Concessivity implies scalarity and impositive updating

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Abstract

This paper presents an account of concessivity within the dynamic modelisation of discourse in Farkas and Bruce 2010. It is proposed that concessive connectives (i) indicate that the proposition expressed by the subordinate clause must be imposed on the common ground, instead of passing through a negotiative phase, and (ii) introduce a specific scalar presupposition that makes use of conditional probability.

Contents

1 Introduction

The literature on concessive connectives often stresses the intimate connection between concessivity and causality (König and Siemund, 2000, a.o.). Many authors even talk of an equivalence between certain constructions. The following example illustrates:

(1) König and Siemund 2000: (5)

a. The house is no less comfortable because it dispenses with air-conditioning
⇒ ¬[house less comfortable *because* house dispenses with air-conditioning]

b. The house is no less comfortable although it dispenses with air-conditioning
⇒ ¬[house less comfortable] *although* house dispenses with air-conditioning

In (1), both the matrix clause and the subordinate clause are superficially identical, with a negative quantifier *no* appearing in the matrix clause. The equivalence is proposed to hold between the two constructions in (1) if negation stays in the matrix clause in the concessive (b), but takes wide scope over the causal relation in (a). In some sense, then, concessive means incausal: whatever causal relation normally holds between the two segments is cancelled or taken not to hold. König (1991) and König and Siemund (2000) even state that "the ability to explicate this relationship should be taken as a criterion of adequacy for such analyses [of concessivity]" (König and Siemund 2000, p. 11). Clearly, then, describing the exact role of causality is of primordial importance in the study of concessivity.

In this paper, I propose that the core meaning of concessive connectives does not come from causality, but from likelihood. It is argued that while a subordinate clause p introduced by a concessive connective does not directly address the current Question Under Discussion (Roberts, 1996, a.o.), it is used as a restriction on the common ground relative to which the main clause q – which answers the current QUD – is interpreted. In this analysis, the intuitively incausal meaning component of a concessive connective is detached from causation. Instead, it is argued that the presupposition of a concessive connective is concerned with the relative probability of q compared to $\neg q$, and this given p. Technically, I propose that what is compared is the likelihood that the actual world is included in one of two projected context sets: the first determined by a common ground updated with p and q, and the second by a common ground updated with p and the negation of q. In other words, concessives make use of conditional probability.

The main empirical focus of this paper is on two concessive connectives, the English *although* and the French *bien que*. In terms of Sweetser's (1990) distinction between the different domains that connectives may operate on, I concentrate here on content-domain uses of concessives, and hope to address issues related to the epistemic and speech-act-related uses of concessives at another occasion.

This paper is structured as follows. In Section 2, I give a brief summary of previous work on concessive connectives and their semantics, and Section 3 is an overview of the dynamic perspective on discourse and its modelisation. In Section 4, I spell out a proposal for the semantics of content-level concessive connectives. Section 5 concludes.

2 Previous work on the meaning of concessivity

2.1 Concessive and causal connectives: duality?

As mentioned above, it is often noted in the literature that concessives are used to convey the opposite of a causal relation. Indeed, König and Siemund (2000) note that the label "concessive" is almost a misnomer, in that that the discursive effect of using a concessive clause often seem to have nothing to do with conceding, and more with opposing a causal relation that should normally hold.

Describing concessivity as the opposite of causality led König (1991) to postulate that the relationship between the two is that of *duality* (cf. Löbner, 1990). Duality is a relation that holds between two expressions α and β if $\alpha(P) = \neg\beta(\neg P)$ and $\beta(P) = \neg\alpha(\neg P)$. In other words, two expressions are duals if they correspond to each other's external and internal negation.

(2) Duality

a. Duals are expressions α and β such that $\alpha(P) = \neg\beta(\neg P)$ and $\beta(P) = \neg\alpha(\neg P)$

b. Let α be $\exists$ and let β be $\forall$.
Given that $\exists x[P(x)] = \neg\forall[\neg P(x)]$ and that $\forall x[P(x)] = \neg\exists x[\neg P(x)]$, α and β are duals

König (1991) proposes that the dual relationship between *because* (causal) and *although* (concessive) can be described as in (3). In this paper, the propositional variable p will be used as a place-holder for the subordinate clause, while q is a placeholder for the main clause.

(3) A duality-based analysis of *because* and *although* (König, 1991, p. 201)

a. $\textsc{because}(p), q \quad \rightsquigarrow \neg(\textsc{because}(p), \neg q) = \textsc{although}(p), q$

b. $\textsc{because}(p), \neg q \quad \rightsquigarrow \neg(\textsc{because}(p), q) \quad = \textsc{although}(p), \neg q$

An immediate problem of König's account, which he himself recognises, is that the duality relation between *because* and *although* would have to be unidirectional: it is impossible to turn a concessive into a clausal by means of external and internal negation, as (4b) shows.

(4) König and Siemund 2000: (22), (23)

a. The road is not getting wet although it is raining
= It is not the case that the road is getting wet because it is raining

b. It is not the case that the road is getting wet although it is raining
≠ The road is getting wet because it is raining

The data in (4) is problematic, as bidirectionality is an essential formal property of duals in Löbner 1990. Further problems for a duality-based account are noted by Pasch (1992a,b) and Iten (1997). It therefore seems that duality is not the right notion for formally describing the relation between causality and concessivity.

2.2 A causal presupposition for concessive connectives

If the relationship between causal and concessive connectives cannot be described using the notion of duality, but the central criterion of adequacy for an analysis of concessivity requires that the intuitive connection between the two be explained, some other way of getting to this explanation must be found. One such way is to postulate a causal presupposition.

König and Siemund (2000) discuss this type of approach to concessivity and note that previous informal proposals making use of such a presupposition (König, 1988, 1994) have also been presented in more formalised versions (Pasch, 1992a). Here, we will discuss the "informal" version of Pasch 1992a as presented by König and Siemund (2000).

König and Siemund summarise Pasch's (1992a) analysis as in the following table:

type:	**causal**	**concessive**
example:	BECAUSE(p), q	ALTHOUGH(p), q
presupposition:	$p \rightarrow q$	$p \rightarrow \neg q$
assertion:	$p \wedge q$	$p \wedge q$

Figure 1: Summary of Pasch 1992a in König and Siemund 2000, p. 13, Table 2

In short, it is proposed that causal and concessive constructions assert the conjunction of the two clauses p and q. The difference between the two constructions lies in the presupposition they evoke: while a causal connective signals that there is a causal relationship between p and q, a concessive connectives signals that a causal relationship holds instead between p and $\neg q$. Therefore, "[...] the two situations linked by a causal connective are in keeping with general tendencies, regularities, sequences of situations, whereas the sequence or concomitance of situations described in a concessive construction goes against the tide: p & q is asserted given a general tendency 'if p then not q', i.e. the very opposite of q normally goes together with p" (König and Siemund 2000, p. 13).

König and Siemund argue that the analysis shown in Figure 1 should be amended in two ways. First, they propose that the p and q inside the presupposition should be replaced by P and Q, where capital letters represent "some kind of generalisation over the two specific situations asserted" (p. 13). The reason for this change lies in their observation that the presupposition of a concessive construction such as *Although it is raining, Fred is going for a walk* in fact seems to have the form *If it is raining, Fred does not normally go for a walk*, or *People do not go out for a walk if it is raining*, or even *The more it rains, the less people go out for walks*. These presuppositions are all developed forms of the $p \rightarrow \neg q$ presupposition proposed in Figure 1.

The second change that König and Siemund propose is that the content of the subordinate clause p be presupposed: this is why the content of p is not affected by e.g. an interrogative operator, as in *Was he fired, although he did not take part in the demonstra-*

tion?, where the content of p is taken to be true and not questioned.

The revised version of the table in Figure 1 is given below.

type:	**causal**	**concessive**
example:	BECAUSE(p), q	ALTHOUGH(p), q
presuppositions:	$P \rightarrow Q$ p	$P \rightarrow \neg Q$ p
assertion:	$p \wedge q$	$p \wedge q$

Figure 2: König and Siemund 2000, p. 14, Table 3

As for the case of causal constructions with wide scope (WS) negation (negation over the causal relation, not the segments p and q, as would be the case with narrow scope (NS) negation), König and Siemund propose the following table, which parallels the one in Figure 2 in an expected way. When negation scopes over the causal relation, which is presupposed, the causal relation remains unchanged – this is because negation is infamous for its property of being a presupposition hole, and lets presuppositions project past it without modifying them. Therefore, König and Siemund argue, negation can only target the assertion $p \wedge q$. Now, as p is presupposed, the truth of $\neg(p \wedge q)$ will amount to the falsity of q, and thus the WS negation of a causal construction amounts to a concessive construction where q is negative.

type:	**causal**, WS negation	**concessive**, NS negation
example:	$\neg$(BECAUSE(p), q)	ALTHOUGH(p), $\neg q$
presuppositions:	$P \rightarrow Q$ p	$P \rightarrow Q$ p
assertion:	$p \wedge \neg q$	$p \wedge \neg q$

Figure 3: König and Siemund 2000, p. 15, Table 4

2.3 From causality to correlation

The account presented by König and Siemund links causality and concessivity in an initially attractive way, postulating a difference only in the polarity of the consequent of the presupposed conditional. Their generalising modification (p, q changed into P, Q), although formally imprecise, fares better than Pasch (1992a) in at least one sense: using

the table in Figure 1 inevitably leads to a presupposition failure in all concessive constructions. In short, it is impossible to satisfy the presupposition $p \rightarrow \neg q$ given that $p \wedge q$ must be true: there are simply no worlds which could make both formulas true at the same time, at least if the relationship is modelled using material implication. This could perhaps also be one of the reasons why König and Siemund (2000) shift to "generalised versions" of the segments, and talk about "general tendencies" and "typical sequences of situations".

In this paper, I take this shift to be the key element in the semantics of concessives: it is not a causal relation that links p to q, but one that can be modelled using conditional probability. In other words, the notion of "general tendency" is formally modeled using basic probability theory. One crucial advantage of letting go of the notion of causality as a defining characteristic of concessivity is that it allows explaining examples where no direct causality is at play. Indeed, some of the paraphrases that König and Siemund propose for the generalised versions of the segments include words that relate to *correlation*, and not *causation*: such is the case, for example, for "general tendency". On the difference between causation and correlation, I cite an example from user Paul at Stackexchange.com[1]:

> For instance, homeless population and crime rate might be correlated, in that both tend to be high or low in the same locations. It is equally valid to say that homelesss population is correlated with crime rate, or crime rate is correlated with homeless population. To say that crime causes homelessness, or homeless populations cause crime are different statements. And correlation does not imply that either is true. For instance, the underlying cause could be a 3rd variable such as drug abuse, or unemployment.

If we construct a concessive example with homeless population (p) and crime rate (q), we do not get to a negation of a *causal* relation between p and q. Instead, the perceived meaning can be rephrased as "in most cases, the amount of homeless people correlates with crime rate, but here we have an exception that does not conform to what was expected based on the correlation". In other words, not only do we *not* negate the relation in itself – indeed, the correlative relation can and should go on existing in the interlocutors' world knowledge – but also, there clearly does not need to be a direct causal relation between the two segments for concessivity to be expressible.

(5) The crime rate is not high *although* there are many homeless people
$\neq \neg$[crime rate is high *because* there are many homeless people]

3 A dynamic perspective on discourse

In this section, we discuss the proposal of Farkas and Bruce (2010) on how to modelise discourse contexts in a dynamic way. We will see what type of components track the individual and shared discourse commitments of discourse participants and their common goals in a discussion. We will also very briefly review two non-negotiating ways of

[1] http://stats.stackexchange.com/questions/36/examples-for-teaching-correlation-does-not-mean-causation

contributing to a discussion, namely, imposition and presupposition.

3.1 The components of context

In this paper, I adopt the modelisation of context structure proposed by Farkas and Bruce (2010), who note that their model stands on foundational work by Hamblin (1971), Stalnaker (1978) and Carlson (1983), and incorporates features from earlier work by Ginzburg (1996), Gunlogson (2001) and Asher and Lascarides (2003). In such frameworks, where discourse is thought of as an incremental process of acquiring and negotiating information, the purpose of discourse can be considered to consist in answering one very important question: *How is the world?* (cf. Roberts, 1996).

To try to answer to such a question, one must start with smaller, easier-to-answer questions, and by incrementally providing new information, get closer and closer to an answer. One standardly used formal way to think about this localisation problem is in terms of possible worlds. A proposition corresponds extensionally to a set of possible worlds, namely, those in which the proposition is true. Finding which world w is our actual world w_0 (and thus answering the question *how is the world?*) means eliminating possible candidate ws until only one w is left. Narrowing down the options is done by accepting more and more propositions as true, and hence eliminating those worlds where the accepted propositions do not hold. In Stalnaker's (1978) terms, the set of propositions accepted by all participants in a conversation c is called the *common ground* (cg).

Farkas and Bruce propose to model the cg as containing only those propositions on which all discourse participants have agreed or which are part of their background knowledge. The authors propose to model the participants *individual* discourse commitments in a separate component, so as to allow for the conversation to be in a state where the participants do not agree on a specific issue p, for example. In this case, neither p or $\neg p$ will be included in the cg, while the participants' discourse commitment sets will contain p and $\neg p$, respectively.

In order to restrict the space of live options for the actual world – modeled as the *context set* which corresponds to the set of worlds in the intersection of all propositions of the cg – participants must have a way of proposing additions to the cg. Farkas and Bruce propose that raising issues and making proposals happens at the *Table*. The Table has a push-down, last-in-first-out stack structure, and stores items that are pairs of syntactic objects and their denotations. The content of the stack is what is "at issue" in the conversation. In this context, Farkas and Bruce propose that the immediate goal of the conversation is to "clean the table", so that nothing is left in the stack. This is done by answering the QUDs and agreeing or disagreeing with assertions, or more generally, by settling the issues on the Table (cf. Roberts, 1996).

As Farkas and Bruce (2010) crucially deal with the canonical and uncanonical ways of expressing (dis)agreement with assertions and answering queries, they also introduce a component that contains a privileged, *projected set* (ps) of future common grounds. These common grounds are supersets of the cg, and correspond to a canonical output cg after the issue has been settled. For example, an proposal to update the cg with an

assertive item will canonically be removed from the Table when the participants agree to add the proposition to the cg. In other words, as the authors put it, "an assertion projects confirmation in that it projects a future common ground that includes the asserted proposition" (p. 88). When the item on the Table is a question, the ps consists in a set of common grounds, each including a possible answer to the question.

Essentially, Farkas and Bruce's (2010) model, shown in Figure 3.1, consists in

- a component that contains all propositions that a participant X has publicly committed to as being true of the world of the conversation: i.e., the set of the participant X's *discourse commitments*, or DC_X;
- a component that contains all propositions that all participants have agreed on being true of the world of the conversation, and the propositions that represent the participants' shared background/world knowledge: i.e., the *common ground*, or cg;
- a component that has a stack structure and stores all Questions Under Discussion (QUD) and proposals to update the cg: i.e., the *Table*, or S;
- a component that takes the current cg and the upmost item on S and projects a set of future cgs in which the upmost item on S is decided (it follows from the cg that the proposition is true, or it follows that it is false): i.e. the *projected set*, or ps; and
- a component that represents the intersection of the current cg and tracks all live options for the actual world w_0: i.e., the *context set*, or cs.

3.2 Bypassing the Table: Appositives and imposition

In the previous section, we discussed a particular approach to modelising conversational contexts, where the participants of a discussion take act to update the cg by putting issues on the Table, and the canonical ways of removing them are represented as the projected cgs included in the ps. The issues that are on the Table correspond to the at-issue content of the context at hand.

However, this is not the only way to update the cg: there is also a way of directly imposing an update on the cg, without passing through any "negotiative" component, such as the Table in Farkas and Bruce (2010). This type of updating is exemplified in (6) with an appositive, non-restrictive relative clause.

(6) AnderBois et al. (2015) p. 94
John, *who played tennis with a woman*, played golf with her too

In (6), the relative clause in italics is appositive: it adds (potentially new) information about John, but does this without subjecting it to approval by other participants. Indeed, appositives are considered not to be part of the at-issue content (Potts, 2005). For this reason, they are not normally up for negotiation, and they cannot normally be used to answer QUDs.

To model the meaning contribution of appositive relative clauses, Potts (2005) proposes a multi-dimensional account where appositives contribute to a different level of meaning (that of conventional implicature) than the at-issue meaning of the sentence.

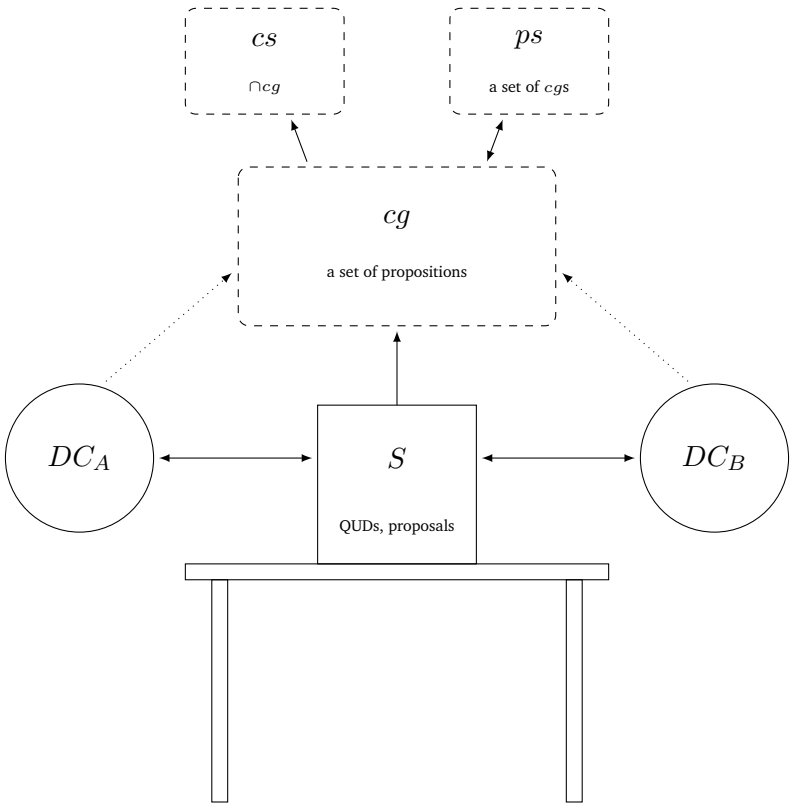

Figure 4: The different components of context in Farkas and Bruce 2010

The multidimensional account of Potts (2005) is challenged by AnderBois et al. (2015) (see also Nouwen 2007), who note that although a multidimensional account predicts that the meaning dimensions are separate from each other, it is possible for anaphorical relations to be established accross the appositive/at-issue boundary. In (6), for example, the appositive-internal indefinite *a woman* introduces the antecedent of the pronoun *her* appearing in the at-issue part. Besides anaphora, AnderBois et al. (2015) also provide data from presupposition satisfaction and VP- and NP-ellipsis showing that the appositive and at-issue content interact casually in a way that would be hard to account for if they should be wholly separate from one another.

The solution of AnderBois et al. (2015) is to change the way in which at-issue content and appositive content enter the cg. At-issue content, as is standardly assumed, must be put forth as a proposal that is subject to the participants' acceptance. Appositive content, the authors argue, is in fact an update that is imposed on the cg. For this reason, they are not normally up for negotiation, and they cannot normally be used to answer QUDs.

Formally, AnderBois et al. deal directly with the cs (the intersection of the propositions in the cg), and propose that appositives restrict the cs to the intersection of the appositive update with the cs, while at-issue updates consist in proposing a cs that is a subset of the current cs, and subsequent acceptance of the proposal leads to the replacement of the current cs with the new cs. In terms of the modelisation of Farkas and Bruce (2010),

AnderBois et al. (2015) propose that appositive updates are updates that do not pass via the Table, and are therefore not negotiable, and cannot be used to answer a QUD.

3.3 Constraints on cs: Presupposition

AnderBois et al. (2015) note that appositives, like presuppositions, directly target the cs (or cg), and neither are part of at-issue content. The authors argue that the main difference between these two types of non-at-issue content is that appositives, unlike presuppositions, are *informative*: they lead to an update that restricts the cs, the set of worlds that are still live options for being the actual world.

Presuppositions, then, are not informative in the sense of updating the cg/cs: as AnderBois et al. put it, they are *constraints* or *preconditions* on the current cs. In other words, a presupposition is a condition that must be satisfied throughout the cg/cs.

4 Proposal

In this section, we build a proposal for the semantics and pragmatics of concessive connectives such as the English *although* and the French *bien que*. The internal properties of concessive subordinate clauses in French (e.g. subjonctive mood) are left for another occasion.

We start by considering the status of the content of a concessive clause (p) in terms of its at-issueness, and take a look at its projection properties. We then take a look at the scalar component of the meaning of concessive clauses. Finally, we model these properties in the context of the modelisation presented in (Farkas and Bruce, 2010), using the notion of conditional probability.

4.1 The content of a concessive clause is not at-issue, projects, and contains new or old information

In the previous section, we discussed the non-at-issueness property of appositives: they were argued not to contribute in answering to the current QUD, but to provide additional information that is non-negotiable. One test for deciding whether a given content m (for *meaning*) is at-issue consists in trying to deny it in a direct way (Roberts et al., 2009):

(7) Roberts et al., 2009, p. 4
Have you stopped drinking beer for breakfast?
m = 'You have been in the habit of drinking beer for breakfast'

a. **direct denial**: "No" or "Yes"
effect: Replying *yes* or *no* commits one to m, i.e. to having drunk beer for breakfast

b. **indirect rejection**: "Hey! Wait a minute!", "What d'ya mean?" etc.
effect: m is rejected

In (7), the non-at-issue content (the addressee's previous habits regarding beer for breakfast) can only be rejected indirectly, while a direct denial addresses the at-issue content of the question.

We can now perform the same test for our concessives *although* and *bien que*. If we take (8b) to be a response to (8a), it can only express disagreement with the content of the main clause, namely, the crime rate. The content of the concessive clause can only be challenged in an indirect way, as in (8c).

(8) No direct denial of the content of a concessive clause

a. Bien qu'il y ait peu de sans-abris, le taux de criminalité est haut
although-EXPL CL has.SUBJ few of homeless the rate of crime is high
'Although there are few homeless people, the crime rate is high'

b. C'est faux
that-is false
'That's false'

c. Comment ça, peu de sans-abris?
how that few of homeless
'What do you mean, "few homeless people"?'

Roberts et al. (2009) propose that all non-at-issue also *projects*, meaning that their content escapes the scope of by e.g. negation and interrogation without modification by the latter. This is also the case for *bien que*: the content of the concessive clause is affected neither by negation or interrogation in (11). Recall one of the arguments that König and Siemund (2000) put forward concerning the status of the subordinate clause as presupposed: in their interrogative example, the concessive clause escapes from the scope of the interrogative operator, and the authors conclude that it must be presupposed. The notion of impositive update allows one to explain why this happens without assuming that the content of p be in any way presupposed. The latter situation would be problematic especially in cases where p constitutes new information – which is possible.

(9) The content of a concessive clause projects past negation and interrogation

a. Le taux de criminalité n'est pas haut bien qu'il y ait beaucoup
the rate of crime NEG-is NEG high although-EXPL CL has.SUBJ many
de sans-abris
of homeless
'The crime rate is not high although there are many homeless people'

i. non-at-issue: *Il y a beaucoup de sans-abris*
'There are many homeless people'

b. Est-ce que le taux de criminalité est haut bien qu'il y ait peu
is.-this that the rate of crime is high although-EXPL CL has.SUBJ few
de sans-abris?
of homeless
'Is the crime rate high although there are few homeless people?'

i. non-at-issue: *Il y a peu de sans-abris*
'There are few homeless people'

In relation to Section 2, it is interesting to note here that the causal clause following *parce que* sometimes – or even often – is at-issue. In (10c), direct denial can target the causal clause p expressing the cause of Marie's falling.

(10) Direct denial of the content of a causal clause

a. Marie est tombée parce que Jean l'a poussée
Marie is fallen because Jean CL-has pushed
'Marie fell because Jean pushed her'

b. C'est faux (elle n'est pas tombée)
that-is false she NEG-is fallen
'That's false: she did not fall'

c. C'est faux (il ne l'a pas poussée)
that-is false he NEG CL-has NEG pushed
'That's false: he did not push her'

The issue of projection is trickier, but there is nevertheless a clear difference between concessive and causal clauses: while concessive clauses always project past negation and interrogation, the content of causal clauses does not always project. In other words, in some cases, the content of the causal clause is not taken to hold.

(11) The content of a causal clause does not always project past negation and interrogation

a. Le taux de criminalité n'est pas bas parce qu'il y a beaucoup de policiers
the rate of crime NEG-is NEG low because-EXPL CL has many of policemen
'The crime rate is not low because there are many policemen'

i. *Il est bas pour une toute autre raison. Il y a peu de policiers*
'It is low for a completely different reason. There are few policemen'

b. Est-ce que le taux de criminalité est bas parce qu'il y a beaucoup de policiers?
is-this that the rate of crime is low because-EXPL CL has many of policemen
'Is the crime rate low because there are many policemen?'

i. *Non. C'est pour une toute autre raison. Il y a peu de policiers*
'No. It is low for a completely different reason. There are few policemen'

In summary, the content of a concessive clause is not at-issue, and projects. This conforms to the generalisation proposed in Roberts et al. 2009. In this sense, concessive clauses are like appositive relative clauses: their content is hardly negotiable, at least directly, and can be described as an imposed update on the cg (AnderBois et al., 2015). We should now note that if concessive clauses are updates that a participant imposes on the cg without passing via the Table, they are inherently speaker-oriented, a property that is ascribed to conventional implicatures (which are also non-at-issue) in Potts 2005.

The concessive clauses used in the previous examples are all easily understood as containing new, not-mentioned-before information, that is made to enter the cg via an imposed update. However, a concessive clause does not always introduce new information.

In (12), for example, participant B's concessive clause *concedes* that A's earlier proposal that the person they are observing is exhausted is correct, and this information is consequently added to the cg. While König and Siemund (2000) and other authors propose that conceding is not part and parcel of the meaning of concessive connectives, a dynamic analysis of discourse seems to permit a characterisation of the uses of concessive connectives that are really concessive in essence. Moreover, the impositive nature of a concessive clause explains why such reactions to previous proposals are felt to to be a bit marked: in this case, a participant B who utters a concessive clause only *indirectly* addresses the issue raised by participant A, as an imposed update will remove the issue from the Table by confirmation by entailment in cg. Indeed, if the cg contains p, then any issue regarding the truth or falsity of p on the Table will be redundant.

When it comes to the main clause, B's response in (12) seems to take issue with an implicit conclusion or proposal that B attributes to A, namely, that the exhausted person should be let off the hook tonight. Perhaps in this case, the contribution of A's utterance could be seen as having a two-fold effect on the Table: for one, A proposes to update the cg with the proposition that the observed person is exhausted (p), but also, A raises the issue of whether the person will have to finish the paper regardless of her state (q). B then both removes p from the Table by imposing its addition on the cg, and answers the raised issue q.

(12) Accepting another participant's proposal with a concessive clause

a. A: *Regarde-la. Elle est crevée*
'Look at her. She is exhausted'

b. B: *Bien qu'elle soit crevée, elle doit finir son papier*
'Even though she is exhausted, she must finish her paper'

4.2 A scalar component: time for a presupposition

In Section 2, we noted that the literature often stresses that the main defining property of concessivity is to express "incausality". The quote from König and Siemund (2000), repeated here, states that "[...] the two situations linked by a causal connective are in keeping with general tendencies, regularities, sequences of situations, whereas the sequence or concomitance of situations described in a concessive construction goes against the tide: p & q is asserted given a general tendency 'if p then not q', i.e. the very opposite of q normally goes together with p" (2000, p. 13).

Section 2 also contained a very brief critique of evoking the concept of causation where correlation is in fact sufficient or even more appropriate. In this paper, we will take König and Siemund to the letter, and consider the relevant relationship between p and $\neg q$ to be one that could be paraphrase as a "general tendency to co-occur", or, in other words, a general tendency to correlation, independently of whether direct causality is involved.

In this context, we can model the intuitively clear meaning component that tells us that given p, $\neg q$ would actually have been a more likely co-occurring state of affairs compared to q, but without making reference to a causal relation between p and q (or $\neg q$). The

crucial element here is the *likelihood comparison* between q and $\neg q$ that is made relative to p. In other words, we are dealing with *conditional probability*, which measures the probability of an event A knowing that another event B has occurred, $P(A|B)$.

Although the form of the French connective *bien que* is not very revealing in this respect, probability plays an important role in the standard semantic treatments of scalar particles, such as *even* in English (Karttunen and Peters, 1979), and indeed, English has a concessive connective that shows a direct link to this particle: *even though*. Moreover, its French cognate *quand même* also shows a direct surface connection to scalarity: the French equivalent of *even* is *même*. These connectives could potentially be analysed in a similar vein to what is proposed for *although* and *bien que* here.

In the framework of Alternative Semantics (Rooth, 1985, 1992, a.o.), scalar particles such as *even* are analysed as focus-sensitive operators. They are focus-sensitive in that their lexical entries make reference to focus alternatives, which are derived based on the positioning of focus-marking, or main focal stress, in the sentence. An example is shown in (13), where the subscripted F marks focus-marking. Formally, F-marked categories introduce alternatives of the same semantic type into the semantic computation, and these alternatives compose with the rest of the sentence using pointwise functional application. In this analysis, *even* is a propositional operator that quantifies over the the set of focus alternatives that are derived based on F-marking.

(13) Illustration of *even* as a focus-sensitive operator
Even [Mary]$_{\text{F}}$ is tired
   a. **additive inference**: some other contextually salient person is tired
   b. **scalar inference**: out of all contextually salient people, Mary is the least likely to be tired

The scalar component of *even* therefore performs a probability or likelihood comparison between the prejacent (the alternative where the F-marked position has the same value as in the assertion) and the other focus alternatives. If we now come back to concessivity, the parallel is clear: what changes is that (i) the probability comparison is done relative to the previously established p, and (ii) the alternatives that are compared are the polar pair q and $\neg q$.

(14) An informal version of the scalar component of concessivity
CONCESSIVE(p), q
Given that p, the probability of q occurring is lower than that of $\neg q$

The scalar component of *even* is often proposed to be a presupposition, encoded as a definedness condition on the use of the operator. In the case of concessive connectives, too, the status of the scalar meaning contribution seems to correspond to that of a presupposition. Indeed, it can be analysed as a constraint or precondition that must be satisfied in order for the expression to be used. The question, of course, is to locate where the condition must be satisfied: the conditional probability analysis makes it clear that it must hold of a component that has taken note of the imposed p-update, but is it at the level of the current cg or cs, or elsewhere? We now turn to these questions.

4.3 Putting everything together: the proposal

The first part of accounting for concessives in a dynamic context is rather straightforward. Let us first assume that we are dealing with concessives where the content of p is new information, and consists in an imposed update on the cg. We will model this using $+$, so that cg_{+p} stands for "cg updated with p".

Let us now look at the main clause q. There are at least two ways q could be interpreted here: either it is put forth as a proposal to update the cg, or it is uttered as a response to an issue that is already on the Table. As we discussed before, the latter option seems to apply to cases where the speaker concedes p, proposed earlier by the addressee, and addresses the issue raised by the addressee. As we decided to first consider p as new information, let us then interpret q as a proposal to update the cg (of *pushing* q on the Table T).

As discussed above, Farkas and Bruce (2010) propose that assertions, which consist in proposals to update the cg, are coupled with a canonical way of removing them from the Table: in their work, this canonical way is reflected in the ps, which stores the projected, privileged future cgs. Specifically, asserting p leads to the projection of a confirmation, which means that the projected cg sees p added to it. For the moment, let us assume this is the case.

So far, we have updated the cg with p (the imposed update), and have projected a ps that contains only cg_{+p}. If we now try to see where the presupposition that we formulated in terms of conditional probability may hold, we notice that we have not defined what it means, technically, in terms of the adopted structure of context, to be a "relatively less likely".

Intuitively, the scalar component of concessivity tells us that given that p is true, it was more likely that our actual world be a $\neg q$-world instead of being a q-world (as it is proposed to be). In other words, the relative likelihood of the two options can be modeled simply by comparing the chances of w_0 being in the *context set* of cg_{+q} (the intersection of the propositions in this set) versus its chances of being in the *context set* of $cg_{+\neg q}$. All things being equal, this is the case if there are *less* worlds in the cs of cg_{+q} than in the cs of $cg_{+\neg q}$. These projected context sets will be labeled *projected context sets* (pcs).

The problem, now, is that Farkas and Bruce (2010) originally propose that the ps that an assertion projects is a singleton set consisting of the cg updated with a confirmation of the proposal at hand. This reflects the observation that confirmation is the "default response move" to an assertion. The proposal formulated above, however, requires the q of a concessive construction to project *two* cgs, each augmented with a polar variant of q. However, Farkas and Bruce (2010) is designed to account for *default assertions*, and in this respect, we may propose that concessives have a non-default effect on the assertive part of a concessive structure, in that it projects a ps that is like that of default polar interrogatives.

If we assume this is the case, we can propose that a concessive connective such as *bien que* leads to the projection of a non-singleton set of future cgs. The scalar component then amounts to a condition that must hold between the projected context sets (pcs): the number of worlds in the intersection of the cg updated with q is *smaller* than the number

of worlds in the intersection of the cg updated with $\neg q$ (signaled with bars, e.g. $|cs|$).

The example below summarises the analysis. The application of this same reasoning to a real conceding use of a concessive is straightforward: the previously proposed p is imposed on the cg, and the QUD is settled while indicating that the concessive's scalar presupposition holds of the projected context sets.

(15) CONCESSIVE(p), q

i. Imposed update with p: $cg = cg_{+p}$

ii. Proposal q put on T: *push*(q, T)

iii. Compute (non-default) ps: $\{cg_{+p+q}, cg_{+p+\neg q}\}$

iv. Presupposition: $|\cap cg_{+p+q}| < |\cap cg_{+p+\neg q}|$

According to the schema laid out in (15), the imposed update with p is done *before* the proposal q is put on the Table (pushed in the stack). This seems like a natural order for proceeding especially when the concessive subordinate clause precedes the main clause, as in (16a). It is worthwhile to ask what happens when the two segments are presented in the reverse order, as in (16b).

(16) Manipulating the presentation order of p and q

a. Bien qu'elle$_i$ soit crevée, Marie$_i$ doit finir son papier
although.she is.SUBJ exhausted Marie must finish her paper
'Although she is exhausted, Marie must finish her paper'

b. Marie$_i$ doit finir son papier bien qu'elle$_i$ soit crevée
Marie must finish her paper although.she is.SUBJ exhausted
'Marie must finish her paper although she is exhausted'

At first, one might think that the account proposed here is not easily applicable to cases where the subordinate clause follows the main clause. After all, it is with respect to a cg updated with the subordinate clause p that the presupposition introduced by the concessive clause must hold. One is tempted to think that if this is true, then the imposed update with p must always precede the update that concerns q.

However, given how we have set things up, we may always also start with putting q on the Table, and computing a default ps, as in (17i-ii). If we then proceed to the concessive clause, an imposed update with p will change the cg directly. At this point, a new, non-default ps can be projected, or at least modified in order to reflect the integration of a concessive clause.

(17) q, CONCESSIVE(p)

i. Proposal q put on T: *push*(q, T)

ii. Compute (default) ps: $\{cg_{+q}\}$

iii. Imposed update with p: $cg = cg_{+p}$

iv. Compute (non-default) ps: $\{cg_{+p+q}, cg_{+p+\neg q}\}$

v. Presupposition: $|\cap cg_{+p+q}| < |\cap cg_{+p+\neg q}|$

In some sense, it is clear that the having the concessive subordinate clause follow the main clause is non-optimal, in that two separate projections of ps must then take place. If the concessive clause precedes the main clause, the correct cg for interpreting q in terms of conditional probability is available from the very beginning. If some type of optimality considerations are at play in discourse interpretation, one could expect that there be a slight preference for the concessive-first order. While some French speakers confirm that this seem to be their intuitive preference, this claim should be investigated in more detail through a corpus study.

In summary, the account proposed in this paper attributes to concessive connectives a two-fold role: first, they tell us that the subordinate clause p must be imposed on the cg without negotiation, and second, they tell us that whatever q is, it was more likely that the actual world is in the projected context set of $\neg q$ than that of q. Concessive clauses therefore have properties that link them to appositivity on the one hand, and to presupposition on the other.

4.4 Some open questions

4.4.1 Anaphora

The account proposed in the previous section is much in spirit with AnderBois et al. (2015), who argue that the interpretation of appositive and at-issue meaning is incremental (left to right) and interleaved, so that e.g. anaphora and presupposition can be resolved and satisfied across the "boundary" between at-issue and non-at-issue meaning. In the previous section, we also discussed the possibility of having a uniform explanation for the interpretation of concessive subordinate clauses, regardless of whether they precede or follow their main clause. Let us therefore take a look at anaphora in concessive clauses.

(18) Linear order of p and q, and coreferentiality between main and subordinate clause

a. Bien qu'elle$_i$ soit crevée, Marie$_i$ doit finir son papier
although.she is.SUBJ exhausted Marie must finish her paper
'Although she is exhausted, Marie must finish her paper'

b. Bien que Marie$_i$ soit crevée, elle$_i$ doit finir son papier
although Marie is.SUBJ exhausted she must finish her paper
'Although Marie is exhausted, she must finish her paper'

c. Marie$_i$ doit finir son papier bien qu'elle$_i$ soit crevée
Marie must finish her paper although.she is.SUBJ exhausted
'Marie must finish her paper although she is exhausted'

d. * Elle$_i$ doit finir son papier bien que Marie$_i$ soit crevée
She must finish her paper although Marie is.SUBJ exhausted
'Marie must finish her paper although she is exhausted'

In only (18d) is it impossible for the pronoun have *Marie* as its antecedent. There are at least two ways of dealing with the data in (18). First, we could assume that (18d)

is just in violation of Condition C of Binding Theory: if the subordinate clause is an adjunct to vP/VP, the matrix subject pronoun will c-command an R-expression, resulting in the impossibility of a coreferential reading. Now compare (18d), where the pronoun-containing main clause linearly precedes the subordinate clause, with (18b), where the subordinate clause linearly precedes the pronoun-containing main clause: if this time, too, the subordinate clause was interpreted in a reconstructed position, adjoined to vP/VP, the coreferential reading should be absent for exactly the same reason that was evoked for (d). This is not the case, however. In this case, one could propose that the adjunct clause is attached higher, perhaps to the CP (cf. Chierchia, 1995; Haegeman, 2003). If that is the case, then (a) should again *not* be analysed as CP-adjunction, for in that case, the pronoun would c-command an R-expression. In other words, in order to avoid configurations where a pronoun c-commands a coreferential R-expression, the syntactic attachement site of the adjunct clause must be determined independently of the surface linear order of the main and subordinate clauses.

Otherwise, one could also take a direction that is more inspired by AnderBois et al. (2015). The data in (AnderBois et al., 2015) excludes all backward anaphora, so it is unknown what analysis the authors would give for (18). We may sketch at least two possibilities. Recall that AnderBois et al. propose that the interpretation of appositive and at-issue meaning is incremental and interleaved, so that the linear order of presentation reflects the order of updates. Adopting this perspective could mean that in examples like (18a), the imposed updates need to be *suspended*, or made to wait, until a suitable antecedent for the pronoun comes up. The contrast between (18a-d) could then be derived by stipulating that only imposed updates can be suspended temporarily for such a reason.

Another possibility is that a pronoun inside an initially-placed subordinate clause could often find its antecedent in previous discourse, and the (imposed) update can be made right after the clause is finished. In that case, the proper name inside the main clause may well be coreferential with the pronoun, while not being responsible for its identification strictly speaking. If this is the case, then (d) could be impossible on a coreferential reading for the same reason that the pronoun and proper name in *She was waiting. Mary was angry* are preferrably not coreferential: if the use of a pronoun is licensed in the first sentence, why would it not be licensed in the second? In the same vein, if in (d) the main clause subject pronoun can be identified from the context, using a proper noun as the subject of the subordinate clause will incorrectly lead to an interpretation where the subordinate clause subject is of low accessibility in the context (cf. Ariel, 1990). Crucially, this explanation would require that the pronoun subject of an imposed update does *not* to interfere with those accessibility considerations that rule out (18d). It does not seem like a very far-fetched idea to claim that the containment of a pronoun in at-issue or non-at-issue content might have an effect on this type of considerations, but obviously, such a proposal would require independent justification.

4.4.2 Scalarity

According to the account proposed in this paper, concessive connectives introduce a scalar presupposition according to which the actual world was, based on p, more likely to be a $\neg q$-world than a q-world (as is proposed). It was proposed that this presupposition can be modelised as a constraint on the number of worlds in two projected context sets.

As concessive connectives also have an impositive component, it is interesting to look at other connectives in light of this analysis: do some connectives express the same presupposition, but lack the impositive power? Do others impose without presupposing scalarity?

Here, we will take a very brief preliminary look at contrastive connectives in French.

(19) French contrastive connectives

a. Marie est crevée, mais elle doit finir son papier
Marie is exhausted but she must finish her paper
"Marie is exhausted but she must finish her paper

b. Marie est crevée, mais elle doit quand même finir son papier
Marie is exhausted but she must nevertheless finish her paper
"Marie is exhausted but she must nevertheless finish her paper

c. Marie est crevée, mais elle doit tout de même finir son papier
Marie is exhausted but she must nevertheless finish her paper
"Marie is exhausted but she must nevertheless finish her paper

d. Marie est crevée. Pourtant/cependant/néanmoins/toujours est-il qu'
Marie is exhausted nevertheless
elle doit finir son papier
she must finish her paper
"Marie is exhausted. Nevertheless, she must finish her paper

As (19a-c) show, the contrastive connective *mais* can conjoin two clauses with or without the addition of another connective, such as *quand même* or *tout de même*. Both these connectives have *même* 'even' as a part. It is not clear whether (a-c) show a clear difference in interpretation. If that is the case, the additional connectives in (b-c) might possibly be analysed as some sort of "scalar supporters". Indeed, *mais* on its own in (a) seems to evoke a scalar presupposition of the same type as the concessive *bien que*: Marie's tiredness might lead you to think that she does not need to finish her paper immediately, but she does. The same remark applies to the connectives in (19d).

While the scalar presupposition we assigned to *bien que* seems to be evoked also by the contrastive connectives above, it seems that the impositive part of concessivity is lacking in all of the examples. It could be that the first sentence in (a), for example, in fact constitutes an acceptance of a proposal put forth by another discourse participant. In that sense, it can be conceded, but the polemic feeling of concession with *bien que* is absent. The first sentence could, however, also constitute new information, and in this case, the other discourse participants should be free to reject the proposal via direct denial. This seems to be the case. If it is, then the conjunctive *mais* has no impositive, non-at-issue meaning contribution.

A last remark concerns the implications of the current analysis for *même* and *even*. An analysis in terms of focus-alternatives (Rooth, 1985, 1992) would almost be able to

account for concessivity if amended with the possibility to evoke scalar presuppositions over *polar alternatives* (q and $\neg q$). However, getting the probability comparison that is so integral to the meaning of scalar particles to hold relative to an established, imposed update seems hard. If scalar presuppositions are modeled as in this paper, an extremely interesting question that arises, of course, is whether the "usual" uses of *even* and *même* could be modeled in the same way. These questions are left for future work.

5 Conclusion

The approach presented in this paper assigns concessive connectives two roles: (i) they signal that the proposition expressed by the subordinate clause p that they introduce must be *imposed* to the cg without negotiation, and (ii) they signal that the relative likelihood of the main clause proposition q being true of the actual world compared to $\neg q$ being true of it is smaller. This treatment answers, at least in part, two longstanding puzzles in the literature on concessives.

First, it explains why causality and concessivity seem so related. As concessivity deals with conditional probability – the probability of an event B given that another event A has occurred – it is always the case that sequences of events that go against a causal schema can be described using a concessive structure. Indeed, in these cases, it is unavoidable that the unexpected cause or consequence will fit a concessive structure. However, as the merely correlative examples show, concessivity does not *require* causality: it either requires correlation based on world knowledge, or even adds to world knowledge if no information about the relevant conditional probabilities yet exist.

Second, a dynamic perspective on discourse context allows one to see when concessives are used in their name-giving function, namely, for conceding: when the subordinate clause they introduce is old information, i.e. put out for negotiation by another discourse participant, using a concessive amounts to indirectly accepting this proposal by way of imposing it on the cg. The use of this uncanonical way of removing an issue from the Table explains why this type of concessive structure can be felt to be polemical.

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