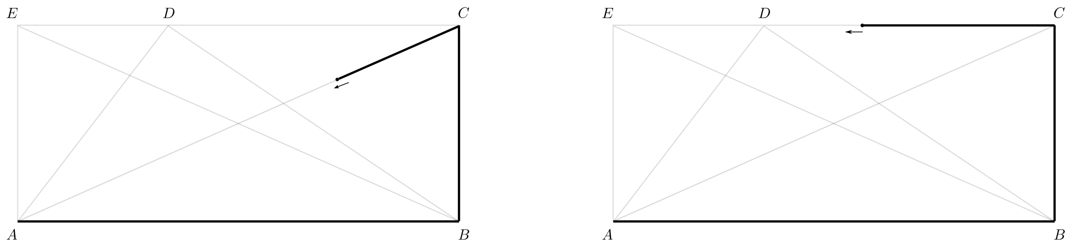
(The lack of) evidential completeness in embedded disjunctions with a non-simple aspect

1 Disjunctions and non-simple aspect

While there is steadily growing literature on the interaction of embedded natural language disjunctions and modals (e.g., Zimmermann (2000), Geurts (2005), Simons (2005)), questions and imperatives (e.g., von Stechow (1991), Han and Romero (2004), Aloni (2007)), implicatures and Gricean maxims (e.g., Sauerland (2004), van Rooij (2010)), research into disjunctions with a *non-simple verbal aspect* is virtually nonexistent.[1] However, the interaction of non-simple aspectual operators, such as the progressive, with embedded disjunctions may present new puzzles and possibly shed a different light on old ones.

For an illustration, let's take the following hypothetical[2] experimental scenario. Imagine a software application that is capable of drawing various closed shapes like triangles and trapezoids as in Figure 1 and works as follows: a pen starts drawing the shape at point A, moves toward point B where it chooses one of the three possible segments ($\overline{\text{BC}}$, $\overline{\text{BD}}$ or $\overline{\text{BE}}$) to continue along, etc., until it finally arrives back at point A again. We can stop the pen at any time and present the subject with a sentence, and the subject's task is to evaluate how good or bad it is to use the sentence to describe the given situation. The software is only capable of drawing three different types of triangles (ABC, ABD, ABE), two trapezoids[3] ($ABCD$, $ABDE$) and one big rectangle ($ABCE$), and it draws the shapes in an essentially unpredictable manner, which is ensured by a random choice of continuation at any point where choice is possible.



(a) Situation described by sentence (1)

(b) Situation described by sentence (2)

Figure 1

For example, we expect sentence (1) to be judged a good description of the situation in Figure 1a,

(1) The computer is drawing the triangle ABC,

and, similarly, sentence (2) to be a good description of the situation in Figure 1b,

(2) The computer is drawing the trapezoid ABCD or the rectangle ABCE,

because at point D the cursor may turn toward point A immediately, or—with equal probability—it may continue toward point E, and then toward point A. In contrast, sentence (1) is expected to be a bad description of the situation in Figure 1b, as is sentence (2) with respect to Figure 1a.

However, in contrast to (1) and (2), we predict that the following sentence will *never* be judged to be a good description of any situation on the screen,

(3) The computer is drawing the triangle ABC or the trapezoid ABCD,

because of the interaction of two Gricean maxims: the first maxim of Quantity "Make your contribution as informative as is required" and the maxim of Quality "Do not say that for which you lack adequate evidence." For a speaker who had adequate evidence that triangle ABC is being drawn would *withhold* information by uttering (3), infringing the maxim of Quantity, as would she in the case when she had adequate evidence that the trapezoid ABCD is being drawn. However, unlike the case of sentence (2)

[1] This is true despite the occurrence of occasional arguments involving disjunctions in progressive sentences, for example, in Dowty (1979) and Bonomi (1999).

[2] We are planning to conduct eye-tracking experiments based on a version of the software described below: primarily, we are interested in the test subjects' strategy when attempting to verify a disjunction for which the situation does not offer evidence for structural reasons (see below).

[3] The term 'trapezoid' has terminological variants; here it only means a simple quadrilateral having *exactly* one pair of parallel sides.

when she can have adequate evidence for (2) by observing the situation depicted in Figure 1b, in the described scenario it is *not* possible to have adequate evidence that would license uttering sentence (3): the minimal disjunction for which the subject can have adequate evidence and which refers to the triangle ABC and trapezoid ABCD together is the disjunction in

(4) The computer is drawing the triangle ABC or the trapezoid ABCD or the rectangle ABCE,

which would be used to correctly describe a situation in which the cursor is occupying a point on the $\overline{\text{BC}}$ segment on its way to vertex C. The necessary lack of adequate evidence for sentence (3) is a consequence of the structural properties of the scenario, the general characterization of which will be the main topic of the talk.

2 Evidential completeness

In the above scenario the subject gains visual evidence about the situation about which she makes various judgements through an active perceptual channel between her and the screen of the computer. In order to discuss such scenarios on a general level, let's introduce some assumptions. Let's assume that we have a way to decide for every *proposition* p_i in a set of propositions Π if $\mathsf{prog}(p_i)$ is assertable in a certain situation σ.[4] More precisely, assume that there is a mapping $\mathfrak{m}$ from Π to $\mathbb{E}$—where $\mathbb{E}$ is a set of *pieces of evidence* (*p.o.e.*)—satisfying the following general constraint:

(5) The speaker S is justified in asserting $\mathsf{prog}(p_i)$ in σ iff $\mathfrak{m}(p_i)$ is a p.o.e. that S has in σ.

The talk cannot offer any substantial insight into the philosophical nature of evidence. We'll only assume that p.o.e.'s can be individuated somehow, and that there is a partial ordering on the set of p.o.e.'s by the *amount of information* that a p.o.e. conveys to the cognitive agent about the actual situation.[5]

Let us define the *disjunctive closure* $\bigvee\Pi$ of Π as $\{p_1 \vee \cdots \vee p_i \mid \emptyset \neq \{p_1, \ldots, p_i\} \subseteq \Pi\}$. We say that Π is $\vee$-*complete* w.r.t. $\mathbb{E}$ iff *there exists* a mapping $\mathfrak{m}^*$ from $\bigvee\Pi$ to $\mathbb{E}$ such that[6]

(6) a. $\mathfrak{m}^*$ is an extension of $\mathfrak{m}$, i.e., $\mathfrak{m}^*$ agrees with $\mathfrak{m}$ on any $p_i \in \Pi$;
b. S is justified in asserting $\mathsf{prog}(p_1 \vee \cdots \vee p_i)$ in σ iff $\mathfrak{m}^*(p_1 \vee \cdots \vee p_i)$ is a p.o.e. that S has in σ.

In the example scenario, Π is the set of sentence radicals of the form *The computer draw X*, where X is the name of one of the shapes mentioned above, and $\mathbb{E}$ is the set of p.o.e. consisting of the subject's visual input watching the shape evolving on the screen. In the talk I will detail this framework and show why $\bigvee\Pi$ in the example above is not closed with respect to this set of p.o.e.'s (that is, it is *evidentially incomplete*), and I'll propose general constraints under which a system of disjunctions is $\vee$-complete w.r.t. an arbitrary set of p.o.e.'s. In particular, I will argue that the general constraints of $\vee$-completeness can be captured through two *homomorphic mappings* f and g, going in the opposite directions between the set of propositions Π, ordered by entailment, and the set of p.o.e.'s $\mathbb{E}$, ordered by the amount of information contained, in such a way that f and g form a special relationship, called a Galois-connection (Davey and Priestley 2002, Humberstone 2011), which is responsible for the evidential incompleteness of the disjunctive closure.

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[4] The framework itself is independent of the progressive operator.

[5] This ordering is not to be confused with evidential *strength* which concerns the reliability of the source of the information (see, e.g., Willett (1988)).

[6] Evidential completeness with respect to other operations could be defined analogously.