Presuppositions as Blockers of "Implicature Cancellation"

We argue that Chierchia's (2001) observation that Scalar Implicatures (SIs) disappear under downward entailing (DE) operators must be qualified: SIs disappear completely under strictly DE operators; they partly persist under Strawson DE (SDE) operators. We propose that this is a result of a clash between the "positive" presuppositions of SDE operators and the process of "implicature cancellation", which requires a strictly DE environment. We connect this phenomenon to Gajewski's (2005) observation that strict NPIs are licensed under strictly anti-additive (AA) operators (as argued by Zwart 1996), but not under Strawson AA (SAA) operators.

The problem. Consider the three-way contrast in (1). (1a) shows that the SI of *not everyone arrived* ((2)) is part of the content of *not everyone arrived* (Chierchia 2001), because (1a) implies that John is certain that someone arrived. (1b) shows that (2) disappears when the main clause appears under the DE operator *not* (Chierchia 2001), because intuitively (and unless *everyone* is focused, in which case *not* may be used meta-linguistically), (1b) is incompatible with a situation where John doesn't entertain the possibility that everyone arrived. We observe that in (1c), where the upward entailing *certain* (see (3)) is replaced with the SDE *sorry* (see (4)-(5)), the embedded SI persists in the presupposition part of the main clause, but disappears in the assertion part. Intuitively, (1c) presupposes that John is aware that: (i) not everyone arrived and (ii) someone arrived, and it adds the information that John wants the opposite of 'not everyone arrived' (namely, 'everyone arrived') to be true. According to Chierchia, SIs are calculated along with standard meanings, so that *not everyone arrived* is assigned a pair of meanings, stated formally in (6a) and informally in (6b) (the first member is the standard meaning, the second includes the implicature as well), and (1a) is assigned the pair in (7a). The second member of (6a) is stronger than the first, and as such, it is usually the preferred interpretation. The same holds of the pair in (7a); this is why we infer from (1a) that John is certain that someone arrived. But when the first member is stronger it wins over the second ("implicature cancellation"). This is what happens in (1b): the second member of (8a) is weaker than the first. The problem is that this doesn't readily explain the intuitions regarding (1c): neither member of (9a) is stronger than the other.

Proposal. We suggest that the mechanism that decides which interpretation survives works as follows: it picks the stronger of each relevant pair, but it operates separately on the pair that forms the presupposition part and the one that forms the assertion part. For example, in (1c) the SI persists in the presupposition part because being SDE, *sorry* has a "positive" presupposition, which is actually the pair in (10), whose second member is stronger than the first. The SI disappears in the "negative" assertion part because the assertion is the pair in (11), whose first member is stronger than the second.

Further extensions. The contrast in (12) shows that non-strict NPIs (e.g., *any*, *ever*) are licensed by operators that are merely DE (Ladusaw 1977), but strict NPIs (e.g., *in weeks*, *yet*) are not (Zwart 1996). The contrast between (12b), (13a) and (13b) shows (Gajewski 2005; cf. Atlas 1993) that strict NPIs are licensed by negated NEG-raising predicates but not by SDE or negated non-NEG-raising predicates. According to Zwart 1996, strict NPIs require AA environments. Assuming that the NEG-raising *think* has the semantics in (14), *not-think* comes out as strictly AA (Gajewski 2005; see (15), (17)), but the SDE *sorry* comes out as SAA (see (4), (18)-(19)), and *not-certain* (negated non-NEG-raising *certain*) comes out as neither (see (3), (16)-(19)). We adopt this view and suggest that, in parallel with SI computation, strict NPIs "look for" anti-additivity independently in the presupposition and in the assertion of their environments (but require it in both). This is why (12b) and (13b) are bad: *not-certain* lacks anti-additivity altogether, and *sorry*, being SAA, is AA in its "negative" assertion part but not in its "positive" presupposition part. (13a), on the other hand, is good because *not-think* is strictly AA.

Summary. Some semantic/pragmatic processes (implicature cancellation, strict NPI licensing) that require a "negative" (DE, AA) licensor are blocked when the licensor – which has the required "negativity" in its assertion – has "positive" presuppositions.

(1) a. John is certain that not everyone arrived.
b. John isn't certain that not everyone arrived.
c. John is sorry that not everyone arrived.

(2) $[\lambda w \in W.\ \{x \in D: x \text{ arrived}_w\} \neq \emptyset]$ ('someone arrived')

(3) $[\![\textit{certain}]\!] = [\lambda p \in D_{<s,t>}.\ \lambda x \in D.\ \lambda w \in W.\ DOX_w(John) \subseteq \{w' \in W: p(w') = True\}]$
($DOX_w(John) = \{w' \in W: w'$ is compatible with what John believes in w$\}$)

(4) $[\![\textit{sorry}]\!] = [\lambda p \in D_{<s,t>}.\ \lambda x \in D.\ \lambda w \in W$: (i) $p(w) = True$ and (ii) $DOX_w(John) \subseteq \{w' \in W: p(w') = True\}.\ DES_w(John) \subseteq \{w' \in W: p(w') = False\}]$
(a. $DES_w(John) = \{w' \in W: w'$ is compatible with what John desires in w$\}$;
b. β is the domain restriction ("presupposition") in $[\lambda\alpha{:}\beta.\gamma]$ and γ the value description.)

(5) A function f is SDE iff for all <X,Y> such that $X \Rightarrow Y$ and f(X) is defined, $f(Y) \Rightarrow f(X)$ (where '$\Rightarrow$' stands for cross-categorial entailment; von Fintel 1999)

(6) a. $<[\lambda w \in W.\{x \in D: x \text{ arrived}_w\} \subset D],\ [\lambda w \in W.\{x \in D: x \text{ arrived}_w\} \subset D \text{ and } \{x \in D: x \text{ arrived}_w\} \neq \emptyset]>$
b. <'not everyone arrived', 'not everyone arrived and someone arrived'>

(7) a. $<[\lambda w \in W.DOX_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} \subset D\}],\ [\lambda w \in W.\ DOX_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} \subset D \text{ and } \{x \in D: x \text{ arrived}_{w'}\} \neq \emptyset\}]>$
b. <'John is certain that not everyone arrived', 'John is certain that not everyone arrived and someone arrived'>

(8) a. $<[\lambda w \in W.DOX_w(John) \not\subseteq \{w' \in W: <\{x \in D: x \text{ arrived}_{w'}\} \subset D\}],\ [\lambda w \in W.\ DOX_w(John) \not\subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} \subset D \text{ and } \{x \in D: x \text{ arrived}_{w'}\} \neq \emptyset\}]>$
b. <'John isn't certain that not everyone arrived', 'John isn't certain that not everyone arrived and someone arrived'>

(9) a. $<[\lambda w \in W$: (i) $\{x \in D: x \text{ arrived}_w\} \subset D$ and (ii) $DOX_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} \subset D\}$. $DES_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} = D\}],\ [\lambda w \in W$: (i) $\{x \in D: x \text{ arrived}_w\} \subset D$ and $\{x \in D: x \text{ arrived}_w\} \neq \emptyset$ and (ii) $DOX_w(John) \subseteq \{w' \in W: \{x: x \text{ arrived}_{w'}\} \subset D$ and $\{x \in D: x \text{ arrived}_{w'}\} \neq \emptyset\}.\ DES_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} = D$ or $\{x \in D: x \text{ arrived}_{w'}\} = \emptyset\}]>$
b. <'John is sorry that not everyone arrived', 'John is sorry that not everyone arrived and someone arrived'>

(10) $<[\lambda w \in W$: (i) $\{x \in D: x \text{ arrived}_w\} \subset D$ and (ii) $DOX_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} \subset D],\ [\lambda w \in W$: (i) $\{x \in D: x \text{ arrived}_w\} \subset D$ and $\{x \in D: x \text{ arrived}_w\} \neq \emptyset$ and (ii) $DOX_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} \subset D$ and $\{x \in D: x \text{ arrived}_{w'}\} \neq \emptyset\}]>$

(11) $<[\lambda w \in W.DES_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} = D\}],\ [\lambda w \in W: DES_w(John) \subseteq \{w' \in W: \{x \in D: x \text{ arrived}_{w'}\} = D$ or $\{x \in D: x \text{ arrived}_{w'}\} = \emptyset\}]>$

(12) a. Mary isn't certain that anyone exercised.
b. *Mary isn't certain that Bill has exercised in weeks.

(13) a. Bill doesn't think that Mary has exercised in weeks.
b. *Bill is sorry that Mary has exercised in weeks.

(14) $[\![\textit{think}]\!] = [\lambda p \in D_{<s,t>}.\ \lambda x \in D.\ \lambda w \in W: DOX_w(John) \subseteq \{w' \in W: p(w') = True\}$ or $DOX_w(John) \subseteq \{w' \in W: p(w') = False\}.\ DOX_w(John) \subseteq \{w' \in W: p(w') = True\}]$ (Bartsch 1973)

(15) $[\![\textit{not-think}]\!] = [\lambda p \in D_{<s,t>}.\ \lambda x \in D.\ \lambda w \in W.\ DOX_w(John) \subseteq \{w' \in W: p(w') = False\}]$

(16) $[\![\textit{not-certain}]\!] = [\lambda p \in D_{<s,t>}.\ \lambda x \in D.\ \lambda w \in W.\ DOX_w(John) \not\subseteq \{w' \in W: p(w') = True\}]$

(17) f is AA iff (f(X) AND f(Y)) $\Leftrightarrow$ f(X OR Y). (Zwart 1996)

(18) f is SAA iff (f(X) AND f(Y)) and f(X OR Y) S-entail each other. (Gajewski 2005)

(19) f S-entails g iff for every X such that g(X) is defined, $f(X) \Rightarrow g(X)$.
(von Fintel 1999, Herdan and Sharvit 2006)