CONTRADICTORINESS (AND REDUNDANCY)*

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Talk at ZAS, Berlin (29 April 2022)

1 Introduction

Consider (1) below: (1)a is perceived as a contradiction (i.e. it *feels* contradictory, which is indicated with '^{c}'); (1)b, by contrast, is not: it is just perceived as false.

(1) a. ^{c} John was killed but he wasn't killed.
b. Donald Trump didn't serve as US President.

Why is this so?

(i) The formalist's response: (1)a, unlike (1)b, is a *formal contradiction* (i.e. false under all possible uniform substitutions of non-logical words).

(i) is known to be too restrictive; e.g. it fails to account for (2).

(2) ^{c} John was killed but he didn't die.

(ii) The romantic's response: (1)a and (2) are perceived as contradictions because (1)a and (2) are *necessary falsehoods* (i.e. false in every possible world).

Because of this clear advantage with its rival, (ii) has gained, at least in semantics circles, the status of being 'the correct response'.

The plan for the talk is the following:

- Part I: I will show that the romantic's response is not correct.
- Part II: I will offer a generalisation that takes steps towards understanding the phenomenon of contradictoriness.
- Part III: I will argue that redundancy and contradictoriness should be thought of as manifestations of the same condition (i.e. as different sides of the same coin).

2 [Part I] The romantic's answer isn't right

The romantic believes (3) to be true:

(3) A sentence is perceived as a contradiction iff it is false in every possible world.

Problematic contrast I:

(4) [CONTEXT I: it is common ground that Benjamin is a member of Linguae.]

^{c} Every member of Linguae likes John and Benjamin hates him.

(5) [CONTEXT II: it is common ground that no member of Linguae likes John and, furthermore, that Benjamin is a member of Parlare (not of Linguae).]

Every member of Linguae likes John and Benjamin hates him.

* For helpful discussions, many thanks to Benjamin Spector, Philippe Schlenker, Emmanuel Chemla, Daniel Rothschild, Amir Anvari, Émile Enguehard, Keny Chatain, Janek Guerrini, Matt Mandelkern, Dan Hoek, and Manuel Križ. All errors my own.

Problematic contrast II:

(6) [CONTEXT: it is common ground that the city of Tajiff is in Cuba.]

a. [c] Benjamin is in Tajiff and he isn't in Cuba.
b. Benjamin is in Tajiff and Tajiff isn't in Cuba.

(Note that (6)a and (6)b are truth-conditionally equivalent.)

! It is possible for a contingent falsehood to exhibit contradictoriness.

Problematic contrast III:

(7) a. Bachelors have wives.
b. [c] Bachelors have wives and aren't married.

(8) The 'Imagine If' test
a. Bachelors have wives.
a'. ? Imagine if bachelors had wives.

b. Dogs don't bark.
b'. ✓ Imagine if dogs didn't bark.

c. Elephants have red stripes.
c'. ✓ Imagine if elephants had red stripes.

! Not all necessary falsehoods exhibit contradictoriness.

3 [Part II] The nature of contradictoriness

I regard contradictoriness as a defectiveness, a pathology that a sentence can have.

A close-up look at the data indicates that *any* sentence can have the contradictoriness disease (irrespective of what its truth value is, and even if it doesn't have one).

(9) **Questions**
a. [c] Is it true that Paul is single and married?
b. [c] Is it true that John lives in Toulouse but doesn't live in France?

Unknown truth value
c. [c] Either John is an artist, or he isn't an artist and he is both single and married.

Tautologies
d. [c] It's false that John lives in Montmartre and doesn't live in Paris.

3.1 What conditions must be met for contradictoriness to arise?

(4)/(5) and (6) partially answer this question. (4)/(5) tells us that contradictoriness is sensitive to *pragmatic factors*: indeed, in (4), the exact same sentence is perceived as a contradiction in CONTEXT I but not in CONTEXT II. (6), in turn, tells us that contradictoriness is sensitive to aspects of *sentence structure*.

3.1.1 First attempt

Let's take a closer look at (4)/(5) and (6), repeated below as (10)/(11) and (12).

(10) [CONTEXT I: it is common ground that Benjamin is a member of Linguae.]

[c] Every member of Linguae likes John and Benjamin hates him.

(11) [CONTEXT II: it is common ground that no member of Linguae likes John and, furthermore, that Benjamin is a member of Parlare (not of Linguae).]

Every member of Linguae likes John and Benjamin hates him.

(12) [CONTEXT: it is common ground that the city of Tajiff is in Cuba.]

a. [c] John is in Tajiff and he isn't in Cuba.
b. John is in Tajiff and Tajiff isn't in Cuba.

What about…?

(13) A natural language conjunction exhibits contradictoriness iff there is a proposition in the common ground that is incompatible with the whole conjunction but not with each conjunct taken separately.

Even if (13) was right (it is not), it would be limited in scope: indeed, there are plenty of contradictory sentences that (13) ought to cover but doesn't (e.g. 'John both smokes and doesn't smoke'; 'every bachelor in the room is married').

First issue with (13). To start with, if one sticks to the (standard) assumption that the common round is closed under entailment, (12)b and (11) are in fact counterexamples to (13). Take (11): if **{*w* : no member of Linguae likes John in *w*}** is in the common ground, so is **{*w* : no member of Linguae likes John or Benjamin doesn't hate John in *w* }**, and this proposition is incompatible with (11) but not with the conjuncts of (11).[1]

Second issue with (13). Even if one rejects the standard assumption that the common ground is closed under entailment, counterexamples to (13) can be generated.

Consider, for example, (14) below.

(14) [CONTEXT: it is common ground that Charles went to Oxbridge (i.e. either to Cambridge or Oxford).]

Charles didn't go to Cambridge and Charles didn't go to Oxford.

In the context stipulated in (14), there is a proposition in the common ground, namely, **{*w* : John went either to Oxford or Cambridge in *w*}**, that is incompatible with (14)a, the conjunction, but not with its conjuncts.

3.1.2 Second attempt

(15) [CONTEXT: it is common ground that Benjamin is a member of Linguae.]
a. [c] Every member of Linguae likes John and Benjamin hates him.

[1] Thanks to Dan Hoek for pointing this out to me.

[CONTEXT: it is common ground that Benjamin is a member of Linguae.]
b. [c] No member of Linguae likes John and Benjamin loves him.

[CONTEXT: it is common ground that the city of Tajiff is in Cuba.]
c. [c] John is in Tajiff and he isn't in Cuba.

d. [c] John (both) smokes and doesn't smoke.

e. [c] Paul didn't move and didn't stay still.

f. [c] Every bachelor is married.

g. [c] Some married bachelor came.

In the sentences above, I have underlined two one-place predicates: these predicates exhibit some interesting features. First, the two underlined predicates in each example are either jointly empty throughout the context set (see def. in (16)a) or jointly redundant throughout the context set (see def. in (16)b).

(16) Let α and β be two one-place predicates, C the context set, and $\mathcal{D}$ the set of all possible individuals. Then…

(a) α and β are jointly empty throughout C iff, for any $w \in$ C, $\{x \in \mathcal{D} : [\![\alpha]\!]^w(x) = 1\} \cap \{ x \in \mathcal{D} : [\![\beta]\!]^w(x) = 1\} = \emptyset$.
(b) α and β are jointly redundant throughout C iff, for any $w \in$ C, $\{x \in \mathcal{D} : [\![\alpha]\!]^w(x) = 1\} \subseteq \{x \in \mathcal{D} : [\![\beta]\!]^w(x) = 1\}$ or, for any $w \in$ C, $\{x \in \mathcal{D} : [\![\beta]\!]^w(x) = 1\} \subseteq \{x \in \mathcal{D} : [\![\alpha]\!]^w(x) = 1\}$.

Second, the underlined predicates are 'connected' (new notion).

(17) **Predicate connection**

Let α and β be two one-place predicates, μ a clause, C the context set, and $\mathcal{D}$ the set of all possible individuals. P and Q are two one-place predicate variables and f a variable over assignment functions from $\{P, Q\}$ to $\mathcal{D}_{\langle s,\langle e,t\rangle\rangle}$.

(i) α and β are both constituents of μ,
(ii) α isn't dominated by β nor is β dominated by α, and
(iii) μ′—a clause just like μ except that α has been replaced by P and β by Q—satisfies (a) and least one of the other three conditions:[2]

a. $\exists f \exists w \in C([\![\mu']\!]^{w,f} = 1)$

b. $\forall f \forall w \in C([\![\mu']\!]^{w,f} = 1 \rightarrow \exists x \in \mathcal{D}$ s.t. $[\![P]\!]^{w,f}(x) = 1 \wedge [\![Q]\!]^{w,f}(x) = 1)$
In such a case, we say that α and β are **pos-connected** (via some entity, in μ/C).

c. $\forall f \forall w \in C([\![\mu']\!]^{w,f} = 1 \rightarrow \exists x \in \mathcal{D}$ s.t. $[\![P]\!]^{w,f}(x) = 0 \wedge [\![Q]\!]^{w,f}(x) = 0)$
In such a case, we say that α and β are **neg-connected** (via some entity, in μ/C).

d. $\exists v_1, v_2 \in \{0,1\}$ such that $v_1 \neq v_2 \wedge \forall f \forall w \in C([\![\mu']\!]^{w,f} = 1 \rightarrow \exists x \in \mathcal{D}$ s.t. $[\![P]\!]^{w,f}(x) = v_1 \wedge [\![Q]\!]^{w,f}(x) = v_2)$
In such a case, we say that α and β are **cross-connected** (via some entity, in μ/C).

[2] I'm assuming the following intepretation rule: if γ is an element of $\{P, Q\}$, then, for any w, $[\![\gamma]\!]^{w,f} = f(\gamma)(w)$; if γ is not an element of $\{P, Q\}$, then, for any w, $[\![\gamma]\!]^{w,f} = [\![\gamma]\!]^w$. To avoid clutter, I am omitting g, the assignment function that deals with the 'real' (as opposed to the artificially introduced) variables. This omission is harmless.

With (17) on board, I am now in a position to put forward the generalisation in (18):

(18) **Contradictoriness**

Let S be a sentence, μ a clause of S, α and β two one-place predicates, C the context set, and $\mathcal{D}$ the set of all possible individuals. *P* and *Q* are two one-place predicate variables and *f* a variable over assignment functions from {*P*, *Q*} to $\mathcal{D}_{\langle s,\langle e,t\rangle\rangle}$.

Generalisation. S exhibits contradictoriness in C iff one of the following statements is the case:

(i) α and β are pos-connected in μ and jointly empty throughout C.
(ii) α and β are neg-connected in μ and not-α and not-β are jointly empty throughout C.
(iii) α and β are cross-connected in μ, μ′—a clause just like μ except that α has been replaced by *P* and β by *Q*—is such that $\forall f \forall w \in C([\![\mu']\!]^{w,f} = 1 \rightarrow \exists x \in \mathcal{D}$ s.t. $[\![P]\!]^{w,f}(x) = 1 \wedge [\![Q]\!]^{w,f}(x) = 0)$, and α and not-β are jointly empty throughout C; or α and β are cross-connected in μ, μ′ is such that $\forall f \forall w \in C([\![\mu']\!]^{w,f} = 1 \rightarrow \exists x \in \mathcal{D}$ s.t. $[\![P]\!]^{w,f}(x) = 0 \wedge [\![Q]\!]^{w,f}(x) = 1)$, and not-α and β are jointly empty throughout C.

(18) (correctly) predicts all the sentences in (15) to exhibit contradictoriness.

(18), in addition, makes sense of all the contrasts discussed in §2.

(19) [CONTEXT I: it is common ground that Benjamin is a member of Linguae.]
[c] Every member of Linguae likes John and Benjamin hates him.

(20) [CONTEXT II: it is common ground that no member of Linguae likes John and, furthermore, that Benjamin is a member of Parlare (not of Linguae).]

Every member of Linguae likes John and Benjamin hates him.

In (19), but not in (20), 'likes John' and 'hates (John)' are connected.

How does (18) account for the contrast in (21)?

(21) [CONTEXT: it is common ground that the city of Tajiff is in Cuba.]

a. [c] Benjamin is in Tajiff and he isn't in Cuba.
b. Benjamin is in Tajiff and Tajiff isn't in Cuba.

(22) [CONTEXT: it is common ground that the city of Tajiff is in Cuba.]

a. Benjamin *P* and he *Q*.
b. Benjamin *P* and Tajiff *Q*.

Response: 'in Tajiff' and 'isn't in Cuba' are not connected in (the matrix clause) of (21)b.

Let's now consider (7), repeated below as (23).

(23) a. Bachelors have wives.
b. [c] Bachelors have wives and aren't married.

Provided that 'bachelors' is analysed as a referential expression—a kind-denoting expression, as in Carlson (1977), this contrast is expected under the proposed generalisation.

For the same reason, the contrast in (24) is expected.

(24) a. Bachelors have wives.
b. [c] Most of the bachelors in this room have a wife.

In §3.1, I noted that a sentence can exhibit contradictoriness despite not being false: indeed, sentences whose truth-value is unknown, interrogative sentences (which aren't truth-bearers), and tautologies may exhibit contradictoriness. (18) is compatible with this fact.

(25) **Unknown truth value**
a. [c] Either John is an artist, or he isn't an artist and he is both *single* and *married*.

Questions
b. [c] Is it true that Paul is *single* despite *being married*?
c. [c] Is it true that John *lives in Toulouse* and *doesn't live in France*?

Tautologies
d. [c] It's false that John *lives in Montmartre* and *doesn't live in Paris*.

(26), it is worth noting, is expected under the generalisation in (18).

(26) [CONTEXT: it is common ground that Charles went to Oxbridge (i.e. either to Cambridge or Oxford).]

Charles didn't go to Cambridge and Charles didn't go to Oxford.

(18) is insensitive as to whether the sentence is a contingent falsehood, a necessary falsehood (but not a formal contradiction), or a formal contradiction.

(27) a. [c] John lives in Paris but not in France.
b. [c] John was killed but didn't die.
c. [c] John was killed but wasn't killed.

4 [Part III] Redundancy

(28) [CONTEXT: it is common ground that Benjamin is a member of Linguae.]
a. [r] Every member of Linguae likes John and Benjamin ~~hates him~~ doesn't hate him.

[CONTEXT: it is common ground that Benjamin is a member of Linguae.]
b. [r] No member of Linguae likes John and Benjamin ~~loves him~~ doesn't love him.

[CONTEXT: it is common ground that the city of Tajiff is in Cuba.]
c. [r] Benjamin is in Tajiff and he is~~n't~~ in Cuba.

d. [r] Benjamin (both) smokes and ~~doesn't~~ smoke**s**.

e. [r] Paul didn't move and ~~didn't~~ stay**ed** still.
f. [r] Every bachelor is **un**-married.
g. [r] Some **un**-married bachelor came.

(29) **Redundancy**

Let S be a sentence, μ a clause of S, α and β two one-place predicates, C the context set, and $\mathcal{D}$ the set of all possible individuals. *P* and *Q* are two one-place predicate variables and *f* a variable over assignment functions from {*P*, *Q*} to $\mathcal{D}_{\langle s,\langle e,t\rangle\rangle}$.

Generalisation. S exhibits redundancy in C iff…

(i) α and β are pos-connected in μ and **jointly redundant** throughout the context set.
(ii) α and β are neg-connected in μ and not-α and not-β are **jointly redundant** throughout C.
(iii) α and β are cross-connected in μ, μ′—a clause just like μ except that α has been replaced by *P* and β by *Q*—is such that $\forall f \forall w \in C([\![\mu']\!]^{w,f} = 1 \rightarrow \exists x \in \mathcal{D}$ s.t. $[\![P]\!]^{w,f}(x) = 1 \wedge [\![Q]\!]^{w,f}(x) = 0)$, and α and not-β are **jointly redundant** throughout C; or α and β are cross-connected in μ, μ′ is such that $\forall f \forall w \in C([\![\mu']\!]^{w,f} = 1 \rightarrow \exists x \in \mathcal{D}$ s.t. $[\![P]\!]^{w,f}(x) = 0 \wedge [\![Q]\!]^{w,f}(x) = 1)$, and not-α and β are **jointly redundant** throughout C.

Under this generalisation, redundancy is expected to be symmetrical in conjunctions (just like contradictoriness). This, I think, is a good prediction. ('r' indicates that the sentence is perceived to be redundant.)

(30) a. r Jane is a woman and she is a blond woman.
b. r Jane is a blond woman and she is a woman.
c. c Jane is not a woman and she is a blond woman.
b. c Jane is a blond woman and she is not a woman.

(31) a. r Jane lives in Paris and in France.
b. r Jane lives in France and in Paris.[3]
c. c Jane lives in Paris but doesn't live in France.
d. c Jane doesn't live in France but lives in Paris.

(32) a. r Jane sells roses and she sells flowers.
b. r Jane sells flowers and she sells roses.
c. c Jane sells roses and she doesn't sell flowers.
d. c Jane doesn't sell flowers and she sells roses.

There are alleged cases of redundancy that don't behave in a symmetrical fashion, e.g.:

(33) a. r? Elon is staying in Paris and he is in France.[4]
b. Elon is in France and he is staying in Paris.

Note, however, that 'x is staying in Paris' does not contextually entail 'x is in France'.

(34) [Elon Musk is on a business meeting in Brussels.]
a. John: Where are you staying Elon?
b. Elon: I'm staying in Paris, so I'll fly back there right after the meeting ends.

Cf. with…

(35) [Elon Musk is on a business meeting in Brussels.]
a. Elon's mum: Where are you Elon?
b. Elon: # I'm in Paris mum.

Interesting—and open—question why (33)a is degraded.

[3] Katzir and Singh (2014: (22)).

[4] From Schlenker (2020).

The parallelism between contradictoriness and redundancy doesn't end here (it is not just symmetry in conjunctions).

(36) **Contradictoriness**
a. [c] Benjamin lives in Paris and he doesn't live in France.
b. Benjamin lives in Paris and Paris isn't in France.

(37) **Redundancy**
a. [r] Benjamin lives in Paris and he lives in France.
b. Benjamin lives in Paris and Paris is in France.

(38) **Contradictoriness**
a. Bachelors have wives. [just FALSE]
b. [c] Bachelors have wives and aren't married.

(39) **Redundancy**
a. Bachelors don't have wives. [just TRUE]
b. [r] Bachelors don't have wives and aren't married.

! (37), I think, is a problem for every existing account of redundancy.

(37) is of course expected under the generalisation in (29).

Mayr and Romoli (2016: 8):

'Both the global[5] and the incremental[6] redundancy approach face problems with disjunctive sentences like [(40)a] in that they predict that the example should be deviant, contrary to intuitions.'

(40) a. Mary isn't pregnant, or she is (pregnant) and it doesn't show.
b. Either Mary isn't pregnant, or it doesn't show.

Under the generalisation proposed, (40)a is *not expected* to exhibit redundancy: 'isn't pregnant' and 'is (pregnant)' are not connected.

In other words, I get (40)a, for the same reason I get (41).

(41) a. [c] Benjamin lives in Paris AND doesn't live in France.
b. Benjamin lives in Paris OR doesn't live in France.

I do not get so-called Hurford disjunctions.

(42) Mary is pregnant, or she is pregnant and happy.

It's not clear, however, that Hurford disjunctions should be ruled out on grounds of redundancy.[7]

(43) a. # Mary is from Russia or she is from Asia.[8]
b. # John invited only some of his students or (he invited) at least half of them.

5 Conclusions

- The condition of being necessary false isn't a predictor of contradictoriness.
- Contradictoriness and redundancy appear to be two sides of the same coin: two ways in which informational oddness can be realised.

[5] E.g. Meyer (2013) and Katzir and Singh (2014).
[6] E.g. Stalnaker (1974, 1978), Fox (2008), Schlenker (2009).
[7] Thanks to Amir Anvari for discussion!
[8] Attributed to Chomsky.

- I have proposed a generalisation based on a novel theoretical notion—namely, predicate connection—that (hopefully) contributes to better understanding the nature of both contradictoriness and redundancy.

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