Hebrew *kol*: a universal quantifier as an existential undercover

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Outline

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Background and overview

Slides: http://is.gd/kolsub

- The Hebrew determiner *kol* has a prominent interpretation as a (distributive) universal quantifier.
- In light of this, it has traditionally and almost unarguably been considered to be truth-conditionally a universal quantifier.
- To illustrate the prevalence of this position, note that any Hebrew speaker would describe *kol* in universal terms. As a matter of fact, the very Hebrew term for *universal* is an adjectival form of *kol*.
- The goal of this talk is to argue that contrary to the widely accepted analysis, *kol* is an existential quantifier whose universal import is a result of strengthening.

Outline

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Examples: *kol*'s universal meaning [=U-*kol*]

- Some typical examples (patterns like *every*):

(1) a. (etmol) *kol* yeled ciyer et acmo b-a-maxberet
(yesterday) *kol* boy drew acc self in-the-notebook
Selo
his
(yesterday,) every boy drew [a picture of] himself in his notebook

b. *kol* yeled higi'a
kol boy arrived
Every boy arrived

For convenience, we label this interpretation U-*kol*.

Outline

An apparent challenge: *kol* in DE environments [=NPI-*kol*]

- In DE environments *kol*'s interpretation parallels with that of *any*:

(2)

lo	nigram	*kol* nezek
neg	was.caused	*kol* damage

No damage was caused

  - Francez & Goldring (2012) cite Doron & Mittwoch's (1986) description of *kol* in terms of a universal that behaves as an NPI.

An apparent challenge: *kol* in DE environments [=NPI-*kol*]

(3) sarat ha-miSpatim hitnagda Se-yevuca
minister the-law objected that-will.be.performed
kol Sinui be-takciv beit ha-miSpat ha-‘elyon
kol change in-budget house the-court the-supreme
The minister of justice objected to performing any change in the budget of the supreme court.

(4) ha-mu‘amad lo kibel *kol* tSuva
the-candidate neg received *kol* response
The candidate did not receive any response.

Outline

kol in modal environments [=FC-*kol*]

- A third interpretation is that found with possibility modals:

(5) yosi raSai le'exol *kol* ugiya
y. is.allowed to.eat *kol* cookie
Yossi may eat any cookie.

(6) ata yaxol lavo *kol* yom
you may to.come *kol* day
a. You may come any day.
b. You may come every day.

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Wide scope universal

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- A potential unified account: *kol* has the semantics of a universal quantifier and it takes wide scope.

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$\forall x \in D[boy(x) \rightarrow arrived(x)]$

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- *kol*'s universal semantics is reflected trivially in the cases of U-*kol*.
- NPI-*kol* is derived from the universal by scoping above DE operators present in the LF.
- FC-*kol* is derived by scoping *kol* above a possibility modal.

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b. [[*kol* damage]$_x$ **neg** was.caused x]
$\forall x \in D[damage(x) \rightarrow \neg[was.caused(x)]]$

c. [[*kol* cookie]$_x$ **may** yossi eat x]
$\forall x \in D[cookie(x) \rightarrow \Diamond[eat(x)(yossi)]]$

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Problem: interpretation in interrogatives

- **Context:** A governmental office is waiting for three responses to three questions it has sent out. An hour ago, the first response has arrived. No additional responses have arrived.
- **Question:**

(8) ha'im hitkabla *kol* tSuva?
Q was.received.3sg *kol* response
Was any response received?

- Given the above context, the answer to (8) is positive.
- If *kol* is a universal quantifier, such an answer would not be predicted.

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- We have seen that *kol* behaves like a universal quantifier in UE contexts and like an existential quantifier in DE contexts. We have shown from questions that a solution in terms of a wide scope universal won't explain the data.

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- We have seen that *kol* behaves like a universal quantifier in UE contexts and like an existential quantifier in DE contexts. We have shown from questions that a solution in terms of a wide scope universal won't explain the data.
- Our proposal is that *kol* is an existential quantifier whose universality comes about by strengthening.

Exhaustification

- Exhaustification, an operation of grammatical strengthening, has been proposed for explaining phenomena like Scalar Implicatures, Free Choice inferences and NPIs (Krifka (1995), Chierchia (2006, 2013), Fox (2007), a.o.).
- An exhaustivity operator is a covert counterpart of *only* which takes two arguments: a proposition (the *prejacent*) and a set of alternatives, and returns it conjoined with the negation of all non-weaker alternatives.

Definition of exhaustification

- Following Fox (2007) we define the exhaustivity operator EXH in the following way, using the notion of innocent excludability (IE):

(9) a. $[\![Exh]\!]_{Alt(p)}(p)(w) \Leftrightarrow p(w) \wedge \forall q \in Excludable(p, Alt(p))[\neg q(w)]$

b. $Excludable(p, Alt(p)) = \cap\{Alt(p)' \subseteq Alt(p) : Alt(p)'$ is a maximal set in Alt(p), s.t. $\{\neg p : p \in Alt(p)'\} \cup \{p\}$ is consistent$\}$

c. *Alt(p)* stands for the set of alternatives of the prejacent p.

- Exhaustification applies recursively until no additional strengthening occurs (that is, until applying EXH would not provide additional information).

The semantics of *kol*

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- *kol* introduces alternatives which cannot be pruned (i.e. neglected).
- The set of alternatives associated with *kol* contains its domain alternatives. That is:

(11) $Alt([\![kol]\!](P)(Q)) = \{\exists x \in D'[P(x) \wedge Q(x)] : D' \subseteq D\}$

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- A crucial part is that this set of alternatives does not include a scalar alternative, namely the universal quantifier:

(12) $[\forall x \in D[P(x) \rightarrow Q(x)]] \notin Alt([\![kol]\!](P)(Q))$

Disjunctions with conjunctive meaning

- We know that existential quantification can be put in terms of disjunction.
- It has been argued that sentences with disjunctive constructions can get conjunctive interpretations.
- A familiar case is that of Free Choice disjunctions:

(13) You may eat ice cream or cake

a. $\rightsquigarrow$ You may eat ice cream

b. $\rightsquigarrow$ You may eat cake

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    b. The monkey is holding a flower **and** a book.

  - Meyer (2011):

    (15) Bernadette must be rich or else she wouldn't own a Porsche.
    a. $\rightsquigarrow$ Bernadette is rich.
    b. $\rightsquigarrow$ If Bernadette wasn't rich, she wouldn't own a Porsche.

Disjunctions with conjunctive meaning

- It has been proposed that such interpretations result from strengthened disjunctions lacking scalar alternatives.
- Similarly, we propose that *kol* is an existential quantifier that lacks scalar alternatives and thus may get strengthened to receive a universal meaning.

Outline

U-*kol* as a strengthened existential

- Assume a toy model of two boys:

(16) *EXH EXH kol* boy arrived

a. $D = \{yossi, john\}$.
b. $a :=$yossi arrived; $b :=$john arrived
c. $[\![kol \text{ boy arrived}]\!] = \exists x \in D[boy(x) \wedge arrived(x)] \equiv a \vee b$

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g. $EXH_{Alt(EXH_{Alt(a \vee b)}[a \vee b])}[EXH_{Alt(a \vee b)}[a \vee b]] =$
$(a \vee b) \wedge \neg[a \wedge \neg b] \wedge \neg[b \wedge \neg a] = (a \vee b) \wedge (a \leftrightarrow b) = a \wedge b$

Deriving NPI-*kol*

- In DE-environments no alternatives of the prejacent are non-weaker (i.e., all are entailed).
- No strengthening occurs and *kol* remains existential.

(17) *EXH* neg was.caused *kol* damage

a. $[\![\text{neg was.caused } kol \text{ damage}]\!] = \neg(a \vee b)$
b. $Alt([\![\text{neg was.caused } kol \text{ damage}]\!]) = \{\neg(a \vee b), \neg a, \neg b\}$
c. $EXH_{Alt(\neg(a \vee b))}[\neg(a \vee b)] = \neg(a \vee b)$

- Additional exhaustifications would not strengthen the meaning.

Deriving FC-*kol*

- Fox (2007) on Free Choice inferences: disjunctive items could be strengthened without contradiction to conjunctions when in the scope of an existential operator.

(18) *EXH EXH* yossi may eat *kol* cookie

a. $D = \{cookie_1, cookie_2\}$

b. $a :=$yossi eats cookie$_1$; $b :=$yossi eats cookie$_2$

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$\diamond(a \vee b) \wedge (\diamond(a) \leftrightarrow \diamond(b)) = \diamond(a) \wedge \diamond(b)$

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- Note that since *kol* lacks scalar alternatives, we do not get the scalar implicature that $\neg \diamond (a \wedge b)$.

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Presuppositional exhaustification

- Problem: assuming innocent excludability won't derive contradictions for items like *any* in UE environments, contradictions which are crucial in explaining the distribution of such items within a general theory of polarity sensitivity (cf. Krifka (1995), Chierchia (2013)).
- An idea on which a solution could be based is to retain Innocent Excludability while adding a presupposition to the exhaustivity operator. In this we follow Danny Fox (p.c.) and modify a suggestion discussed by Chierchia (2013).

Presuppositional exhaustification

(19) Presuppositional exhaustivity operator revised (following Chierchia (2013)[p. 186] & Danny Fox (p.c.)):

$$EXH_{PR}(Alt(p))(p) =$$

$$\begin{cases} EXH_{IE}(Alt(p))(p) \text{ if for every } q \in Alt(p): \begin{cases} \text{Either: } EXH_{IE}(Alt(EXH_{IE}(Alt(p))(p))(EXH_{IE}(Alt(p))(p)) \rightarrow q \\ \text{Or: } EXH_{IE}(Alt(EXH_{IE}(Alt(p))(p))(EXH_{IE}(Alt(p))(p)) \rightarrow \neg q \end{cases} \\ \text{Undefined otherwise} \end{cases}$$

- Assuming that alternatives introduced by PSIs are unprunable, we thus predict that for every alternative introduced by a PSI, exhaustification must determine its truth-value.
- Such a requirement predicts items like *any* to be bad in episodic UE environments while also predicting Free Choice inferences in possibility contexts.

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Previous proposals: discussion

- **Ambiguity:** Levy (2008) argues that NPI-*kol* and FC-*kol* are existential quantifiers, while U-*kol* must be given a universal semantics.
- U-*kol* then is a counterpart of *every*, while NPI-*kol* and FCI-*kol* are (roughly) a counterpart of *any*.

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- U-*kol* then is a counterpart of *every*, while NPI-*kol* and FCI-*kol* are (roughly) a counterpart of *any*.
  - This is an appealing analysis. However, we propose that a unified account is possible, if *kol* is taken to be an existential quantifier, with no need for assuming different lexical entries.

- **Universal indefinite:** Tonciulescu (2011), based on Menéndez-Benito's (2005) analysis for Free Choice *any*, argues that *kol* is a pronoun which denotes a set of individual alternatives and agrees with a (propositional) universal quantifier.

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  - In her analysis, even U-*kol* in UE episodic contexts such as (1-a)-(1-b) needs to involve (possibility) modality. But this modality is empirically unjustified, since the cases of U-*kol* in (1-a)-(1-b) don't seem to have any modal flavor.
  - Our proposal does not ascribe any kind of modality to cases of U-*kol*.

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Open issues (not an exhaustive list)

- *kol* + definite restrictor is unambiguously universal:

(20) yosi (lo) pagaS et *kol* **ha**-yeladim
yossi (neg) met ACC *kol* **the**-children
(It is not true that) Yossi met all the children.

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- U-*kol* sometimes seems to be available in DE contexts in which EXH is not supposed to occur (based on the distribution of scalar implicatures).
  - A possible solution: in these cases *kol* is focused and thus requires EXH even in DE environments. Whether it is an empirically justified assumption or not we leave for future research.

Open issues (not an exhaustive list)

- Certain factors interfere with how easy it is to get existential interpretation. More specifically, NPI-*kol* prefers 'abstract' restrictors.
- High/low register as vacuous vs. non-vacuous EXH.

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Summary

- We have presented data showing that Hebrew *kol*, which is traditionally considered a universal quantifier, is in fact an existential as is evident in questions ((8)).
- Our analysis is that the universal import of *kol* is only a derivative of it being an existential that:
  1. Must undergo exhaustification.
  2. Introduces domain alternatives and lacks a scalar alternative.
- We claimed that this is in line with different phenomena of disjunctions with conjunctive meanings for which analyses in similar terms have been suggested.
- We sketched a possible way for embedding our analysis in a general theory of PSIs while maintaining the notion of Innocent Excludability.

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All mistakes and shortcomings are ours.

References

[1] Chierchia, G. Broaden your views: Implicatures of domain widening and the "logicality" of language. *Linguistic inquiry 37*, 4 (2006), 535–590.

[2] Chierchia, G. *Logic in Grammar: Polarity, Free Choice, and Intervention*. Oxford University Press, 2013.

[3] Doron, E., and Mittwoch, A. Polarity-sensitive kol: Universal or existential. In *talk given at Second Annual Conference on Theoretical Linguistics, Jerusalem* (1986).

[4] Fox, D. Free choice and the theory of scalar implicatures. *Presupposition and implicature in compositional semantics 71* (2007), 112.

[5] Francez, I., and Goldring, K. Quantifiers in modern hebrew. In *Handbook of Quantifiers in Natural Language*. Springer, 2012, pp. 347–397.

[6] Krifka, M. The semantics and pragmatics of polarity items. *Linguistic analysis 25* (1995), 209–257.

[7] Levy, A. *Towards a Unified Approach of the Semantics of'any'*. PhD thesis, Bar Ilan University, 2008.

[8] Menéndez-Benito, P. *The grammar of choice*. PhD thesis, University of Massachusetts Amherst, 2005.

[9] Meyer, M.-C. "or else", a new kind of disjunction. In: Meaning, Context and Implicit Context, working papers, Conference at CNRS Thematic School, p. 121, 2011.

[10] Raj Singh, Ken Wexler, A. A. D. K. D. F. Children's interpretation of disjunction and the theory of scalar implicatures. Talk given at the McGill-Jülich dialogue, 2012.

[11] Tonciulescu, K. C. *Licensing Conditions for Indefinite Pronouns in Modern Hebrew*. PhD thesis, University of Ottawa, 2011.

Appendix: Deriving U-*kol*

(21)

a. $[\![kol \text{ boy arrived}]\!] := p$
$p = \exists x \in D\,[B(x) \wedge L(x)]$
$Alt(p) = \{\exists x \in D'\,[B(x) \wedge L(x)] : D' \subseteq D\}$

b. $q := EXH\,[Alt(p)]\,[p]$
$q = p$ Since no domain-alternative is innocently excludable

c. $Alt(q) = \{EXH\,[Alt(p)]\,[p] : D' \subseteq D\} =$
$\{(\exists x \in D_i\,[B(x) \wedge L(x)]) \wedge \neg(\exists x \in D \smallsetminus D_i\,[B(x) \wedge L(x)]) : D_i \subseteq D\}$

d. $EXH\,[Alt(q)]\,[q]$
$= q \wedge \forall D_i \subset D\,[\neg\,[(\exists x \in D_i\,[B(x) \wedge L(x)])$
$\wedge\neg(\exists x \in D \smallsetminus D_i\,[B(x) \wedge L(x)])$
$= (\exists x \in D\,[B(x) \wedge L(x)])$
$\wedge\forall D_i \subset D\,[(\exists x \in D_i\,[B(x) \wedge L(x)])$
$\leftrightarrow (\exists x \in D \smallsetminus D_i\,[B(x) \wedge L(x)])$
$= (\exists x \in D\,[B(x) \wedge L(x)])$
$\wedge(\forall x \in D\,[B(x) \rightarrow L(x)])$

Deriving NPI-*kol* and FC-*kol*

(22) $[\![\text{neg was.caused } \textit{kol} \text{ damage}]\!] := p$
$p = \neg\left[\exists x \in D\left[\textit{damage}\left(x\right) \wedge \textit{was.caused}\left(x\right)\right]\right] \equiv \textit{EXH}\left[\textit{Alt}\left(p\right)\right]\left[p\right]$

(23) a. $[\![\text{yossi may eat } \textit{kol} \text{ cookie}]\!] := p$
$p = \diamond\left[\exists x \in D\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right]$
$\textit{Alt}(p) = \{\diamond\left[\exists x \in D'\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right] : D' \subseteq D\}$

b. $q := \textit{EXH}\left[\textit{Alt}\left(p\right)\right]\left[p\right]$
$q = p$ Since no domain-alternative is innocently excludable

c. $\textit{Alt}\left(q\right) = \{\textit{EXH}\left[\textit{Alt}\left(p\right)\right]\left[p\right] : D' \subseteq D\} =$
$\{(\diamond\left[\exists x \in D_i\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])$
$\wedge\neg(\diamond\left[\exists x \in D \smallsetminus D_i\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right]) : D_i \subseteq D$

d. $\textit{EXH}\left[\textit{Alt}\left(q\right)\right]\left[q\right]$
$= q \wedge \forall D_i \subset D\left[\neg\left[(\diamond\left[\exists x \in D_i\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])\right.\right.$
$\left.\left.\wedge\neg(\diamond\left[\exists x \in D \smallsetminus D_i\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])\right]$
$= (\diamond\left[\exists x \in D\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])$
$\wedge\forall D_i \subset D\left[(\diamond\left[\exists x \in D_i\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])\right.$
$\left.\leftrightarrow (\diamond\left[\exists x \in D \smallsetminus D_i\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])\right]$
$= (\diamond\left[\exists x \in D\left[\textit{cookie}\left(x\right) \wedge \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])$
$\wedge(\forall x \in D\left[\diamond\left[\textit{cookie}\left(x\right) \rightarrow \textit{eat}\left(x\right)\left(\textit{yossi}\right)\right]\right])$