# Backward binding illusions?

## Psych effects in theory and practice

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# Backward Binding as psych effect:

## I In theory…

- Phenomenon
- Analyses
- Conclusion I

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## II …and practice

- Material, Method & Design
- Results
- Conclusion II

General discussion

# Phenomenon

## Psych effects

- triggered by exceptional properties of non-agentive experiencer object structures; leads to behavior that violates grammatical rules

- occur in a large number of languages
  & affect central phenomena of grammar (e.g., islandhood, word oder or control)
  & specific rules in several languages (i.e. clitic doubling and genitive of negation rules) (see Landau 2010 for an overview of core and peripheral psych effects)

  ➔ experiential/mental domain is grammatically relevant;
  [exp] is a relevant grammatical feature of verb meaning

# Phenomenon

Exceptional binding with psych predicates

- B&R (1988) - Backward Binding (**BB**) with Italian EO verbs:
  "*Perhaps the most notorious puzzle raised by psych-verbs of the preoccupare class [class II psych verbs] is their anomalous behavior with respect to the theory of Binding.*"

(1) *Questi pettegolezzi su di* ***sé$_i$*** *<u>preoccupano</u>* ***Gianni$_i$*** *piú di ogni altra cosa.*
'These gossips about himself worry Gianni more than anything else.'

(2) **Questi pettegolezzi su di* ***sé$_i$*** *<u>descrivono</u>* ***Gianni$_i$*** *meglio di ogni biografia ufficiale.*
'These gossips about himself describe Gianni better than any official biography.'

- <u>Principle A (Binding Theory; BT):</u>
  local c-command requirement for syntactic binding of anaphors

# Phenomenon

- BB in OE structures structures seems to violate Principle A of BT
  (3) [*Pictures of each other*$_i$]$_{NOM}$ *worried*$_{EXP}$ [*the linguists*$_i$]$_{ACC}$.

- Nominative/„subject“ anaphors: the subject antecedent should be structurally reconstructable —> BB is derived & not base generated
  (4) a. *His$_i$ mother seems to everybody$_i$ to be the best.*
  b. *seems to everybody$_i$* [*his$_i$ mother to be the best*] (reconstructed)

- BB with psych verbs not reconstructible (in a simple transitive analysis) —> apparently violates grammatical rule

- BB is documented cross-linguistically; e.g. Italian, English, Chinese, Hungarian, Japanese (among others)

  ➡ BB structures are used for assumptions about the nature of psych structures

# Phenomenon

- First intuition:
  Backward Binding violates *pragmatic rules* – the speaker would not use the backward option, if he wants us to bind.

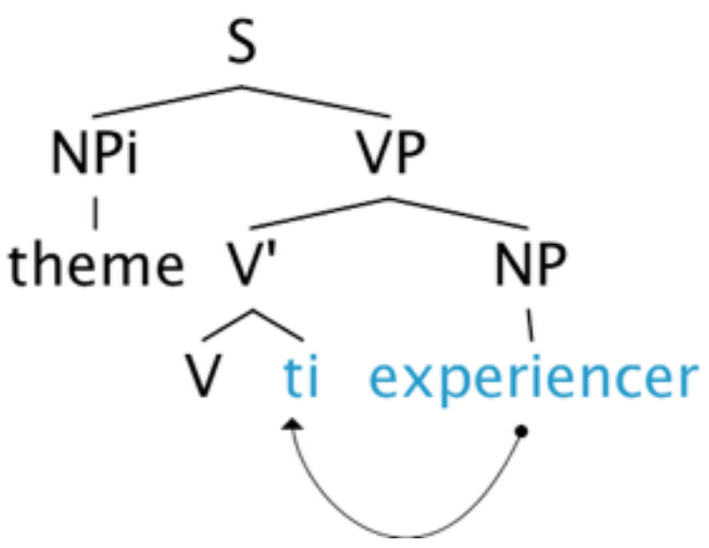
- Even if the backward option is pragmatically disfavored, does BB as grammatical/well-formed option depend on factors like verb type/ [exp] feature?

- How is there a potential *psych effect*?

  Usually subjects are preferred binders:
  It is argued that EXP-Antecedents (of EO verbs) are subject/ topics of a clause either syntactically or semantically.

# Analyses

- B&R 1988, Pesetsky 1987, 1995:
  EXP-BB ist <u>derived backward binding</u>: EXP-antecedent syntactically binds (-> c-commands) from its base position
  theta-grid [EXP, TH]
  case grid [ACC, —]




necessary assumptions

1. Principle A is an „anywhere“ condition (here at DS)
2. EO are base-generated higher than the theme
3. (all) object-experiencers are non-canonical objects
4. accusative case is inherent (unaccusative analysis)

- problematic assumption for many (non-stative) $EO_{ACC}$ structures

- there seem to be more factors

# Analyses

- one problem: different types of $EO_{ACC}$ verbs/class II psych verbs
  (Pesetsky 1995, Arad 1998, Reinhart 2001)

  stative $EO_{ACC}$ verbs: no agentive reading
  *depress, worry*; German: *interessieren, bedrücken;* smaller class!

  (6) *#He tries to depress me./#Er versucht mich zu bedrücken.*

  „labile“ $EO_{ACC}$ verbs: alternate between agentive & non-agentive reading
  *shock, annoy*; German: *ärgern, nerven, stören*

  (7) *He tries to annoy me./ Er versucht mich zu ärgern.*

- for labile cases: animacy can influence the reading of the structures - no experiential meaning with agentive reading

# Analyses

- One solution: finer-grained semantics - thematic hierarchy/ aspectual prominence/ inherent topicality of the participants (Jackendoff 1972, E. Grimshaw 1990, Kiss 2002, among others)

(8) ‚He annoys me‘:

| | |
|---|---|
| *He*$_{AG}$ *tries to annoy me*$_{EXP}$. | AG > EXP/PAT |
| *His behavior*$_{TH/CAU}$ *annoys me*$_{EXP}$. | EXP > TH/CAU |

- Reinhart (2001): feature clusters as grammatical primitives
  Causer/Theme subjects differ with respect of the relevance of causation & mental state

  *CAU > EXP
  TH/subject matter > EXP (different structure building, no direct external projection)

- =volitional/non-volitional causers

# Analyses

- BB not restricted to EXP
  Experiencer-object verbs
  Syntactic causatives: make angry, make happy
  **?**Lexical causatives: kill, destroy
  Ditransitive verbs: give

  *„…that backward binding is licensed by the causative nature of the construction rather than its psych properties.“* (Landau 2010)

- one global solution: BB anaphors are logophoric anaphors - do not require c-command

# Conclusion I

- Pseudo-psych effect (Landau 2010)
  „*At any rate, it is safe to conclude that backward binding is not a purely structural phenomenon, and hence does not attest to any specific feature in the syntax of psych verbs*."

- internal vs. external backward binding (Broccias 1997):
  „*We can easily see that we arrive at contradictory requirements. (…)*

  *I think that the conclusion we can draw from our discussion so far is that EBB* [external BB] *cannot be accounted for syntactically, but depends on some notion of logophoricity. The crucial requirements that guarantee the availability of EBB are the inanimate character of the subject and the use of a psychological predicate*"
  (internal BB: binding relation between two internal arguments)

# Conclusion I

- varying/ contradictory intuitions about the wellformedness of BB structures:
  Pesetsky/Reinhart „?“ for causatives -> minimal contrast

- contradictory assumptions about the relevant factors: verb type, subject type, animacy, volitionality, aspect

- theoretical/well-formedness oberservations lead to/support conclusions about the nature of psych verbs or the grammatical modeling (θ roles, EXP base genration)
  Should we consider BB as indicator for the nature of psych verbs?

- Do we find experimental evidence for BB as psych effect?

## …and practice:

- Experimental investigation of Backward Binding:

- Requirements: controlled study, adequate size of sample and subjects, constant and minimal manipulation of factors

- according to the discussion in the literature: verb type & animacy are possible factors

# Material, Method & Design

| **„True“ anaphors** | |
|---|---|
| Reflexives: | ‚Himself worries John the least.‘ (in several languages) |
| Reciprocals | Each other’s health worried the students.<br>*Each others parents invited the students to dinner.<br>*Each others friends murdered the men. |
| Frequent type: pictures of/ stories/articles about | Pictures of each other annoyed the politicians.<br>Pictures of himself annoyed the politician.<br>Stories about herself generally please Mary.<br>(Pesetsky 1987/ 1995) |
| **Pronominal anaphors** | |
| Possessive: | $His_i$<br>??His<br>*His<br>$His_i$ |
| Personal: | Everyone who knows Zelda |

# Material, Method & Design

- picture-NP-anaphors/possessive reciprocals: problematic case - sensitive to pragmatic factors (Pollard & Sag 1992)

- BT for true argument reflexives, but not for picture-NPs; analysis as logophors (i.e. bound or anaphoric pronouns) (Pollard & Sag 1992, Reinhart & Reuland 1993)

- *„The coreferential interpretation was available for reflexives in picture NPs in the ellipsis and 'only' constructions. If the coreferential interpretation does indicate a logophoric use of the reflexive, then this study supports the claim that picture NP reflexives are logophors“*

- *„non-Binding Theory compatible reflexives in representational NPs are acceptable if they refer to "sources-of-information" (e.g. Kuno 1987) and pronouns with local antecedents are acceptable if they refer to "perceivers-of-information" (Tenny 2004).“*
  (experimental study on the coreferential reading of picture-NP-reflexives Goldwater & Runner 2006)

—> has nothing to do with psych properties at all

# Material, Method & Design

- Relevant factors (vary in literature):

- Type of anaphor (reflexives, reciprocals, pronouns):
  1 - no picture-NP-type anaphors with reflexives or reciprocals
  2 - simple (primary reflexives) vs. complex anaphors

  —> lexically flexible anaphors: possessive pronouns
  (his meaning, his house, his father,…)

- Type of Binder (proper name/ DP/ QNP): pronouns can also be anaphoric, if they are bound to their c-commanding antecedent. QNPs are known to bind pronouns under c-command.

  —> c-command: QNP experiencer

# Material, Method & Design

- **Here:**
  Binding between pronominal anaphors and experiencers represented by QNPs

- manipulated factors
  VERBTYPE: worry, frighten <> heal, destroy
  ANIMACY: his medicine <> his doctor

  —> close to examples from Reinhart (2001)
  *His$_i$ health worries every patient$_i$.*

- relevant reading: His$_i$ own health worried every patient$_i$.

# Material, Method & Design

- The languages: German & Greek

- German: backward binding in psych structures is not discussed in German - one data point in Platzack (2009)

(9) **Bilder voneinander beunruhigten*$_{EOACC}$ *die Linguisten.* (German)
'Pictures of each other worried the linguists.'

(10) **Árangur sinn hræddi hanum.* (Icelandic)
success REFL.POSS frightened him
His success frightened him.

- intuition: seems to be restricted, but one can find a difference between stative uses of and some non-experiential structures

- clear difference between ACC and DAT experiencers; most ACC experiencers behave like canonical objects

# Material, Method & Design

- Greek: discussion & some examples in Everaert and Anagnostopoulou (1997)

(11) O eaftos tui aresi tu Petrui.
the self his pleases-3sgthe Petros
`Himself pleases Petros.'

(12) Den tin endiaferi tin $Ana_i$ o eaftos $tis_i$ katholu.
not her interests-3sg the Ana the self her at all
`Herself does not interest Ana at all.'

- Greek experiencers are typically analyzed as quirky - compatible with „derived BB“-analyses

- cross-linguistic assumption:
psych effect: verb type effect, animacy effect for EXP
no psych effect: no verb type effect, but animacy effect for both EXP & CAU

# Material, Method & Design

- 4 different randomized lists without fillers (but with familiarization phase)
- decision based on previous research: in German BB is comparably less accepted; fillers lower the rating - factors might become invisible
- potential fillers need to be „odd“ in the sense that BB-structures are „odd“ & due to method: they
- 3.5 item grand mean with all fillers rated between 3.9 and 4.8; no effects

*Because of her$_i$, many pedestrians were injured and asked the driver$_i$ for help.*
*He$_i$ had to be held back a grade because Chris$_i$ couldn't understand the texts.*
*They were shocked because Tom$_i$ prevented the reelection of himself$_i$.*
*People tried to prevent Karl$_i$ from spreading the convictions of himself$_i$.*

—> follow-up study without fillers

# Material, Method & Design

- factorial design: 2x2 ANIMACY X VERB TYPE
- animate (anim) vs. inanimate (inanim) subjects
- experiencer (EXP) & causative (CAU) verbs: both stimulus & causer can be represented by animate and inanimate subjects.
- 24/20 subjects; age 20-40
- questionnaires; 7-point acceptability rating (from not acceptable to acceptable)
- statistical analysis: means & mixed effect logistic regression
  rating ~ verbtype*animacy+(1|subject)+(1|item)

# Material, Method & Design

exp, +anim: **His investors** frightened every businessman
exp, -anim: **His investments** frightened every businessman
cau, +anim: **His investors** destroyed every businessman.
cau, -anim: **His investments** destroyed every businessman.

# Material, Method & Design

exp, +anim: **His investors** frightened every businessman
exp, -anim: **His investments** frightened every businessman
cau, +anim: **His investors** destroyed every businessman.
cau, -anim: **His investments** destroyed every businessman.

Seine Kunden haben jeden Unternehmer empört$_{exp}$.
Seine Abgaben haben jeden Unternehmer empört$_{exp}$.
Seine Kunden haben jeden Unternehmer ruiniert$_{cau}$.
Seine Abgaben haben jeden Unternehmer ruiniert$_{cau}$.

# Material, Method & Design

exp, +anim: **His investors** frightened every businessman
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Seine Kunden haben jeden Unternehmer empört$_{exp}$.
Seine Abgaben haben jeden Unternehmer empört$_{exp}$.
Seine Kunden haben jeden Unternehmer ruiniert$_{cau}$.
Seine Abgaben haben jeden Unternehmer ruiniert$_{cau}$.

Οι επενδυτές του τρομάζουν$_{exp}$ κάθε επιχειρηματία.
Οι επενδύσεις του τρομάζουν$_{exp}$ κάθε επιχειρηματία.
Οι επενδυτές του καταστρέφουν$_{cau}$ κάθε επιχειρηματία.
Οι επενδύσεις του καταστρέφουν$_{cau}$ κάθε επιχειρηματία.

# Material, Method & Design

*$His_i$ health worries every $patient_i$. —> $His_i$ <u>own</u> health worried every $patient_i$.*

- In order to support the this reading we manipulated the…

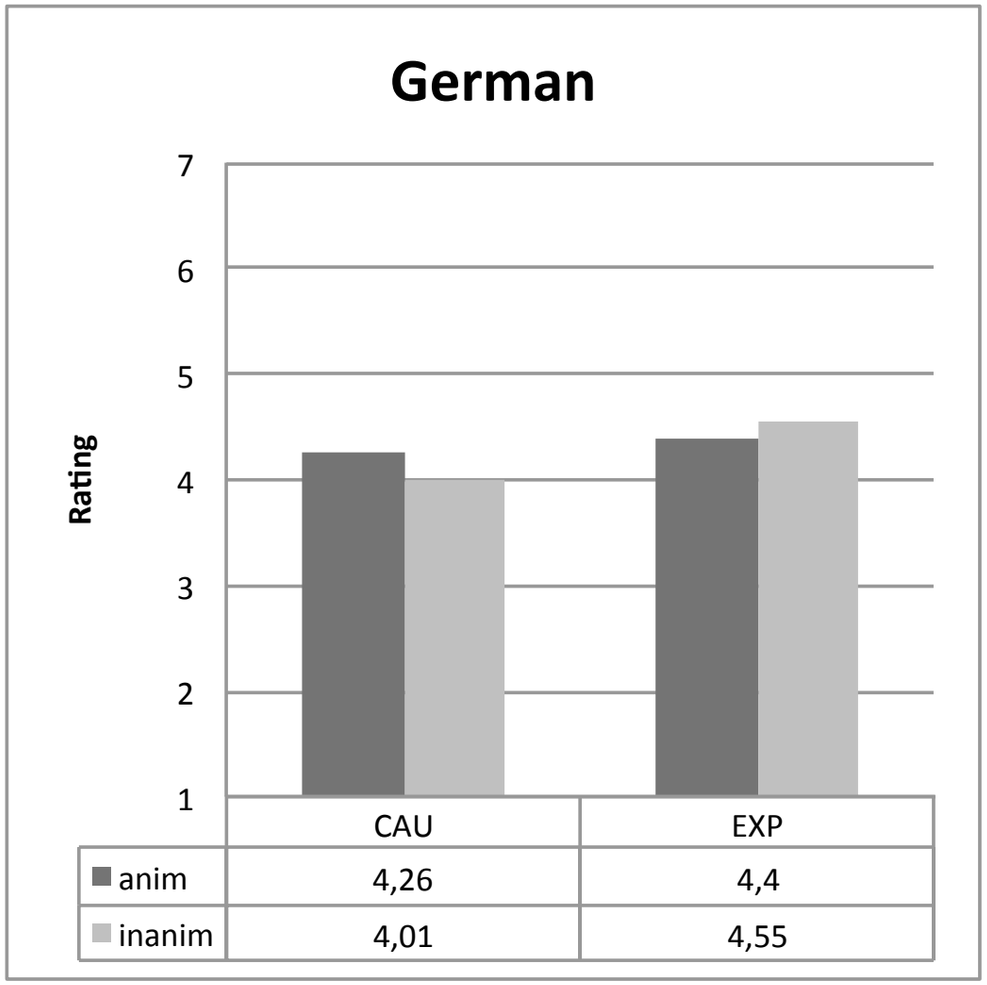
- instructions:
  the subjects were asked explicitly to bind anaphor and antecedent „the structures are ambiguous - it's about, e.g., <u>his own health</u> (not of some other person).“ & we presented structures that exemplified the ambiguity

- visual level:
  anaphor & antecedent were marked (dark blue)

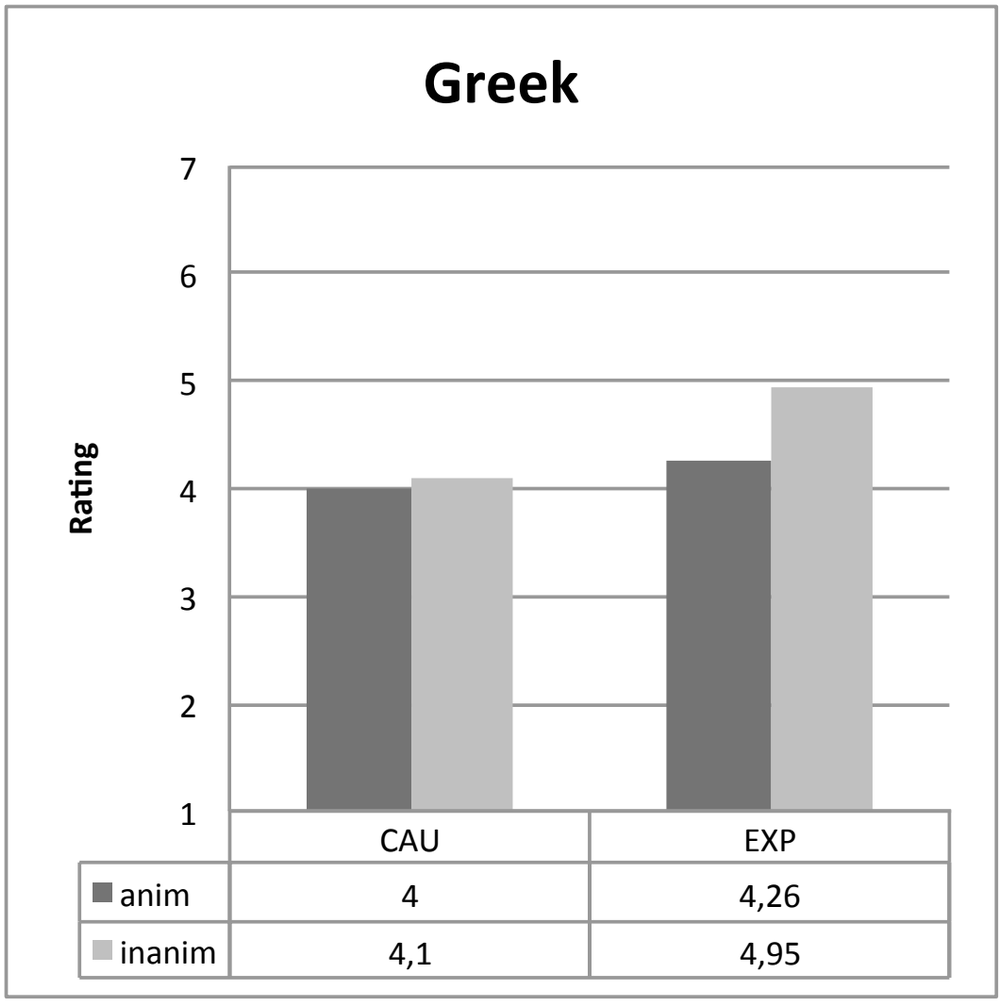
- semantic level: plausible possessive relations

**His investments** <u>encouraged</u> every businessman.

# Results




- no verb type effect
- no animacy effect




- no fixed effects
- **interaction effect:** for EXP inanimate subjects significantly increase the rating (p=.00895 **)

# Conclusion

- recall: cross-linguistic assumptions
  psych effect: verb type effect; possible animacy effect for EXP
  no psych effect: no verb type effect, but animacy effect for both EXP & CAU

- no safe interpretation based on the results

  —> animacy effect with experiencer verbs in Greek:
  Both languages exhibit purely stative class II verbs and „labile“ class II verbs (stative & agentive reading)
  —> agentive reading is not controllable, but might evolve here

- main problem: BB „in practice“ different readings of the structures & and the interpretation of „every“

# Discussion

- observation: interpretation of the quantifier difficult for informants and participants—> a statement about ‚every X‘ in a time-bound situation :-/

- possible rescuing strategies: create generic readings that „relativize the statement“
  —> *Usually his investments/his clients frighten(ed) every businessman*.

- Under this reading, we have a different situation.

# Discussion

Chierchia (1989)

*„perhaps the best one can do is to assume that* [existential] *readings and* [universal] *readings are both generally available, but certain sentences may strongly disfavour one of them due to specific properties of their meaning.“*
*(…)*
*„For a sentence like "**a student interviewed every professor**", it is very hard or impossible to get the reading where every professor has wide scope over a student (in contrast with, e.g., "**a mechanic inspected every plane**“).*

—> factors like verb type (stage-level/individual-level) and subject type influence the generic potential of a structure.

—> test items as well as participants have an individual tendency to have generic potential/ access the generic reading of a structure

# Discussion

- Fox & Sauerland (1996): Generic operator & Qs

  *Yesterday, a guide ensured that every tour to Louvre is fun.*
  *In general, a guide ensures that every tour to Louvre is fun.* (wide scope)

  „*the generic operator leads to a trivialization of the universal so that each time a relevant portion of the world is considered, a single guide is involved in each situation of a tour to Louvre*“

  => the quantifier cannot ensure structural binding
  => we have coreference/semantic binding of pronouns even with Q

- true syntactic binding under c-command still holds &
  no strong assumption about grammatical modeling (base generation, EXP > TH)

# Discussion

some external evidence from Greek: Alexopoulou

*To Yani *(ton) idha sto PARTY.*
the Yani-acc him saw-1sg at-the party
‚Yanis I met at the Party.'

- Quantifiers resist CLLD in Greek:
  *KANENA fititi dhen (*ton) idha sto parti.*
  no-acc student-acc not him saw-1sg at-the party
  ‚No student did I see at the party.'

- In generic statements they can be CLLD-ed
  *KANENA dhen ton apoliun etsi.*
  no one-acc not him fire-3pl like-this
  ‚No one do you fire like this.'

- CLLD = topicalization; in generic structures universal Qs can be topics (are referential (Reinhart 1987))

# Open Qs & goals

- methodological:
  1 - improve methods for testing binding relations
  2 - proper analysis/control for filler-less questionnaires for cases of „scale-depression“ for relevant items

- theoretical:
  Answer to the question: How exactly do generic readings influence binding configurations? - couldn’t it be the source of previous BB evaluations?

  1 - test experiential & non-experiential generics - in case that coreference/semantic binding potential is different
  2 - clear formulation of the conditions on coreferential/„dynamic binding“

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