introduction

This paper focuses on negative conditionals (NCs) in Mandarin, a crosslinguistically well-attested phenomenon where the complementizer of conditional antecedents contains a negative morpheme. What makes NCs particularly interesting is the generalization that they are obligatorily counterfactual. See the following examples of NCs from three unrelated languages—English (1), Tagalog (2) and Mandarin (3).

- (1) **If not for** the jacket he'd though to put on before leaving home, he'd be drenched from this deluge of rain. (COCA)
- (2) **kundi** napakalayo ng Maynila, papag-aaralin ko sana siya roon.
if-not-that very-far Case Manila cause-study I SANA him there
'If Manila weren't so far away, I'd send him to study there.' (Nevins 2002 : 444)
- (3) **yaobushi** wo ying xia yi-tiao xin, genben jiu ci bu liao zhi, geng
IF.NOT I harden down one-CL heart at.all then quit NEG RESULT job more
lai bu liao beijing.
come NEG RESULT Beijing
'If I hadn't made up my mind, I wouldn't have been able to quit my job, nor would I have been able to come to Beijing.' (Jiang 2016: 196, [32])

Recent works have noted the importance of causal reasoning in the interpretation of counterfactual conditionals, and provided different ways of formally implementing causal networks into the semantics of counterfactuals (cf. Kaufmann 2013 and Schulz 2007, 2011). Using data of Mandarin NCs, this paper discusses the connection between the causal reasoning encoded in NCs and the discourse where NCs are uttered. The discoveries show

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that causality may be encoded by linguistic expressions in ways that are more complex than previously thought. To have a full story about how NCs (and possibly other types of conditionals) are interpreted, one should consider the utterance contexts in addition to the semantics per se.

In §2, I discuss two novel observations in addition to those noted by the previous studies on NCs (cf. Henderson 2010, 2011, Ippolito and Su 2014). First, NC-antecedents cannot be marked as contrastive topics. And second, NC-antecedents tend to pick out the most explanatorily powerful proposition(s). In §3, I build the semantics of NCs on a model that combines (a simplified version of) Kaufmann's (2013) Causal Premise Semantics and Kratzer's (1981) graded modality. The two seemingly unrelated novel observations will be analyzed in a unified fashion. §4 concludes the paper.

2. Data

2.1 Basic properties

Mandarin lacks overt morphological marking of counterfactuality, and contexts help disambiguate between an indicative and a counterfactual interpretation. As mentioned in the beginning, NCs differ from standard conditionals in that they only allow counterfactual interpretations (cf. Ippolito and Su (2014) and Jiang (2016)). This is illustrated by the contrast between the NC in (4) and the standard conditional in (5).

- (4) Context: The apartments in Storrs experience water suspension only when the road is under construction. As a result, the residents cannot cook at home and have to order food delivery.

yaobushi waimian xiulu, John jiu hui ziji zuofan.

IF.NOT outside road.construction John then will self cook

Indicative: 'If the road isn't under construction, John would cook by himself.'

✓CF: 'If the road weren't under construction, John would cook by himself.'

- (5) **yaoshi** waimian mei xiulu, John jiu hui ziji zuofan.

IF.NOT outside NEG.PERF road.construction John then will order delivery

✓Indicative: 'If the road isn't under construction, John would cook by himself.'

✓CF: 'If the road weren't under construction outside, John would cook by himself.'

Second, counterfactuals normally associate with the causal reasoning that proceeds from the cause expressed by the antecedent to its effect expressed by the consequent. For example, the counterfactual reading of (5) relies on the speaker's knowledge that John's decision of ordering food delivery causally depends on whether the road construction occurs. Counterfactuals also have a less common interpretation called backtracking that associates with upstream causal reasoning from effect to cause, as in Lewis's (1979) example below.

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- (6) Context: Jim and Jack quarreled yesterday, and Jack is still hopping mad.
- a. **Non-backtracking:** If Jim asked Jack for help today, Jack would not help him.
 - b. **Backtracking:** (But Jim is a prideful fellow, so..)
If Jim were to ask Jack for help today, there would have to have been no quarrel yesterday. (Adapted from Lewis 1979: 456)

NCs reject backtracking reasoning despite the limitation to counterfactual interpretations, as in the contrast between (7) and (8).

- (7) #**yaobushi** jiali tingshui, jiu zhenging waimian mei zai xiulu.
IF.NOT home water.shutdown then prove outside NEG.PERF PROG r.cstruct
Intended: ‘If there were no water shutdown at home, there would have to have been no road construction outside.’
- (8) **yaoshi** jiali mei tingshui, jiu zhengming waimian mei zai xiulu.
IF home NEG.PERF w.shutdown then prove outside NEG PROG r.cstruct
✓ Indicative: ‘If there isn’t water shutdown at home, it has to be the case that the road isn’t under construction outside.’
✓CF: ‘If there weren’t water shutdown at home, it would have to be the case that the road hadn’t been under construction outside.’

Finally, the prejacent of *yaobushi* is factive (Ippolito and Su 2014). For example, (4) implies that the road is truly under construction. The fact that such implication is presuppositional rather than conversational implicature is supported by its non-cancellability and non-reinforceability.

- (9) (As a continuation to (4))
- a. #**suiran** waimian xianzai mei zai xiulu.
although outside now NEG.PERF PROG road.construction
‘Although the road is not under construction now.’
 - b. #**qishi** xianzai waimian jiu zai xiulu.
actually now outside just PROG road.construction
‘Actually, the road is just under construction now.’

Note that the contrast between (4) vs. (5) and (7) vs. (8) show that NCs are truly distinct from standard counterfactuals with sentential negation in the antecedent. As expected, (5) does not presuppose the road construction event, allowing the continuations shown in (9).

2.2 New observation: NC-antecedents cannot be contrastive topics

The basic properties mentioned above are not new. Some have been observed for English *if not for*-conditionals in Henderson (2010, 2011), and some for Mandarin *yaobushi*-

conditionals in Ippolito and Su (2014). To these, I add that there is a novel contrast between NCs and standard conditionals in Mandarin that *NC antecedents cannot be contrastive topics*. In Mandarin, this contrast can be directly diagnosed by the particle *ne*.

Constant (2014) argues that *ne* marks contrastive topics, i.e. a subissue that belongs to a larger issue being addressed in discourse. For instance, in the following example, *baba* ‘dad’ is marked as a contrastive topic because the sentence answers the question ‘When does dad go home?’, which contrasts with the question ‘When does mom go home?’. In the current discourse, both subissues belong to the larger issue ‘When do mom and dad go home?’.

- (10) Everyday mom doesn’t come home until late... (Constant 2014: 299 (2))
 baba **ne**, gancui jiu bu huilai.
 dad NE simply just NEG return
 ‘And as for dad, he doesn’t come back at all.’

Hypothetical conditionals have the nature of breaking up a larger issue into several subissues and offering the answer of each subissue in the consequent. This makes conditional antecedents a suitable candidate for contrastive topics, as shown by the *ne*-marking in (11).

- (11) A: What’s the problem if there’s a construction going on outside?
 B: If the crane is under operation, it will get very noisy...
yaoshi xiu shuiguan **ne**, jiali jiu hui tingshui.
 IF fix water.pipe NE home then will water.shutdown
 ‘If they try to fix the water pipes, the water will be shut down at home.’

Constant also observes that a *ne*-marked conditional antecedent can form a fragment question to convey contrastiveness with previously mentioned alternative(s), as in (12).

- (12) Responding to (5): dan **yaoshi** waimian zhengzai xiulu **ne**?
 but IF outside PROG road.construction NE
 ✓ Indicative: ‘But what if the road is currently under construction outside?’
 ✓ CF: ‘But what if the road were currently under construction outside?’

Finally, *ne* shares with the grammatical indicators of contrastive topics in other languages (e.g. the English rise-fall-rise intonation contour) that it resists maximal elements, such as the maximal quantifier *suoyou* ‘all’.

- (13) {**dabufe** / # **suoyou**} de shiqing **ne**, dou hen nanban.
 most all DE matter NE DISTR very hard.manage
 ‘Most/All of the things are hard to deal with.’ (Constant 2014: 317 (32))

Unlike standard conditionals, NCs systematically reject *ne*-marking even if contrastiveness is explicitly supplied by the discourse.

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- (14) A: I heard the construction outside your house is finally over. Would it be annoying if the construction had gone a bit longer?
B: Oh yeah. If the crane came, it would get really noisy.
yaobushi xiuhao shuiguan **ne**, jiali jiu hui tingshui.
IF.NOT fix water.pipe NE home then will water.shutdown
Intended: ‘If the pipes hadn’t been fixed, the water would be shut down at home.’

Forming fragment questions with NC antecedents is also not possible.

- (15) Responding to (5): # dan **yaobushi** waimian tinggong **ne**?
but IF.NOT outside stop.construction NE
Intended: ‘But what if it weren’t the case that the road construction had stopped?’

Note that although English does not mark contrastive topics explicitly with (non-prosodic) grammatical particles, the oddness of NC antecedents in fragment questions is directly attested, as in (16).

- (16) a. But what if the road is under construction?
b. #But what if not for the road construction having stopped?

2.3 NC-antecedents, explanation and explanatory power

Native speakers also report the intuition that the antecedents of *yaobushi*-conditionals tend to offer what is considered the ‘most important factor’ in addressing the causes of the facts under discussion. Consider (4) again. Although John’s decision of not cooking by himself and ordering food delivery instead may be the result of multiple factors (e.g. his desire of saving some time, or trying some cuisine that he doesn’t know how to make), (4) implies that the fact of the road being under construction alone is already sufficient to explain his decision. This intuition becomes particularly robust if the ‘importance’ of the causes are made explicit. In the following example, people would normally agree that knowing the presence of oxygen is trivial in explaining the occurrence of the forest fire. Knowing the arsonist’s action, on the other hand, makes a good explanation. Note that both the presence of oxygen and the arsonist’s action are truly the causes of the forest fire. Nevertheless, NCs prefer the latter as the antecedent, as in (17a).

- (17) Context: We are investigating why the forest fire had occurred. Eventually, we found that an arsonist dropped a lit match. (Adapted from Halpern 2016: 197)
- a. **yaobushi** you ren zonghuo, jiu bu hui fasheng senlin huozai.
IF.NOT have people set.fire then NEG will happen forest fire
‘If someone hadn’t set fire, the forest fire wouldn’t have happened.’
- b. #**yaobushi** you yangqi, jiu bu hui fasheng senlin huozai.
IF.NOT have oxygen then NEG will happen forest fire

'If there hadn't been oxygen, the forest fire wouldn't have happened.'

In scenarios with two causes that are 'equally important', NC antecedents pick out both causes, instead of just one. See the context of (18). Again, although Country A's agreement had truly contributed to the peace, the utterance of (18b) gives the wrong impression that B's contribution by itself had made the peace come true. Rather, NCs prefer describing the joint cause in the antecedent, as in (18a).

- (18) The peace between Country A and B depends on both A's agreement on providing more natural resources and B's agreement on providing more technology. The two countries play equally important part in this bilateral treaty.
- a. **yaobushi** liangguo dachng xieyi, heping buhui chengwei xianshi.
IF.NOT two.country reach agreement peace will.not become reality
'If the two countries hadn't reached an agreement, peace wouldn't come true.'
- b. **#yaobushi** B tongyi tigong kexuejishu, heping buhui chengwei xianshi.
IF.NOT B agree provide technology peace will.not become reality
'If B hadn't agreed to provide more technology, peace wouldn't come true.'

(17) and (18) also show that the role that NCs play in discourse is similar to that of 'explanations'. After all, we can find similar contrast in answering *why*-questions about the forest fire and the peace.

- (19) A: Why did the forest fire happen?
- a. B: Because the arsonist dropped a lit match.
- b. B: # Because there was oxygen.
- (20) A: Why did the peace between Country A and B come true?
- a. B: Because they reached an agreement—A agreed to provide more natural resources and B agreed to provide more technology.
- b. B: # Because B agreed to provide more technology.

I take these examples as an indication that NCs are subject to the constraint of *explanatory power*. Following Gärdenfors (1988), the need to have an explanation for an observation arises usually when the observation is unexpected according to what the agent knew prior to this observation. The explanatory power of an explanation corresponds to the extent to which it resolves the unexpectedness. In this respect, the observation in (17)–(18) suggests that *the explanatory power of NC antecedents is required to be strong enough that it completely resolves the unexpectedness brought about by the observation*. In (17), having the knowledge about the arsonist's action would make one to expect the forest fire to have occurred, while merely knowing the presence of oxygen would not have such effect. Similarly, having the knowledge about the two countries' agreement would make one to expect the peace to have come true, while knowing Country B's agreement is insufficient

to lead to such expectation. In the next section, I present a way of modeling explanatory power formally.

3. Analysis

I argue that NCs instantiate a linguistic form of causal reasoning to the best explanation in discourse. In a nutshell, the causal reasoning that an NC ‘*yaobushi p, q*’ expresses proceeds as follows.

- (21)
- a. First, in search of the explanation of a fact x , which is the negation of q , the speaker infers upwards from x to its best cause (in terms of explanatory power) along the causal flow.
 - b. Next, a causal intervention raised by the negation in *yaobushi* forces the speaker to cut the established causal link into x ’s cause.
 - c. Finally, she reasons once more in the opposite direction, namely from the cause to the effect, about the non-factual situation and reaches the outcome $\neg x$.

The general flow of reasoning here can also be interpreted as a non-probabilistic version of Pearl (2000)’s three-step procedure of counterfactual reasoning. Let us first look at the notion of **causal intervention**, which is the crucial component involved in the last step of (21) (modeled by the *do*-operator in Pearl 2000). One central assumption relevant to causal intervention is that the parent-child relation between variables in a causal network is autonomous in the sense that ‘it is conceivable to change one such relationship *without* changing the others’ (Pearl 2000: 22). Causal intervention models the most important part of counterfactual reasoning: when the speaker updates the value of a certain variable, the causal links between the variable and its causal parents need to be cut off first. For instance, imagine a causal network where the Season of the year causes the Sprinkler to be on/off, and the Sprinkler further makes the streets Wet. The external intervention with the action ‘turning the Sprinkler On’ is represented by deleting the causal link between Season and Sprinkler first, and then assigning the value On to Sprinkler (see Pearl 2000: 23 for the original example). The speaker’s belief about the value of Season thus remains independent from the effect that the external intervention has on the network.

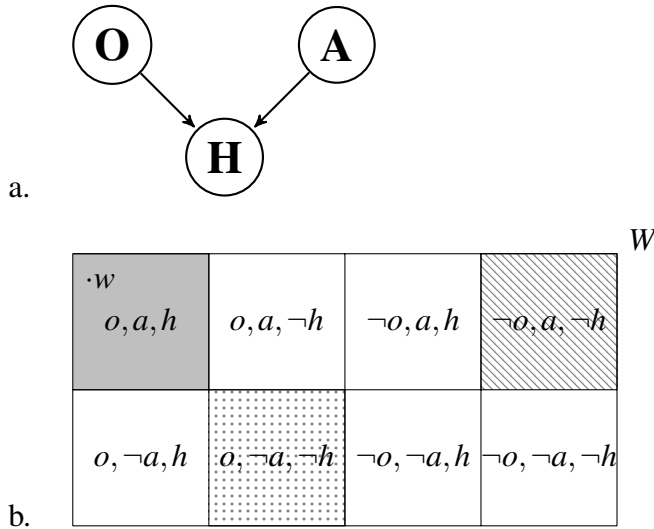
In §3.1, I introduce some formal ingredients that are necessary to capture the reasoning process outlined above. §3.2 implements the observations discussed in §2.

3.1 Ingredients

The way that I model causal intervention largely builds on (a much simplified version of) Causal Premise Semantics in Kaufmann (2013), developed from the Kratzer-style premise semantics for modeling counterfactual reasoning. I assume that a causal network \mathcal{C} is a pair $\langle U, < \rangle$, where U is a set of partitions on W , and $<$ is a directed acyclic graph over U . I sometimes refer to the partitions in U as the variables of \mathcal{C} . I assume that all variables

are bipartitions, each containing two cells (e.g. the variable X contains two cells, x and $\neg x$). For example, let O and H be the variables that partition W with the questions ‘Was there oxygen?’ and ‘Did the forest fire happen?’, $O < H$ indicates that there is a non-empty causal path from O to H . If we add another variable A that partitions W with the question ‘Did the arsonist set fire?’, there will be two causal paths in this network, i.e. $O < H$ and $A < H$. For a world w , there is a set of propositions true at w that also determine which cell w is in. Following Kaufmann (2013), I call these propositions causally relevant truths. (22) visualizes a model with the three partitions O , A and H as discussed above. (a) represents the directed acyclic graph, and (b) depicts the eight cells in W resulting from the three partitions. The causally relevant truths at w are then o , a and h . Note that a cell is a set of possible worlds that is the intersection of the causally relevant truths of any world of that cell.

(22) Directed acyclic graph and the partitions



With these, I define a causal modal base f_c as a function from worlds to sets of causally relevant truths. In the case above, $f_c(w) = \{o, a, h\}$, and the gray cell represents $\cap f_c(w)$. The causal modal base is thus realistic, and all propositions in the set it assigns are causally relevant. I also define a normalcy ordering source g_n , a function from worlds to sets of propositions describing what the speaker takes to be the normal course of events. In the case above, $g_n(w) = \{o, \neg a, (o \wedge a) \leftrightarrow h\}$ if the speaker assumes it normally the case that oxygen is present, that people do not set fire on purpose, and that the occurrence of a forest fire requires the arsonist to set fire in the presence of oxygen. A g_n thus supplies two types of information. First, it encodes what the speaker takes to be unconditionally normal in her world, e.g. o and $\neg a$. The second type of information is represented in the form of biconditionals, e.g. $(o \wedge a) \leftrightarrow h$. These propositions encode the dependencies between variables in a model (it is also similar to structural equations used by the philosophical literature, see Kaufmann 2013 for a formal discussion).

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In interpreting conditionals, I treat conditional consequents as modalized propositions evaluated against a modal base f and an ordering source g . If the consequent does not contain an overt modal (or only contains the auxiliary *would* in the case of counterfactuals), I assume there to be a covert epistemic necessity modal similar to *must*. Interpreting modal operators involves the idea of premise sets, which are generated by adding propositions from the ordering source to the modal base while ensuring consistency.

- (23) Let f and g be the modal base and the ordering source, and w be the world. $Prem(f(w), g(w))$ is the set of of premise sets with respect to f , g , w . It is the set of all and only the consistent supersets of $f(w)$ obtained by adding (zero or more) propositions from $g(w)$. (Kaufmann 2013: 1141)

For a proposition to be a necessity, we simply check whether all premise sets generated lead to some premise set that entails the proposition. This is exactly how necessity operators like *must* are interpreted.

- (24) $Must(p)$ is true at f , g and w iff every premise set in $Prem(f(w), g(w))$ has a superset in $Prem(f(w), g(w))$ of which p is a consequence. (Kaufmann 2013: 1141)

In addition, conditional antecedents restrict the modal in the consequent by updating its modal base. I define the update of f with an antecedent ϕ as follows:

- (25) $f[\phi](w) := f'(w) \cup \{\phi\}$ where $f'(w)$ is the maximal subset of $f(w)$ that is
- a. logically consistent with ϕ , and
 - b. closed under ancestors, i.e. whenever x is in $f(w)$, x 's causal ancestors are also in $f(w)$, but not vice versa. (Kaufmann 2013)

Note that the clause (25b) is important for the purpose of dealing with counterfactuals (and thus causal intervention), but not needed if we only focus on indicative conditionals. With these ingredients, the interpretation of a conditional '*If p, q*' is as follows.

- (26) '*If p, q*' is true at f , g and w iff $Must(q)$ is true at $f[p]$, g and w .

We also need a way to model the intuition about explanatory power that we saw in §2.3. I propose a solution by using the ordering source. In addition to the role it plays in interpreting modals in premise semantics (e.g. in (24)), an ordering source can also induce a pre-order on a set of worlds.

- (27) Let w be a world, $g(w)$ a set of propositions that induces an ordering $\leq_{g(w)}$ on W : For all worlds u and $v \in W$: $u \leq_{g(w)} v$ iff $\{p : p \in g(w) \text{ and } v \in p\} \subseteq \{p : p \in g(w) \text{ and } u \in p\}$. (Kratzer 1981: 298)

The usefulness of this ordering relation is that it can also be used to compare propositions, following Kratzer (1981). The idea is that, for p to be at least as good a possibility as q , for every q -world there is a p -world that is ranked equivalent or even higher based on $\leq_{g(w)}$.

- (28) A proposition p is at least as good a possibility as q in w w.r.t. f and g iff for all $u \in \cap f(w)$ and $u \in q$, there is a $v \in \cap f(w)$ such that $v \leq_{g(w)} u$ and $v \in p$. (Kratzer 1981: 299)

This captures the differences between the antecedents of the sentences in (17) and (18). For (17), let us assume the causal networks and partitions as shown in (22), $f_c(w) = \emptyset$ (or $\cap f_c(w) = W$) for simplicity, and $g_n(w) = \{o, \neg a, (o \wedge a) \leftrightarrow h\}$ as discussed earlier. It is then not hard to see that the antecedent of (17a) (i.e. $\neg a$) is strictly better a possibility than the antecedent of (17b) (i.e. $\neg o$): in W , we can always access from a $\neg o$ -world to a $\neg a$ -world that is at least as normal as the $\neg o$ -world in terms of g_n , but not vice versa. For (18), this works similarly. Simply replace the variables in the causal model in (22a) with three variables A (for ‘*Did Country A agree to provide more natural resources?*’), B (for ‘*Did Country B agree to provide more technology?*’) and P (for ‘*Did peace come true?*’), and assume that $f(w) = \emptyset$, $g_n(w) = \{\neg a, \neg b, (a \wedge b) \leftrightarrow p\}$. It is easy to check that the antecedent of (18a) (i.e. $\neg(a \wedge b)$) is better a possibility than the antecedent of (18b) (i.e. $\neg b$).

3.2 Implementation

I assume that the utterance context c of NCs is a quintuple in the form of $\langle w, QUD, \mathcal{C}, f, g \rangle$. w is the world of c . QUD is the stack of Question Under Discussion in c (cf. Roberts 2012). \mathcal{C} represents the salient causal structure as defined in the previous section. f and g are the standard Kratzer-style modal base and ordering source respectively, both being functions from worlds to sets of propositions (Kratzer 1981, 1991). I also assume that the utterance context of an NC sets the flavors of the modal base and the ordering source to causal (f_c) and normalcy (g_c) respectively, both as defined in the previous sections.

I propose the following semantics for NCs, with the presuppositions in (29), and the truth-conditions in (30).

- (29) ‘*yaobushi p, q*’ is defined in c only if
- a. Q is causally dependent on P , where $P \in U_c$, $Q \in U_c$, $p \in P$ and $q \in Q$; and
 - b. the question on top of QUD_c is in the form of ‘*Why $\neg q$?*’, and
 - c. For all $r \in R$ such that $R \in U$ and Q is causally dependent on R , for all $u \in W$ and $u \in \cap f_c[\neg r](w)$, there is a $v \in W$ such that $v \leq_{g_n(w)} u$ and $v \in \cap f_c[\neg p](w)$.
- (30) Once defined, ‘*yaobushi p, q*’ is true in c iff $MUST(q)$ is true at $f[\neg p], g, w$.

Note that the truth conditions of NCs in (30) are kept minimal. In fact, it is identical with that of (26) except the modal base is updated with $\neg p$ rather than p , since the complementizer contains the negation *bu* ‘not’. For reasons of space, I refrain from the discussion on how a complementizer-internal negation contributes compositionally to the update of the modal base together with its prejacent, but see an explanation offered in Ippolito and Su (2014).

The observations discussed in §2 are all implemented in the presuppositions. First, with the definition of the causal network \mathcal{C} in c , (29a) ensures that there is a non-empty causal path from the causal variable expressed by the antecedent to the one expressed by the consequent. This naturally rules out backtracking interpretation as shown in (7), since such interpretation requires upstream causal reasoning.

(29b) captures our observation that *yaobushi* presupposes the truthfulness of its antecedent, as seen in (9). I assume that *why*-questions presuppose their prejacents (Lawler 1971, Tomioka 2009 a.o.), which under the current semantics of NCs ensures the truthfulness of $\neg q$. Together with the truth condition that $Must(q)$ be true in the modal base updated with $\neg p$, the factivity of p follows.

(29c) captures the observation that NCs pick out the most explanatorily powerful propositions and completely resolve the unexpectedness of the speaker’s observations. It characterizes the notion of explanatory power through a way of comparing cells (rather than worlds or propositions) in W using Kratzer’s comparative possibility as discussed in (28). The idea is that, after $\neg p$ is updated to f_c , the resulted cell needs to be as good a possibility as all the other cells that are resulted from updating f_c with potential causal ancestors of Q . Let us use the toy model in (22) to see how this captures the examples in §2.3, again with $f_c(w) = \{o, a, h\}$ and $g_n(w) = \{o, \neg a, (o \wedge a) \leftrightarrow h\}$. Updating f_c with $\neg a$, this leads to the cell of $o, \neg a$ and $\neg h$. Recall that the definition of modal base update in (25) requires closure under ancestor. This means that, in the current case, since a is excluded from $f[\neg a](w)$ because of its inconsistency with $\neg a$, h must also be excluded. It then follows that the only cell compatible with this update is that of $o, \neg a$ and $\neg h$ (the dotted cell). Alternatively, updating f_c with $\neg o$ leads to the cell of $\neg o, a$ and $\neg h$ (the lined cell). The former is strictly better a possibility than the latter with the defined g_n . This accounts for the contrast between (17a) and (17b).

It is now easy to see why NC antecedents cannot be marked by *ne*. Recall that contrastive topic markers like *ne* are incompatible with semantically maximal phrases, since they cannot be contrasted with other alternatives, cf. (13). With the assumption that general semantic maximality can be reduced to the maximality of explanatory power in the case of NCs, (29c) ensures that NC antecedents target the unique maximally informative variable or the conjunction of the maximally informative variables provided by the causal network, thus naturally banning *ne*-marking on antecedents.

4. Conclusion

Using the data on Mandarin *yaobushi*-conditionals, in this paper we have seen a series of the properties of negative conditionals. Previous works in the literature have distinguished NCs from standard counterfactuals based on their obligatory counterfactuality,

the rejection of backtracking interpretation and the factivity of the prejacent of ‘*if not*’-complementizers. In addition to these properties, *yaobushi*-conditionals showed further restrictions relevant to the utterance discourse. First, the antecedents cannot be contrastive topics. Also, the construction itself carries the function of offering explanations, resembling *because*-phrases that answer *why*-questions. Among the possible explanations offered by the context, *yaobushi*-conditionals pick out the most explanatorily powerful one(s) as the antecedents. We argued that *yaobushi*-conditionals instantiate a linguistic form of causal reasoning to the best explanation in discourse (in the sense of explanatory power), and saw a framework that captures these observations. The crucial ingredients of this framework include Kaufmann’s (2013) Causal Premise Semantics and a normalcy ordering relation induced by the ordering source. The two novel observations were both implemented in the presuppositions.

One of the remaining open questions is whether the observations and the implementations proposed here can be extended to NCs in other languages. And if so, to what extent? Interestingly, English and Spanish native speakers suggest that English and Spanish NCs do not come with the intuition of ‘offering the most important explanations’. In the scenario of (18), it is reported felicitous to utter (31) or (32); in fact, it is even acceptable to utter (31) and (32) in conjunction.

(31) If not for A’s agreement to provide more resources, peace wouldn’t come true.

(32) If not for B’s agreement to provide more technology, peace wouldn’t come true.

If this crosslinguistic variation is real, could there be a correlation with how the negative *if*-complementizer is formed in each language? I hope to find an answer in future research, and hope the answer to give us some hints on a compositional treatment of NCs in general.

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