

Attenuating NPIs in indicative and counterfactual conditionals¹

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Abstract. The antecedent of conditionals is well-established as a licenser of weak negative polarity items (NPIs), but comparatively less attention has been paid to potential differences between indicative and counterfactual conditionals in this regard. Here, we argue that attenuating NPIs like English *all that* and German *sonderlich* (‘particularly’) are systematically degraded in indicative conditionals. We support this observation with experimental evidence from a naturalness rating task and attribute the degradation in indicative conditionals to an interaction between the licensing condition of attenuating NPIs, on the one hand, and the pragmatics of indicative and counterfactual conditionals, on the other.

Keywords: negative polarity items, conditionals, conditional perfection, counterfactuality, experiment, German, semantics, pragmatics

1. Introduction

Although the antecedent of conditionals is well-established as licenser of weak negative polarity items (NPIs) (von Fintel, 1999; Giannakidou, 1998, 2006), comparatively less attention has been paid to potential differences between indicative and counterfactual conditionals in this regard. Indeed, for weak NPIs like *ever* or German *jemals* (‘ever’), both types of conditionals are usually treated as equally acceptable licensing contexts (1).

- (1) a. *If you ever visit Cologne, you will see its cathedral.*
b. *If you had ever visited Cologne, you would have seen its cathedral.*
c. *Falls du jemals Köln besuchst, wirst du den Dom sehen.*
if you ever Cologne visit will you the cathedral see
d. *Falls du jemals Köln besucht hättest, hättest du den Dom gesehen.*²
if you ever Cologne visited had_{SBJV} had_{SBJV} you the cathedral seen

In the present work, we focus on attenuating NPIs (cf. Israel, 1996, 2006, 2011) like English *all that* and German *sonderlich* (‘particularly’) and show that these NPIs are systematically degraded in indicative compared to counterfactual conditionals (2), despite otherwise patterning along with other weak NPIs. We support this observation with corpus and experimental data, and propose an analysis that attributes this degradation to an interaction between the li-

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²Liu (2021) notes that there is a somewhat controversial contrast between the conditional connectives *wenn* and *falls* (both meaning ‘if’) in counterfactual conditionals, such that some German grammars assume that the use of *falls* in counterfactuals is excluded or at least strongly dispreferred. Liu argues that there might be regional differences in this regard; Juliane Schwab and other native speakers of the South Franconian dialect group we consulted find *falls* acceptable in counterfactuals such as (1d).

censing condition of attenuating NPIs, on the one hand, and the pragmatics of indicative and counterfactual conditionals, on the other.

- (2)
- a. *?If I like the book all that much, I will buy the sequel.*
 - b. *If I had liked the book all that much, I would have bought the sequel.*
 - c. *?Wenn mir das Buch sonderlich gut gefällt, kaufe ich die Fortsetzung.*
if me the book particularly good like buy I the sequel
 - d. *Wenn mir das Buch sonderlich gut gefallen hätte, hätte ich die Fortsetzung gekauft.*
if me the book particularly good like had_{SBIV} had_{SBIV} I the sequel bought

The article is structured as follows: In section 2, we provide a brief background on conditionals as NPI licensers and the distinction between emphatic and attenuating NPIs. In sections 3 and 4, we examine the distribution of the attenuating NPIs *all that* and *sonderlich* (‘particularly’), lay out the crucial *explananda* regarding conditionals, and provide experimental data confirming their degradation in indicative conditionals. In section 5, we present our analysis and lay out how it accounts for the data. In section 6, we look at additional predictions our analysis generates, particularly regarding imperfectible conditionals and universal quantifiers as licensers. Section 7 concludes.

2. Background

2.1. Conditionals as NPI-licensing environment

Within the scope of this work, we will broadly consider two classes of theories on NPI licensing that make clear assumptions on the licensing property of conditionals: the veridicality-based approach (Giannakidou, 1998, 2006) and scalar approaches (Chierchia, 2004, 2006; Kadmon and Landman, 1993; Krifka, 1994; Ladusaw, 1979; *inter alia*). The basic observation that both types of theories have to contend with is that weak NPIs like *ever* are licensed in the antecedent of conditionals in indicative (1a,c) and counterfactual form (1b,d).

For Giannakidou, licensing in conditionals straightforwardly follows from her general proposed licensing condition for NPIs: She assumes that weak NPIs require nonveridical environments, i.e. environments where the truth of the proposition *p* is not entailed or presupposed with respect to the epistemic model it is evaluated under (3). Anchoring veridicality to an individual’s epistemic model ensures that weak NPIs are licensed if embedded under verbs expressing negative attitudes towards a proposition (such as *doubt*) and are not licensed under verbs expressing a positive propositional attitude (such as *believe*). Both indicative and counterfactual conditional antecedents are nonveridical, thus allowing weak NPIs. Counterfactual conditional antecedents further allow an antiveridical inference, as Giannakidou (1998) assumes that the falsity of the antecedent is conversationally implicated. This inference may indirectly license some strong NPIs (e.g., Greek *dhino dhekara* ‘give a damn’), which are otherwise restricted to strictly antiveridical environments (Giannakidou, 1998).

- (3) A propositional operator F is veridical iff F_p entails or presupposes that p is true in some individual's epistemic model $M_E(x)$; otherwise F is nonveridical (Giannakidou, 2006: p. 589)

Alternatively, within scalar approaches to polarity sensitivity, conditional antecedents are said to license NPis because they allow for certain scalar inferences, namely Strawson-downward-entailing (Strawson-DE) inferences (von Fintel, 1999), where Strawson-DE is a form of downward entailment that holds iff one grants the presuppositions of the consequence (4).

- (4) A function f of type $\langle \sigma, \tau \rangle$ is Strawson-DE iff for all x, y of type σ such that $x \Rightarrow y$ and $f(x)$ is defined: $f(y) \Rightarrow f(x)$ (von Fintel, 1999: p. 104)

Conditionals are not straightforwardly downward entailing, as apparent from the well-known example in (5). However, downward entailing inferences go through if the initial utterance context is assumed to be compatible with both antecedents x and y and held constant throughout the inference process, see (6). Strawson-DE applies equally in indicative and counterfactual conditionals (von Fintel, 1999), therefore, if one accepts Strawson-DE as licensing condition for weak NPis, NPis should be acceptable in both types of conditionals.

- (5) *If I strike this match, it will light.* (von Fintel, 1999)
 $\nRightarrow$ *If I dip this match into water and strike it, it will light.*
- (6) *If you had ever visited Cologne, you would have seen its cathedral.* ($f(y)$)
- You have visited Cologne this month $\Rightarrow$ You have ever* (i.e. at some point in time) *visited Cologne* ($x \Rightarrow y$)
 - Assume that the context of (2) provides an accessible modal horizon wide enough to be compatible with both antecedents, i.e., $f(x)$ is defined.
 $\rightarrow$ Provided the context stays constant, $f(y) \Rightarrow f(x)$.

To summarize, both approaches to NPI licensing thus assume that indicative and counterfactual conditionals do not differ with respect to their ability to license weak NPis. Giannakidou further assumes that strong NPis, requiring an antiveridical environment, are not licensed in indicative conditionals, but may, in some cases, be indirectly licensed in counterfactuals through the inference to the falsity of the antecedent.

2.2. Emphatic and attenuating NPis

Within the literature on NPis, theoretical approaches to the *licensing question* (Ladusaw, 1979) have occasionally been somewhat narrowly set on strengthening (minimizer and indefinite) NPis. In particular, scalar accounts (Chierchia, 2004, 2006; Kadmon and Landman, 1993; Krifka, 1995; Ladusaw, 1979; *inter alia*), which assume that NPis require a context in which they strengthen the assertion they appear in (e.g., in terms of entailments), struggle to extend to a secondary set of NPis, so-called attenuating or understating NPis (Israel, 1996, 2011). Attenuating NPis have received less attention (but see Israel, 1996, 2011; Matsui, 2011, 2013; Onea and Sailer, 2013), but are a cross-linguistically relevant class whose members are by no means rare: They include, for instance, English *much* (7b) and *all that* (7a) (Israel, 1996),

Japanese *anmari* ('very') and *so(n)nani* ('that') (Matsui, 2011, 2013), and German *sonderlich* ('particularly') (7c) (Israel, 2011) and *so recht* ('really') (Schwab et al., 2021)³.

- (7) a. *John hasn't been to the pub all that often this year.*
 b. *Mary didn't like the new Star Trek movies much.*
 c. *Mary haben die neuen Star Trek Filme nicht sonderlich gut gefallen.*
 Mary have the new Star Trek movies not particularly well liked

Following Israel (1996, 2011), we assume that attenuating NPIs are restricted to contexts where they render an assertion informationally weaker than its alternative(s). This intentionally mirrors the licensing requirement of strengthening NPIs as described above: Israel assumes that all polarity sensitive expressions lexically carry a "quantitative" (q-) and "informativity" (i-)value that together restrict their distribution, and that strengthening and attenuating NPIs form two sides of the same coin. Specifically, the q-value refers to an expression's position within a scalar model, such that the minimizer NPI *the least bit*, for instance, lexically expresses a minimal amount (low q-value), whereas the attenuating NPI *all that* lexically expresses that a property holds to a relatively high degree (high q-value). According to this view, q-values are a lexical feature of all scalar operators.

Polarity items then form a special class of scalar operators which additionally carry a lexical i-value. The i-value refers to the expression's relative informativity within the scalar model, such that a low i-value would indicate that an expression is less informative than its relevant alternatives within the scalar model, whereas a high i-value would indicate that it is more informative than its alternatives. For *the least bit* a high i-value restricts it to contexts where it renders the assertion more informative than the alternatives. For attenuating NPIs like *all that*, on the other hand, a low i-value means that they have to render an assertion weaker/less informative than the relevant alternative(s). In particular, (8) does not entail, but is entailed by, alternatives in which the high-degree modifier is omitted (or replaced by a degree modifier expressing that the property holds to a lower degree). Although we will deviate from the assumption of lexical q- and i-values in our own analysis below, we crucially endorse the principal observation that attenuating NPIs are scalar operators that constitute a mirror image to strengthening NPIs.

- (8) *John hasn't been to the pub all that often this year.*
 $\nRightarrow$ *I* $\Leftarrow$ *John hasn't been to the pub (at all).*

3. The distribution of *all that* and *sonderlich*

Within the rest of this article, we focus on attenuating NPIs in German and English, specifically the degree modifier NPIs *all that* and *sonderlich* ('particularly'). This focus allowed for an in-depth investigation of the distribution of the investigated NPIs, which forms the backbone of our proposal. An extension to a broader set of NPIs and/or other languages is subject to future work.

³Schwab et al. (2021) focus on the acquisition of polarity sensitive expressions. They compare adults' and 11-12-year-old childrens' comprehension of two NPIs (*jemals* 'ever' and *so recht* 'really') and two positive polarity items (PPIs, *durchaus* 'quite/indeed' and *absolut* 'absolutely'), and found that children show an adult-like comprehension of only one of the tested NPIs, namely *jemals* ('ever'). For *so recht* and *durchaus*, children tended to accept un-/antilicensed uses. The authors argue that the delayed acquisition of *so recht* and *durchaus* may be due to (a) differences in the input frequency and (b) the complex pragmatic function of linguistic attenuation. Finally, based on a high acceptance for *absolut* scoping under negation, the authors argue that it is not a good PPI candidate.

We conducted corpus searches in the British National Corpus (BNC), version 3 (2007), and the German Reference Corpus (DeReKo) (IDS, 2020) to investigate the distribution of the two NPIs at hand. Specifically, we used the tagged-T archive (comprising 1,020,172,774 word forms) of DeReKo and a syntactically annotated version of the BNC (comprising 96,986,707 words) hosted at Treebank.info (Uhrig and Proisl, 2011) to extract all instances of *all that* (218 total) and *sonderlich* (5,188 total) and categorize them by licenser type. Note that although the word collocation *all+that* appears a total of 8,035 times in the BNC, the syntactic treebank allowed us to narrow our search to *all that* as sister nodes in the syntactic parse tree (excluding instances such as “*All that is learnt must be carried over*”), such that the remaining 2,458 hits could be manually cleared of non-degree-modifier uses (primarily instances of *all (of) that*, as in “*All that was over for her*”). For space reasons, we restrict ourselves to reporting results for three critical types of licensing environments: nonveridical environments, Strawson-DE environments, and conditionals. Interested readers can find a full results table at our data repository (<https://osf.io/phydx/>). Overall, the data indicate that both *all that* and *sonderlich* most often occur under the scope of clausemate sentential negation (9) (81.7% of all instances *all that*, 89.2% of all instances of *sonderlich*). Nonetheless, we found that anti-additive (e.g. *no*, *never*), DE (e.g., *few*, *hardly*), Strawson-DE (eg., *only*), and nonveridical (e.g., questions) licensing environments are acceptable as well (see sections 3.1-3.3). This directly contradicts previous claims that they are strong NPIs (e.g., Giannakidou, 1998; Zwarts, 1998).

- (9) a. *She didn't know him all that well.*
b. *Sie kannte ihn nicht sonderlich gut.*
she knew him not particularly well

3.1. Nonveridical (and DE) environments

Giannakidou's account attributes the licensing of NPIs in the antecedent of conditionals to the nonveridical nature of this environment (licensing weak NPIs), plus a potential antiveridical inference for counterfactual conditionals (licensing some strong NPIs). Thus, to establish the account's predictions for conditional antecedents with *all that* or *sonderlich*, we sought to establish whether these NPIs can appear in other nonveridical environments. As can be seen in (10) and (11), the data show *all that* and *sonderlich* in various nonveridical contexts, including questions and the scope of adversatives. Under Giannakidou's account, we would therefore expect that conditional antecedents, too, should be an appropriate licensing context. With regard to the scalar approaches to polarity sensitivity, the data serve to demonstrate that DE operators such as *few* are sufficient as licensors.⁴

- (10) a. *Did it matter **all that** much who did the cleansing, the pulling down?*⁵
b. *..., few [guests] are **all that** happy about having to pay extra for extended Wi-Fi access.*⁶
c. *..., Fabia doubted that it would have bothered her **all that** much had the heavens opened.*⁷

⁴Questions are not DE, but van Rooy (2003) has demonstrated that we can maintain a scalar account of NPI licensing once we understand their *strength* not in terms of entailment relations but in terms of the question's *utility*.

⁵BNC entry EV1_1221

⁶<https://www.trivago.ae/manchester-38961/hotel/travelodge-manchester-piccadilly-3509960>

⁷BNC entry JYF_1160

- (11) a. *Haltet ihr den Satz für **sonderlich** gelungen?*⁸
 hold you the sentence for particularly well-formed
 ‘Do you think the sentence is particularly well-formed?’
 b. *About glass surface buildings:*
*Wenige sind **sonderlich** einladend für den Betrachter draußen.*⁹
 few are particularly inviting for the viewer outside
 c. *[...] haben erhebliche Zweifel, dass die Mund-zu-Mund-Propaganda das*
[...] have considerable doubts that the mouth-to-mouth-propaganda the
*Geschäft **sonderlich** beleben wird.*¹⁰
 business particularly stimulate will
 ‘[...] have considerable doubts that the buzz marketing will stimulate the business all that much.’

3.2. Strawson-DE environments

Turning to the second type of account of the NPI licensing property of conditional antecedents, scalar accounts assume that conditionals license NPIs because they are Strawson-DE (von Fintel, 1999). Once more we thus sought to determine whether other Strawson-DE contexts, such as the scope of *only*, can license *all that* and *sonderlich*. The data show that *only* can license *sonderlich* (12). Although our corpus data did not reveal instances of *all that* in Strawson-DE contexts, note that the total occurrence of *all that* in the corpus was low (218 hits). Informal judgments on the examples in (13), however, suggest that Strawson-DE operators such as *only* and *to be surprised* are acceptable as licensers of *all that*. In addition, Onea and Sailer (2013) provide corpus data and experimental evidence from acceptability ratings that support that *only* may license *all that*.

- (12) *Daneben gibt es einige kleine Makel [...], die aber nur bei genauer*
 besides gives it several small blemishes [...] that but only at close
*Betrachtung **sonderlich** auffallen.*¹¹
 inspection particularly stand-out
 ‘Aside from that, there are a few small blemishes, but these only stand out much upon close inspection.’
- (13) a. *(Out of the friend group,) only John was **all that** happy with the exam results.*
 b. *I’m surprised that Mary was **all that** excited about her in-laws’ visit.*

3.3. Conditionals

Sections 3.1 and 3.2 showed that both nonveridical and Strawson-DE environments can license *all that* and *sonderlich*. Following standard analyses (Giannakidou, 1998, 2006; von Fintel, 1999), we would therefore predict (indicative and counterfactual) conditional antecedents to

⁸DeReKo entry WDD11/P01.72378

⁹DeReKo entry T09/MAR.03687

¹⁰DeReKo entry VDI08/JUL.00316

¹¹<https://picclick.de/Bloomingville-Schminkspiegel-Wandregal-Spiegelschrank-m-F%C3%A4chern-222884362710.html>

likewise license these NPis. However, naturally occurring examples from our corpus data and supplementary searches on the web primarily reveal counterfactual conditional antecedents as a licensing environment (14). An interesting exception is the factive conditional in (14d), which we will return to in section 6.2.

At the outset of this article, we postulated that indicative conditionals with *all that* or *sonderlich* in the antecedent are degraded compared to counterfactuals. The naturally occurring examples lend some credence to the idea that indicative conditionals are at least not a typical licensing environment for *all that* and *sonderlich* —although the absence of this construction in corpus and web data does not allow us to conclude that it is incompatible with the language’s grammar. To empirically validate the intuition that indicative conditionals with attenuating NPis are degraded compared to counterfactuals, we therefore conducted a naturalness rating study. This study is reported in the following section.

- (14) a. *It might possibly be an unrealistic expectation, but if he had been all that realistic about the world when he was 19, he probably wouldn’t have a hundred tons to his name 20 years hence.*¹²
b. *If the shift to the disadvantaged had been all that intense, I would have thought that the number would have gone up in 1966.*¹³
c. *If singing were all that serious, frowning would make you sound better.*¹⁴
d. *What’s more, if those “safety improvements” really are all that tangible, will not those aircraft [...] be exposing UK citizens to added risk [...]?*¹⁵

4. Experiment

We conducted a naturalness rating study in German using indicative and counterfactual conditionals with or without *sonderlich* in the antecedent. The study was conducted to test our intuition that indicative conditionals are degraded as a licensing environment for the attenuating NPis *sonderlich*.

4.1. Methods

4.1.1. Participants

An initial 169 participants were recruited over *Prolific* (<https://www.prolific.co/>), nine of whom were later excluded for scoring an accuracy <80% on comprehension questions. All 160 remaining participants were German native speakers (49 female, aged 18 – 60, mean age = 28) and gave informed consent before participating. The study took around 30 minutes. All stimuli, data, and code are available at the following repository: <https://osf.io/phydx/>.

¹²<https://www.cricketcountry.com/articles/destiny-offers-sachin-tendulkar-another-shot-at-that-fairytale-ending-12423>

¹³<https://books.google.de/books?id=oTnulbLilyIC&pg=PA131&lpg=PA131&dq=#v=onepage&q&f=false>

¹⁴<http://www.picturequotes.com/if-singing-were-all-that-serious-frowning-would-make-you-sound-better-quote-540209>

¹⁵BNC entry BNV

4.1.2. Materials

We created 12 target items in six conditions, as shown in (15). Conditions (15a-d) follow a 2x2 design with the factors NPI (present or absent) and conditional type (indicative or counterfactual). Conditions (15a,b) contained the NPI *sonderlich* in the conditional antecedent whereas conditions (15c,d) did not contain an NPI, and conditions (15a,c) were indicative conditionals whereas (15b,d) were counterfactual conditionals. Additionally, we included conditions (15e,f) to test the naturalness of *sonderlich* in the restrictor of universal quantifiers. The role of these conditions will be discussed at length in section 6.1. In short, the analysis we propose below makes immediate predictions for universal quantifiers, which were hereby tested empirically. Participants only saw one of the six conditions per target item. In addition, the experiment included 56 grammatical filler items.

- (15)
- a. *Wenn die Schüler sonderlich aufmerksam sind, werden sie die Klausur bestehen.*
if the students particularly attentive are_{IND} will they the exam pass
 - b. *Wenn die Schüler sonderlich aufmerksam wären, würden sie die Klausur bestehen.*
if the students particularly attentive are_{SBJV} would they the exam pass
 - c. *Wenn die Schüler aufmerksam sind, werden sie die Klausur bestehen.*
if the students attentive are_{IND} will they the exam pass
 - d. *Wenn die Schüler aufmerksam wären, würden sie die Klausur bestehen.*
if the students attentive are_{SBJV} would they the exam pass
 - e. *Alle Schüler, die sonderlich aufmerksam sind, werden die Klausur bestehen.*
all students who particularly attentive are will the exam pass
 - f. *Alle Schüler, die aufmerksam sind, werden die Klausur bestehen.*
all students who attentive are will the exam pass

4.1.3. Procedure

The study was implemented on Ibex Farm. In each trial, participants had to read the target sentence and press the space bar once they were done. Afterwards, a 1-7 Likert scale asked them to provide a naturalness rating (1 = unnatural, 7 = natural) for the sentence they had just read. In one half of the trials, distributed randomly across the experiment, this question was further followed by a yes/no comprehension question targeting the content of the just-read sentence.

4.1.4. Data analysis

Data were analyzed using Bayesian ordinal regression models (Bürkner and Vuorre, 2019) using the *brms* package (Bürkner, 2017), version 2.12, in *R* (R Core Team, 2019), version 4.0.

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We constructed two models: The first compared the naturalness ratings provided for conditionals (15a-d). It included the two factors conditional type (indicative/counterfactual) and NPI (present/absent) as sum-coded fixed effects (0.5, -0.5) with interaction term. The second model compared the naturalness ratings for the indicative conditionals (15a,c) and the assertions containing universal quantification (15e,f), again including two factors, namely sentence type (indicative conditional/universal quantifier) and NPI (present/absent), coded as sum-coded fixed effects (0.5, -0.5) with interaction term. Both models used the maximal random effects structure including random by-subject and by-item intercepts and slopes for all effects. All models used the *brms* default priors and were run in four chains with 8,000 sampling iterations each using a warm-up period of 4,000 iterations.

4.2. Results

The results are visualized in Figure 1. The posterior for the first model supports an interaction effect ($\hat{\beta} = -0.58$, CrI = [-1.19, -0.01], $P(\beta < 0) = 0.97$) such that with the attenuating NPI *sonderlich* indicative conditionals are less natural than counterfactual conditionals, while no difference in naturalness is observed for indicative and counterfactual conditionals without the NPI. The posterior for the second model is further in line with main effects of NPI presence ($\hat{\beta} = -1.50$, CrI = [-1.86, -1.16], $P(\beta < 0) = 1$) and sentence type ($\hat{\beta} = -0.39$, CrI = [-0.72, -0.07], $P(\beta < 0) = 0.99$), but no interaction effect ($\hat{\beta} = -0.16$, CrI = [-0.62, 0.29], $P(\beta < 0) = 0.78$), such that assertions with universal quantification were generally rated as more natural than conditionals, but much like for indicative conditionals, were perceived as considerably less natural if they included *sonderlich*. Finally, note that in general even indicative conditionals and the restrictor of universal quantifiers with attenuating NPis were not rated as completely unnatural. Our proposal will take into account all of these findings.

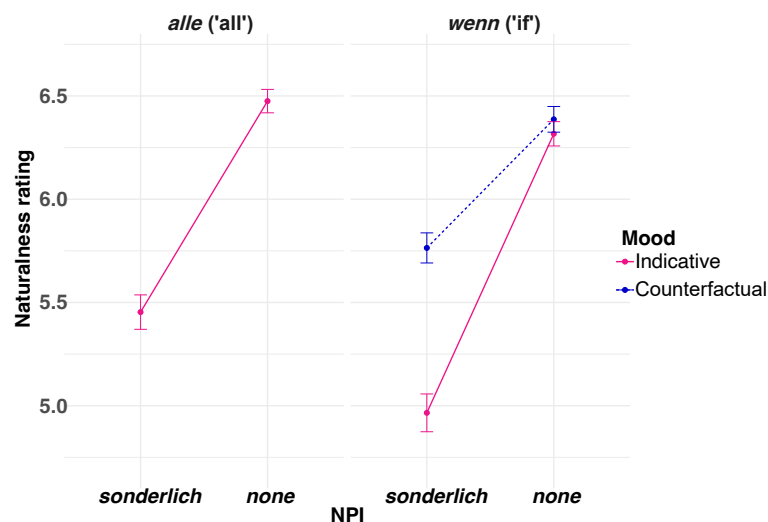


Figure 1: Naturalness ratings on a 1-7 Likert scale for indicative and counterfactual conditionals (right) and universal quantifiers (left) with or without German *sonderlich* ('particularly').

5. Proposed analysis

To capture the distributional idiosyncrasies of *all that* and *sonderlich*, we propose an analysis of the licensing condition for attenuating NPIs that engages lexically evoked alternatives and a scalar licensing mechanism in the spirit of Krifka (1995), but takes serious Israel’s (1996; 2011) proposal that attenuating NPIs are scalar operators that weaken the assertion they appear in. Under our analysis conditionals *can* license attenuating NPIs, but sometimes fail to do so for pragmatic reasons.

5.1. Preliminaries

Krifka (1995) assumes that weak NPIs have both a descriptive content and evoked alternatives, such that *ever*, for instance, has the descriptive content of a temporal indefinite (*at some time t*) and alternatives that refer to more specific times *t'*. The presence of such informationally ordered alternatives serves as triggering condition for a scalar assertion (16c), wherein the proposition *p* containing the NPI is asserted, while all stronger alternatives are negated. In licensing contexts, the proposition with the NPI is at least as strong as all alternatives, thus “surviving” scalar assertion. In non-licensing context, scalar assertion results in contradiction.

The formalisation of this licensing mechanism is provided here in terms of Condoravdi’s (2010) re-formalisation of Krifka’s proposal that ensures compatibility with Strawson-entailing contexts, and will serve as foundation for our own analysis. She defines the informational order of a proposition *p* and its alternatives in terms of sequential contextual updates (16a); if Strawson-updating the context with *p'* does not add anything (in terms of removing possible worlds) after the context has already been updated with *p*, it is considered informationally no stronger than *p*. In other terms, everything that can be said with *p'* has already been said with *p*. While standard contextual update returns the set of worlds compatible with the context in which *p* is true, Strawson contextual update only removes the worlds in which the proposition is false. This ensures that alternatives that are associated with presuppositions will not be considered stronger than *p* simply by virtue of their undefinedness in some worlds.

- (16) a. *p'* is informationally no stronger than *p* iff for any context *c*, $c + p +_{str} p' = c + p$
b. Strawson contextual update: $c +_{str} p = c \setminus \{w \in c \mid \llbracket p \rrbracket_w^c = 0\}$
c. $ScalAssert(\langle p, Alt(p) \rangle, c) = \{w \in c \mid w \in \llbracket p \rrbracket_c \wedge \neg(\exists p' \in Alt(p)(w \in \llbracket p \rrbracket_c \wedge c + p +_{str} p' \neq c + p))\}$
(Condoravdi, 2010: 897)

Contrary to NPIs like *ever*, which require a licensing context in which they render the assertion stronger than any of its alternatives (16c), we follow Israel (1996, 2011) in assuming that attenuating NPIs must render an assertion *informationally weaker* than its alternative(s). The precise licensing condition we propose is introduced in the following section.

5.2. Licensing attenuating NPIs

Our analysis centers around *sonderlich* and *all that*, for which we preliminarily assume a common lexical meaning: Both are ascribed a standard high degree modifier meaning (identical to *very* in McNally (2016)) in their descriptive content in (17).¹⁶ Additionally, they are assumed to evoke less specific alternatives, which, by virtue of *all that* and *sonderlich* being degree modifiers positioned at the upper part of a scale, concern lower degree alternatives to $G(x)$.

$$(17) \quad \llbracket all\ that \rrbracket / \llbracket sonderlich \rrbracket \\ = \lambda G. \lambda x. [G(x) \geq d_s(\{y: pos(G)(y)\}) \wedge \forall G' \in ALT(G) [G(x) \sqsubset G'(x)]]$$

Our proposed licensing condition is provided in (18). It employs the alternatives lexically evoked by the NPI, which offers flexibility to be applied to attenuating NPIs other than *all that* and *sonderlich*, including non-degree-modifiers, in future work. The formulation in (18) is analogous to that for scalar assertion in (16c) in the first conjunct, such that it states that the proposition p is true in the evaluation world w . This ensures the assertability of p in w . It deviates from scalar assertion in the second conjunct, however: the critical licensing condition for attenuating NPIs is determined to be that there must be an alternative p' such that there is a world w' compatible with context c where p' is true and p' is informationally stronger than p . Essentially, this analysis implements that the NPI will be licensed only when there is an alternative p' that is more informative than p .

$$(18) \quad \textbf{Licensing condition:} \\ \{w \in c \mid w \in \llbracket p \rrbracket_c \wedge \exists p' \in Alt(p) (\exists w' \in c \mid w' \in \llbracket p' \rrbracket_c \wedge c + p +_{str} p' \neq c + p)\}$$

To illustrate this licensing condition on a concrete example, let us consider a basic case with sentential negation as licensing context: Provided the asserted proposition p in (19a), the alternatives evoked by the NPI *all that* will concern lower degree alternatives as in (19b). Following the licensing condition in (19c), it must be the case that there is an alternative which is stronger than p . This clearly holds: In a world where the alternative p' is true, asserting p' (e.g. *The students aren't attentive*) is coherent with and adds more information even after it has already been established that p (*The students aren't all that attentive*). Specifically, asserting p' removes all worlds as false in which the students' attentiveness ranges somewhere between *attentive* and *all that attentive*. Therefore, *all that* is licensed.

$$(19) \quad \begin{array}{ll} \text{a.} & p = \textit{The students aren't all that attentive.} \\ \text{b.} & Alt(p) = \textit{The students aren't attentive} \text{ (to some lower degree than in } p) \\ \text{c.} & \{w \in c \mid w \in \llbracket \textit{The students aren't all that attentive} \rrbracket_c \wedge \exists p' \in Alt(\textit{'The students aren't all that attentive'}) (\exists w' \in c \mid w' \in \llbracket p' \rrbracket_c \wedge c + \textit{'The students aren't all that attentive'} +_{str} p' \neq c + \textit{'The students aren't all that attentive'})\} \end{array}$$

Conversely, in affirmative contexts, the licensing condition does not hold: Provided a proposition p like *The students are all that attentive*, updating a context c with a lower degree alterna-

¹⁶Compositionally, *all that* has a demonstrative component *that*. Indeed, a previous account of *all that* as NPI by Onea and Sailer (2013) has analyzed *all that* as inherently anaphoric. We acknowledge that *all that* can be used anaphorically, particularly if *that* is stressed (e.g., *all THAT happy*), but argue that it is not inherently anaphoric. In anaphoric contexts, the specific degree value returned by the measure function in (17) may be contextually provided. We refer the reader to Calle-Martín (2019) for a discussion of the grammaticalization process of *that* to a degree adverb.

tive proposition p' (e.g. *The students are attentive*) does not provide any new information as p' is logically entailed by p . P' is thus no stronger than p and licensing fails.

5.3. Applying the analysis to conditionals

Recall that the aim we set out with was to provide an analysis that can capture the degradation of indicative conditional antecedents as licensing environment for the attenuating NPIs *all that* and *sonderlich*. In the following, we pursue a pragmatic explanation of the phenomenon that can be summarized in three main arguments: First, per the licensing condition defined above, conditionals (both indicative and counterfactual) do, in principle, license attenuating NPIs. Second, per that same licensing condition, perfected conditionals do not license attenuating NPIs. We therefore argue that *all that* and *sonderlich* will be degraded in any conditional that is pragmatically strengthened to a biconditional. Third, counterfactuals trigger an inference towards the falsity of the antecedent.¹⁷ This inference can rescue the NPI in counterfactual conditionals (c.f. Giannakidou, 1998, 2006). Overall, we thus posit the degradation of indicative conditionals compared to counterfactual ones as a consequence of the pragmatics of conditionals, specifically the inferences that indicatives and counterfactuals generate. The analysis is laid out step by step in the following.

First off, applying our proposed licensing condition to conditionals yields that conditional antecedents are a suitable licensing environment for attenuating NPIs: Given (20a) as the asserted proposition and (20b) as the relevant alternatives, the licensing condition in (20c) requires that there must be an alternative p' that is stronger than p . This is the case: Asserting that *the students will pass the exam if they are attentive* (to some lower degree than asserted in p) is coherent with and *adds more information* even after p has already been said. Specifically, asserting p' clarifies that a lower degree of attentiveness is also sufficient for passing the exam. This reasoning extends analogously to counterfactual conditionals. Our analysis therefore predicts that *all that/sonderlich* will be licensed in both types of conditionals.

- (20)
- a. $p = \text{If the students are all that attentive, they will pass the exam.}$
 - b. $\text{Alt}(p) = \text{If the students are attentive (to some lower degree than in } p), \text{ they will pass the exam.}$
 - c. $\{w \in c \mid w \in \llbracket \text{all that attentive} > \text{pass} \rrbracket_c \wedge \exists p' \in \text{Alt}(\text{'all that attentive} > \text{pass'})$
 $(\exists w' \in c \mid w' \in \llbracket p' \rrbracket_c \wedge c + \text{'all that attentive} > \text{pass'} +_{str} p' \neq c + \text{'all that attentive} > \text{pass'})\}$

We now turn to the second part of our analysis, namely the breakdown of licensing under conditional perfection.

¹⁷The status of this inference as implicature or presupposition has been under some debate, see e.g., Anderson (1951); Iatridou (2000); Ippolito (2003); Leahy (2018); von Stechow (1998); Zakkou (2020). We treat it as presupposition, but its precise status is not a deciding factor in our analysis.

5.3.1. Conditional perfection

Conditional perfection is a common pragmatic inference whereby a conditional sentence receives a biconditional interpretation (21). This is a non-obligatory, cancelable inference (21c), whose precise status has been under some debate (among others: Atlas and Levinson, 1981; Geis and Zwicky, 1971; Herburger, 2015a, b; Horn, 2000; Van Der Auwera, 1997). We follow Herburger (2015a), who assumes that (a) whether a conditional is perfected is a matter of pragmatics, and (b) that conditional perfection is achieved by silently conjoining the sentence with an exhaustified version of itself (22).

- (21) a. If you work hard, you'll succeed. (Herburger, 2015a)
b. If and only if you work hard, you'll succeed.
c. If you work hard, you'll succeed. But sometimes, a bit of luck can be enough.
- (22) If you work hard, you'll succeed ~~and only if you work hard, you'll succeed~~.

One consequence of conditional perfection is that the alternative proposition p' evoked by the NPI is no longer stronger than the original proposition p . Instead p and p' are mutually exclusive, with neither being stronger than the other: Specifically, if the necessary and sufficient condition for passing the exam is that one was attentive to a high degree, it cannot simultaneously be true that lower-degree attentiveness is sufficient for passing the exam. Vice versa, if the necessary and sufficient condition for passing the exam is that one was attentive to some (lower) degree, it cannot simultaneously be true that passing the exam is contingent on a high degree of attentiveness. Contra the licensing requirement of attenuating NPIs, for perfected conditionals the contextual update in (18) yields that $c + p +_{str} p' = \emptyset = c + p$, as p must be false in any world where p' is true. Therefore, *all that* and *sonderlich* are not licensed in perfected conditionals.

- (23) *If the students are all that attentive, they will pass the exam ~~and only if the students are all that attentive, they will pass the exam~~.*

Given that conditional perfection is a pragmatic phenomenon, the extent to which conditionals with attenuating NPIs in their antecedent will be degraded is thus predicted to depend on a range of contextual factors and, to some extent, individual differences in comprehenders' likelihood to draw the inference. Generally, the rate of conditional perfection in indicative conditionals may be quite high (for experimental data, see Liu and Barthel, 2021). Additionally, conditional perfection is arguably present in both indicatives and counterfactuals (e.g., Horn, 2000), although, to our knowledge, it has so far not been investigated whether it arises to the same extent in both indicatives and counterfactuals. One possible explanation for the increased naturalness of counterfactual conditionals with attenuating NPIs is thus that they give rise to fewer inferences to conditional perfection. Another explanation, which we pursue in the following section, is that attenuating NPIs can be rescued in (perfected) counterfactual conditionals due to another factor: the inference to the falsity of the antecedent.

5.3.2. Counterfactuality

So far, we have established (a) that indicative and counterfactual conditionals license attenuating NPIs in principle, but that (b) under the common inference of conditional perfection, licensing breaks down. The question we still have to contend with, then, is why the attenuating NPIs *all that* and *sonderlich* are more acceptable in counterfactual conditionals. For this, we argue that the NPIs can be rescued through the inference to the falsity of the antecedent, e.g., *The students haven't been all that attentive*. This presupposition (or implicature) (Anderson, 1951; Iatridou, 2000; Ippolito, 2003; Leahy, 2018; von Stechow, 1998; Zakkou, 2020) provides an environment in which the NPI is licensed (c.f. Giannakidou, 1998, 2006), thus improving counterfactual conditionals compared to indicative ones. Note that although an unconstrained application of implicature-based licensing has come under justified criticism for overgeneralizing (Giannakidou, 2006; Horn, 1996; Kadmon and Landman, 1993), some sensitivity to contextually and/or conventionally available inferences that generate an NPI-licensing (scalar) construal is hardly deniable (24). Part of what appears to be crucial is what the speaker intends to convey (Israel, 2011; Kadmon and Landman, 1993):

- (24)
- a. *There are exactly two reasons I would ever talk to her again: one is if my life depended on it; the other is if she were to say 'hello' to me.* (Israel, 2011)
→ conveys that there are *no more than two reasons*
 - b. *Be glad we got any tickets (at all)! (Kadmon and Landman, 1993)*
→ conveys that *it was expected that they would not be able to get tickets*.
 - c. *It isn't because Sue said anything bad about me that I'm angry.* (Kadmon and Landman, 1993)
→ metalinguistic rejection conveying that *it is not the case that Sue said something bad*.
 - d. *If the students had been all that attentive, they would have passed the exam.*
→ presupposes and conveys that *the students have not been all that attentive*.

To summarize, we have thus argued that conditionals can, in principle, license *all that/sonderlich*, but that licensing fails under the pragmatic inference to conditional perfection. For counterfactual conditionals, we have argued that they are always rescuable, regardless of conditional perfection, via the inference to the falsity of the antecedent. In the following, we turn to two predictions our analysis generates, one concerning imperfectible conditionals and one concerning the restrictor of universal quantifiers as licensors of attenuating NPIs.

6. Additional predictions of the proposed analysis

6.1. The restrictor of universal quantifiers

We follow the widely held assumption that conditionals have universal force (a feature shared by various analyses of conditionals, e.g. the Lewis/Kratzer style (Kratzer, 2012), the strict conditional (Lewis, 1918), and the variably strict conditional (Lewis, 1973) analyses)¹⁸, such that *If p, q* means that *all p-cases are q-cases*. This invites the question whether the restrictor of

¹⁸aptly reviewed in Herburger (2015b)

universal quantifiers, known as licensing environment for weak NPis like *ever* (25), displays a similar behavior to conditionals. Universal quantifiers with relative clause restrictors are pragmatically strengthenable such that the material in the restrictor of the quantifier is understood as exhaustive description of the conditions that bring about the consequent in its scope. Thus, for instance, ‘*All students who are all that attentive in class will pass the exam*’ allows for the inference that ‘*All and only those students who are all that attentive will pass*’.¹⁹ Analogously to the licensing breakdown under conditional perfection, our analysis therefore predicts that universal quantifiers with *all that* or *sonderlich* in their restrictor will be degraded.

(25) *All people who have ever been to the moon were men.*

The experiment we reported in section 4 tested for this prediction by collecting naturalness ratings for *sonderlich* in the restrictor of universal quantifiers.²⁰ The results confirm that universal quantifiers are degraded as licensing environment for *sonderlich* to a similar extent that indicative conditionals are (see section 4), which is in line with our analysis.

6.2. Imperfectible conditionals

Our analysis predicts that conditional antecedents should be a more acceptable licensing context if the conditional is imperfectible. Factive conditionals (also sometimes called premise conditionals) offer a test case for this prediction: Echoing information that has previously been introduced, these conditionals presuppose the truth of the antecedent and cannot be perfected.²¹ A naturally occurring example—the only instance of an indicative conditional with *all that* in our corpus data—is (14d), repeated as (26) for convenience:

(26) *What’s more, if those “safety improvements” really are all that tangible, will not those aircraft [...] be exposing UK citizens to added risk [...]?*²²

In our informal judgment, the acceptability of *all that* and *sonderlich* is indeed improved when an indicative conditional has a clearly factive reading, as in the modified experimental stimuli in (27). The behavior of attenuating NPis in imperfectible conditionals thus appears to be in line with our proposed analysis. Experiments to validate these intuitions are outstanding.

¹⁹Compare this to an example where the strengthened construal is less likely, e.g.,

(i) *alle, die sonderlich viel mit religion am hut haben [...] kamen und kommen als partner nicht in frage.*
all who particularly much with religion at-that hat have [...] came and come as partner not in-to question
‘Everyone who has all that much to do with religion has been and will be an unsuitable partner for me.’

The speaker arguably does not intend to say that being highly religious is their only “no-go” (i.e., necessary and sufficient criterion for being excluded as potential partner). Indeed, the speaker continues to provide other criteria: *wenn der religiöse part rausfällt, dann kommt es nurnoch darauf an ob z.b. unsere vorstellungen von dem verhältnis mann/frau, korrektem sozialverhalten usw. übereinstimmen* (‘once the religious part is excluded, it only matters whether, for example, our beliefs regarding the relation between man and woman, acceptable social behaviors, etc., match’) (Thanks to Patrick Grosz (p.c.) for this example. Source: <https://www.planet-liebe.de/threads/interkulturelle-liebesbeziehungen.555424/>)

²⁰Universal quantifiers were tested only in the indicative form.

²¹Although factive conditionals presuppose the antecedent, they are often used as rhetorical device for a speaker to cast doubt on the presupposed content.

²²BNC entry BNV

- (27) a. A: *My students are very attentive in class!*
 B: *If the students (really)²³ are all that attentive, they will pass the exam.*
- b. A: *Meine Schüler sind im Unterricht sehr aufmerksam!*
 my students are in-the class very attentive
 B: *Wenn die Schüler (wirklich)²³ sonderlich aufmerksam sind, werden sie*
 if the students (really) particularly attentive are will they
die Klausur bestehen.
 the exam pass

7. Conclusion

In summary, we have made the novel observation that attenuating NPIs like *all that* and *sonderlich* show a quantitatively confirmed contrast between indicative and counterfactual conditionals, and put forward an analysis that captures this behavior by arguing that (a) conditionals can generally license attenuating NPIs, (b) the degradation is due to conditional perfection, and (c) counterfactuals are rescuable by the counterfactual presupposition. We have further shown that our analysis seems to make the right predictions for imperfectible factive conditionals and for the restrictor of universal quantifiers as licenser. In future work, we aim to test the analysis on a broader set of attenuating NPIs, and will revisit differences between indicative and counterfactual conditionals in NPI licensing more broadly.

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²³ Although the examples are acceptable without *really* and *wirklich*, these elements may improve their naturalness both because they lexically mark a contextual presupposition of *p* and because they might contribute speaker bias against *p*, see Liu et al. (2021).

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