On the Excluded Middle

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Goals:

- Argue for connection between reference to pluralities and the excluded middle across constructions.
- Suggest source for excluded middle in repair of sortal mismatch between plural-denoting argument and distributive predicate.

1. (Definite) Plurality and the Excluded Middle

Definite plural noun phrases exhibit an excluded middle when negated. (Fodor 1970, Löbner 1987, a.o.)

(1) The boys are blond
≈ all of the boys are blond

(2) The boys are not blond
≈ none of the boys are blond

Not about (surface) scope:

(3) Mary has read the files on her desk
≈ Mary has read all the files on her desk

(4) Mary hasn't read the files on her desk
≈ Mary has read none of the files on her desk

Not just about definite plural noun phrases, either. There is a significant correlation between those constructions that show an excluded middle and those that exhibit properties of definite plurals.

1.1. Other constructions exhibiting an Excluded Middle:

1.1.1. Bare Conditionals (Stalnaker 1980, von Fintel 1997)

(5) a. Bill leaves if you insult him.
b. Bill doesn't leave if you insult him.

Scope an issue here. Possible cases with higher neg:

(6) a. I don't think Bill leaves if you insult him.
b. It's not true that Bill leaves if you insult him.

Another kind of evidence (Quine 1956, Stalnaker 1980):

(7) a. #If Bizet and Verdi were compatriots,
Bizet would be Italian
b. #If Bizet and Verdi were compatriots,
Verdi would be French
c. If Bizet and Verdi were countrymen,
Bizet would be Italian or Verdi French

Compare overt quantification:

(8) a. Bill always leaves if you insult him
b. Bill doesn't always leave if you insult him

1.1.2. Embedded Questions (Krifka 1996)

(9) a. Bill knows who was at the party

b. ∀p,x [p = x at party → Bill knows p]

(10) a. Bill doesn't know who was at the party
b. ∀p,x [p = x at party → ¬Bill knows p]

(11) a. Bill completely knows who was at the party
b. Bill doesn't completely know who was at the party.

1.1.3. Bare Plurals (Fodor 1970, Carlson 1977, von Fintel 1997)

(12) a. Ravens are black
b. Ravens aren't black

(13) a. Bill likes wombats
b. Bill doesn't like wombats

(14) a. Bill likes all wombats
b. Bill doesn't like all wombats

1.2. Evidence for treating these constructions as definite plurals (i.e., as involving reference to – not quantification over – pluralities)

A. Possibility of Collective/Non-distributive interpretation:

(15) The children are numerous.

B. Possibility of Semidistributive interpretation with another plural (Scha 1981)

(16) a. The men danced with Sue.
≈ every man danced with Sue
b. Bill danced with the women.
≈ Bill danced with every woman

(17) The men danced with the women.
∀x[M(x) →∃y[W(y) & D(x,y)]] &
∀x[W(x) →∃y[M(y) & D(y,x)]]

C. Morphosyntax resembling definite noun phrases

D. Non-monotonicity

(18) (Uttered in L.A.) The students are happy,
therefore the students at the Sorbonne are happy
(invalid) (Schlenker 2004)

1.2.1. Conditionals

Schlenker 2004 offers extensive evidence in favor of treating conditional clauses as plural definite descriptions.

Collective Interpretation: No

Semidistributive Interpretation: No

(19) If John is sick, the students are happy
(no semidistribution over students and worlds in which John is sick)

Morphosyntax: Yes

Cf. Bhatt & Pancheva 2001 on resemblance of *if*-clauses to correlatives in Marathi.

Non-monotonic: Yes, Stalnaker 1968

(20) If I strike this match, it will light. Therefore, If I soak this match in water and strike it, it will light.
(Invalid)

1.2.2. Embedded questions
Lahiri's 2002 evidence in favor of treating embedded questions evidence as algebraic elements lends itself to an analysis in terms of reference to pluralities.

Collective Interpretation: Yes Lahiri's *surprise*-class

(21) Bill is surprised who came to the party.
(Truth depends on complete answer: Bill might be surprised Sue AND Joe came without being surprised at either's individual attendance.)

Semidistributive: Yes, Lahiri again.

(22) The witnesses knew which Klansmen were at the rally.
Every witness knows some part of the answer; every part of the answer is known by some witness

Morphosyntax: To my knowledge, no such evidence.

Non-monotonic: Unclear.

Note difficulty in formulating notion of monotonicity for questions in NPI literature. Possibility of strongly exhaustive reading also interferes.

1.2.3. Bare plurals
Collective Interpretation: Yes, kind readings

(23) Dinosaurs are extinct

Semidistributive interpretation: Yes, in some contexts

(24) a. Americans know the (three) languages on this list
b. Americans have the (three) eye-colors on this list

(25) a. The ducks are swimming and quacking
b. The ducks are swimming and flying

Morphosyntax: Generics in Italian, French

(26) I cani sono rari. (Italian)
The dogs are rare
'Dogs are rare.'

Non-monotonic: Yes.

(27) Ravens are black.
Therefore, albino ravens are black.
(Invalid)

2. Incorporating Excluded Middle into semantics of (definite) plurals
Fodor 1970: definite plurals themselves carry Excluded Middle presupposition

Löbner 1985 ff., Schwarzschild 1994: distributive operator carries Excluded Middle presupposition

Löbner 2000 ($\Sigma \approx$ distributive operator):

(28) Definition

For any predication p with domain D(p), Σp is a predication whose domain consists of all those groups of elements of D(p) for which p yields a uniform truth value (i.e., all homogeneous groups within the original domain).
For any x in D(Σp), Σp(x) is true/false iff p(y) is true false for each y that belongs to x.

Assigning each of the above constructions a semantics in terms of reference to a plurality and a distributive operator accounts for their adherence to the Excluded Middle.

Is there more to be said about the Excluded Middle in these constructions?

Motivating Questions
Can we do better? Can we explain why the distributive operator carries this presupposition? Why is it an unpronounced element that carries it?

2.1. Krifka 1996

There are two distributors: existential and universal

Evidence: total vs. partial predicates

(29) a. The windows are open (some)
b. The windows are closed (all)

In sentences in which predicate doesn't prejudice either choice is in principle available. Pragmatic strengthening principle makes the choice.

Krifka:

(30) If a predicate P applies to a sum individual x, grammar does not fix whether the predication is universal ($\forall y[y \subseteq x \rightarrow P(y)]$) or rather existential ($\exists y[y \subseteq x \ \& \ P(y)]$), except if there is explicit information that enforces one or the other interpretation.

(31) If grammar allows for a stronger or a weaker interpretation of a structure, choose the one that results in the stronger interpretation of the sentence, if consistent with general background assumptions!

Is there reason to posit an existential distributor? We miss a generalization if we analyze (29) in terms of distribution.

(32) a. The window is open.
b. The window is closed.

These, (32a) and (32b), show an existential/universal split similar to that in (29). Should we account for this in terms of distribution or only in terms of lexical semantics?

3. An Alternative Story: An Extension of Stalnaker
3.1. Stalnaker 1980 on Conditional Excluded Middle:

Conditional antecedents pick out a <u>unique</u> world via a selection function relative to a proposition and a world.

Uniqueness assumption is implausible but can be maintained: when a unique world is not determined, a supervaluational strategy applies. Cp., <u>vagueness</u>:

(33) a. Patch A is red
b. Patch A is orange

(34) Patch A is red or orange

Applying this strategy to the case of definite plural noun phrases faces an obvious difficulty. We cannot get away with assuming that definite plural noun phrases denote singularities. If we did we would have no analysis of collective predication.

(35) The boys are numerous.

Is there any way we could extend Stalnaker's theory of the Excluded Middle to definite plural noun phrases?

3.2. Viewing Distribution and Excluded Middle as Repair of Presupposition Failure

I. Adopt Sauerland's 2004 Theory of number marking:

A. Plural marker is vacuous; Singular introduces presupposition.
B. Plural reference (generally) enforced by Heim's 1991 Maximize Presupposition

II. Follow von Fintel 2004/Yablo 2004 perspective on presupposition failure.

> "…there is no such problem [of presupposition failure - jrg] – more like an opportunity of which natural language takes extensive advantage" (Yablo 2004)

von Fintel on the King of France:

(36) a. #The King of France is wise.
b. ^{F}The King of France is sitting in that chair

What accounts for the difference between these two? In the first case, granting the truth of the presupposition doesn't allow you to judge the entire sentence false. In the second case it does. Formally,

(37) Rejection
Reject a sentence φ as FALSE with respect to a body of information D iff for all worlds w compatible with $rev_{\pi}(D)$: $[\![\varphi]\!](w) = 0$.

(38) Conversational revision [instructions for $rev_{\pi}(D)$] Remove $\neg\pi$ from D. Remove any proposition from D that is incompatible with π. Remove any proposition from D that was in D just because $\neg\pi$ was in D, unless it could be shown to be true by examining the intrinsic properties of contextually salient entity without at the same time showing that π is false.
Add π to D.
Close under logical consequence.

I propose, following Yablo, to give a symmetric account of judgments of truth:

(39) von Fintel-Acceptance
Accept a sentence φ as TRUE with respect to a body of information D iff for all worlds w compatible with $rev_{\pi}(D)$: $[\![\varphi]\!](w) = 1$.

Applying this system to distribution:

Distributive predicates carry the sortal presupposition that their argument is a singleton.

Application of a distributive predicate to a plurality is a presupposition failure (given Maximize Presupposition).

(40) The boys are blond.
π = ⟦the boys⟧is a singleton

Despite failure, it is possible to assign such sentences truth-values:

Revise the background to entail that there is only one boy. The details of this revision are important. For simplicity assume the extension of *boys* is known in D:

(41) $\forall w \in D[\ [\![\text{boys}]\!]^w = \textbf{boys}\ ]$

The relationship of revision to supervaluation: each actual boy is equally likely to be the one boy under revision. So,

(42) $\forall x \in \textbf{boys}[\ \exists w \in rev_\pi(D)\ [\ [\![\text{boys}]\!]^w = x]]$

Further suppose, that no one who is not an actual boy is as likely as any actual boy to be the single boy under revision. I.e.,

(43) $\forall w \in rev_\pi(D)[\ [\![\text{boys}]\!]^w \in \textbf{boys}\ ]$

Finally, suppose information about which individuals are blond does not change under revision.

Then, by (39), we accept (40) as TRUE relative to D if and only if
$\forall w \in D[\forall x \in [\![\text{ boy}]\!]^w$
$[\ x \in [\![\text{blond}]\!]^w]]$.

Similarly, by (39), we reject (40) as FALSE relative to D if and only if
$\forall w \in D[\forall x \in [\![\text{boy}]\!]^w$
$[\ x \notin [\![\text{blond}]\!]^w]]$.

Hypothesis: this repair strategy can be exploited by a speaker to convey truth-conditions for distributive sentences. The middle is excluded in these truthconditions.

Problem 1: Singular Definite Descriptions

If von Fintel's algorithm can be used to repair the sortal presupposition failure above, there's no reason it couldn't repair a failure of a uniqueness presupposition. So, it seems we predict the same truth-value judgments for such cases.

Possible response: competition between SG and PL prevents exploitation in SG case. We must then say definite descriptions are not in direct competition with universal quantifiers.

Problem 2: Coordination

Szabolcsi & Haddican 2004 argue for an Excluded Middle with (some) coordinations. Can we apply our method to such cases? The only way to revise our beliefs to make *Bill and Mary* denote a singleton would be to identify Bill and Mary. Are such revisions possible?

If not, we may need to say that the reasoning proposed above has been grammaticized in the form of a distributive operator that applies to coordinations as well as plurals.

Problem 3: Excluded Middle with predicates whose domains contain pluralities.

(44) The suitcases are heavy.

Again, perhaps a reason to believe that pragmatic strategy in some sense gives the origin of the distributivity operator and is now grammaticized.

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