

# Event causation and force dynamics in argument structure constructions

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# Two models of causation

- Events cause other events: the standard model, in both philosophy and linguistics
- Individuals act on other individuals: the transmission of force, causal chain, or force dynamic model, found in various approaches in linguistics
- A hybrid model, agents bringing about events, will not be discussed here; it is not generalizable to other types of causation

# Linguistic motivations for the two models

- Events cause other events: complex sentences with causal connectives
- Individuals act on other individuals: argument structure constructions

*The car hit the statue **and** it fell over.  
The statue fell over **because** the car ran into it.*

*The car **SBJ** knocked over the statue **OBJ**.*

# Force dynamics and argument structure constructions

- Many linguists have argued that event structure, usually a decompositional event structure, should be the semantic basis for argument structure
- I have argued that the specific type of decompositional event structure to account for argument structure patterns is force dynamic and other interactions between participants, following Leonard Talmy (1976, 1988)

# Force-dynamic analysis: a recap

*Sue broke the coconut for Greg with a hammer.*

Participants are arranged in order in the causal chain

Sue → hammer → coconut → Greg

Verb profiles segment of causal chain (solid red arrows)

preposition profile (dashed red arrow)

# Force-dynamic analysis: a recap

*Sue broke the coconut for Greg with a hammer.*

Sue → hammer → coconut ..... Greg

SBJ

A.OBL

OBJ

S.OBL

Linking rule 1: SBJ and OBJ delimit verbal profile

Linking rule 2: SBJ is antecedent to OBJ in causal chain

Linking rule 3: A.OBL precedes OBJ; S.OBL follows OBJ

*(Croft 1998)*

# Antecedent and subsequent obliques

- English A.OBL: *with, by, of*, metaphorical *from, out of*
- English S.OBL: metaphorical *to, for*, all spatial Path prepositions (including *to*)
- Almost all languages differentiate antecedent vs. subsequent oblique case marking/adpositions

# Extending force dynamics in argument realization

- Basic force dynamics (Talmy 1988) involves physical interactions or “billiard ball causation” (Langacker 1987)
- It can be extended to the laws of society, or “social dynamics” (cf. Talmy 1988)
- And to the laws of human psychology, or “mental dynamics” (cf. Talmy 1976, Croft 1993)
- Even to the laws of inference (Sweetser 1990)
- and to non-force-dynamic relations (Croft 1991)

# Noncausal (undirected) relations

*Jack loaded the furniture on the truck.*

noncausal spatial relation  
indicated by a line



Figure-first construal: Figure is antecedent to Ground

Path adpositions are subsequent obliques

# Noncausal (undirected) relations

*Jack loaded the truck with the furniture.*

noncausal spatial relation  
indicated by a line



Figure-first construal: Figure is antecedent to Ground

Antecedent preposition with oblique Figure

# Noncausal (undirected) relations

*The beavers stripped bark from the trees.*

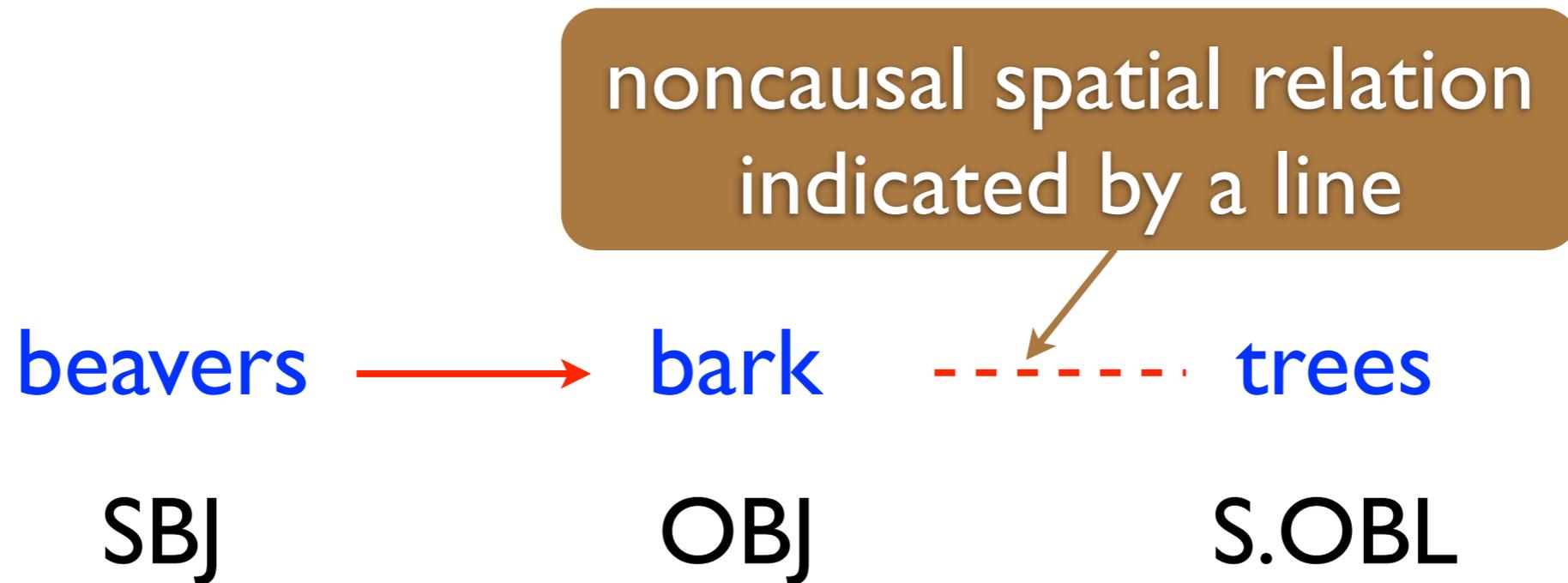


Figure-first construal: Path doesn't matter

Path adpositions are subsequent obliques

# Noncausal (undirected) relations

*The beavers stripped the trees of bark.*

noncausal spatial relation  
indicated by a line



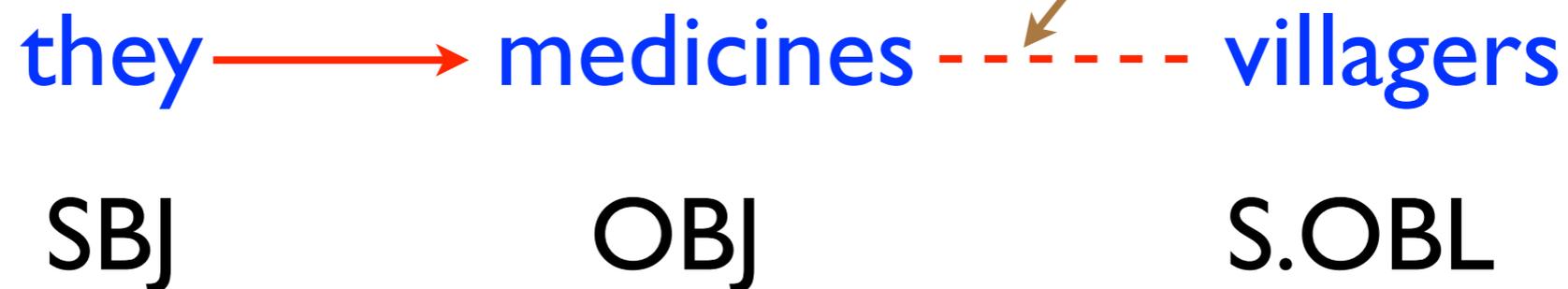
Figure-first construal: Path doesn't matter

Antecedent preposition with oblique Figure

# Noncausal (undirected) relations

*They provided medicines to the villagers.*

noncausal possessive  
relation indicated by a line



Possessed-first construal: Possessed is antecedent to Possessor

Recipient (dative) adpositions are subsequent obliques

# Noncausal (undirected) relations

*They provided the villagers with medicines.*

noncausal possessive  
relation indicated by a line



Possessed-first construal: Possessed is antecedent to Possessor

Antecedent preposition with oblique Figure

# Antecedent and subsequent obliques

Syncretisms among antecedent participant roles	39
Syncretisms among subsequent participant roles	30
No directionality in the case system	5
Syncretisms across antecedent and subsequent participant roles	2
<i>Number of languages surveyed</i>	40

W. Croft, *Syntactic categories and grammatical relations*, p. 196

# Antecedent and subsequent obliques

- Developmental evidence:
  - Substitution of *by* for instrumental *with* (Bowerman 1983:463-465): ‘*I just eat it **by** my spoon*’ [C 4;4]
  - Substitution of *from, of, with* for passive *by* (Clark and Carpenter 1989, Bowerman MS): ‘*Sometimes Eva needs to be feeded **with** you because she doesn’t eat*’ [C 4;4]

# Antecedent and subsequent obliques

- Developmental evidence:
  - Choice of correct antecedent or subsequent preposition type with erroneous locative alternation

*‘Cause I’m going to touch it [hand] **on** your pants’ [E 3;0]*



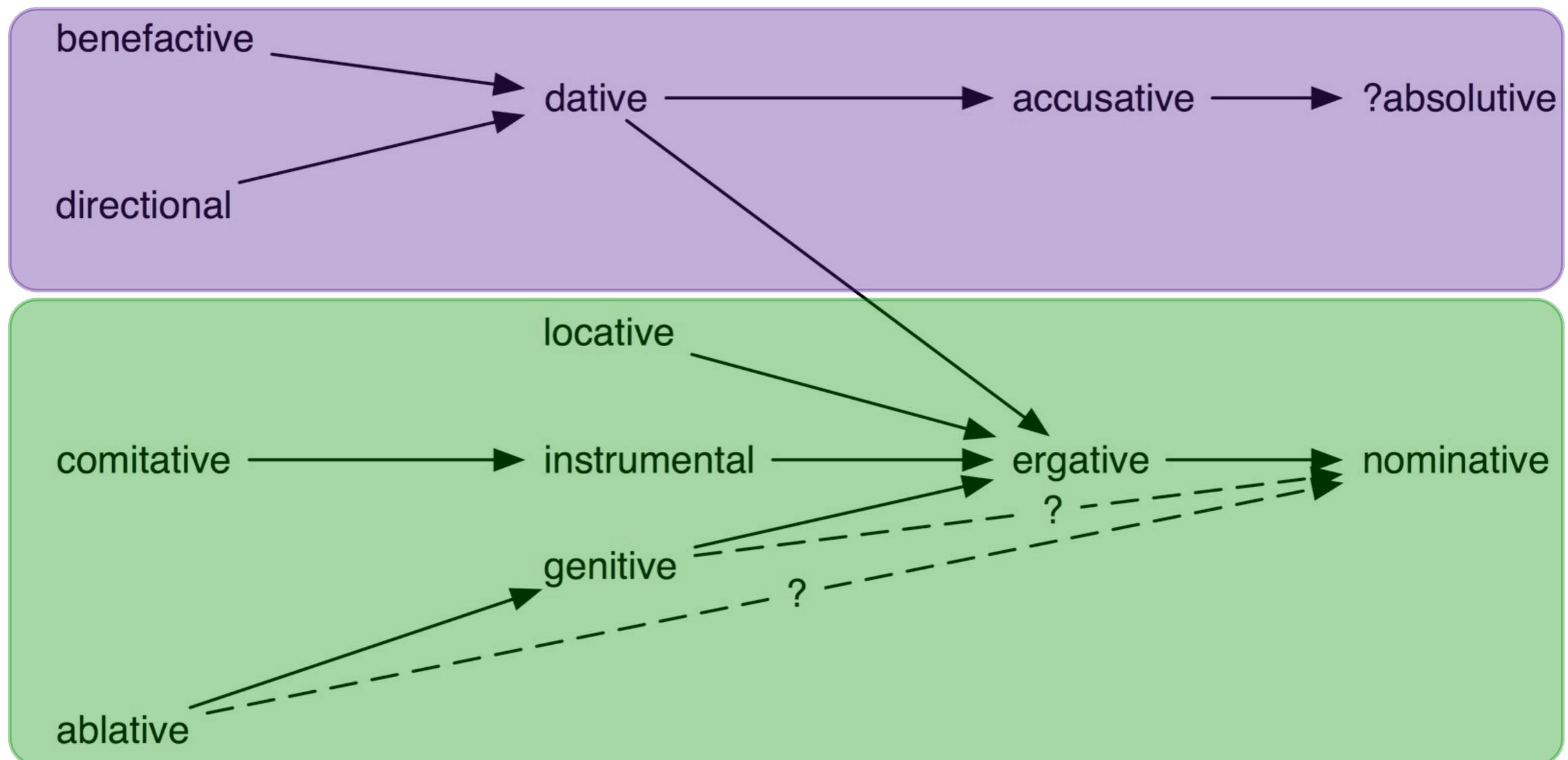
# Antecedent and subsequent obliques

- Developmental evidence:
  - Choice of correct antecedent or subsequent preposition type with erroneous locative alternation

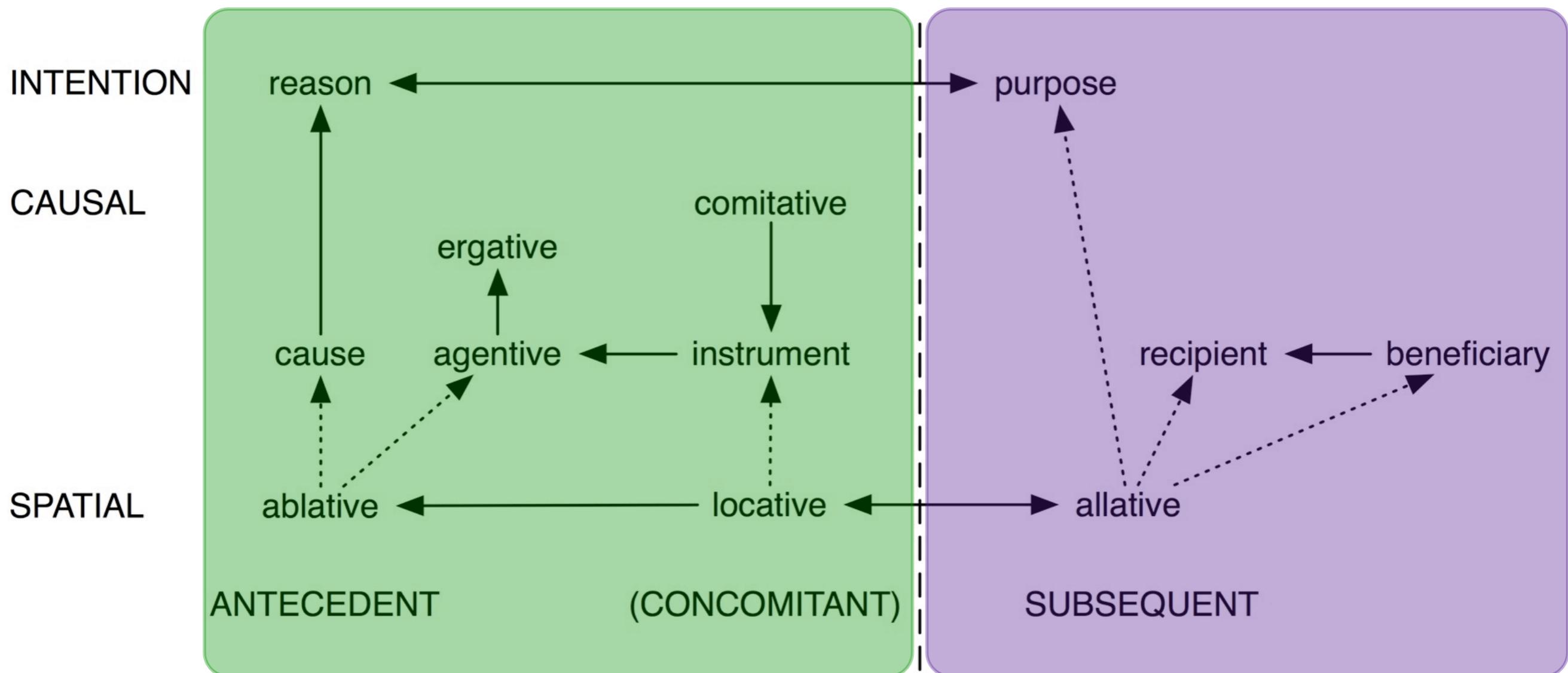
*'because I spilled it [toast] of orange juice' [E 4;11]*



# Diachronic paths for the extension of case forms: Lehmann 1982/1995/2002



# Diachronic paths for the extension of case forms: Luraghi 2001, Croft 2012

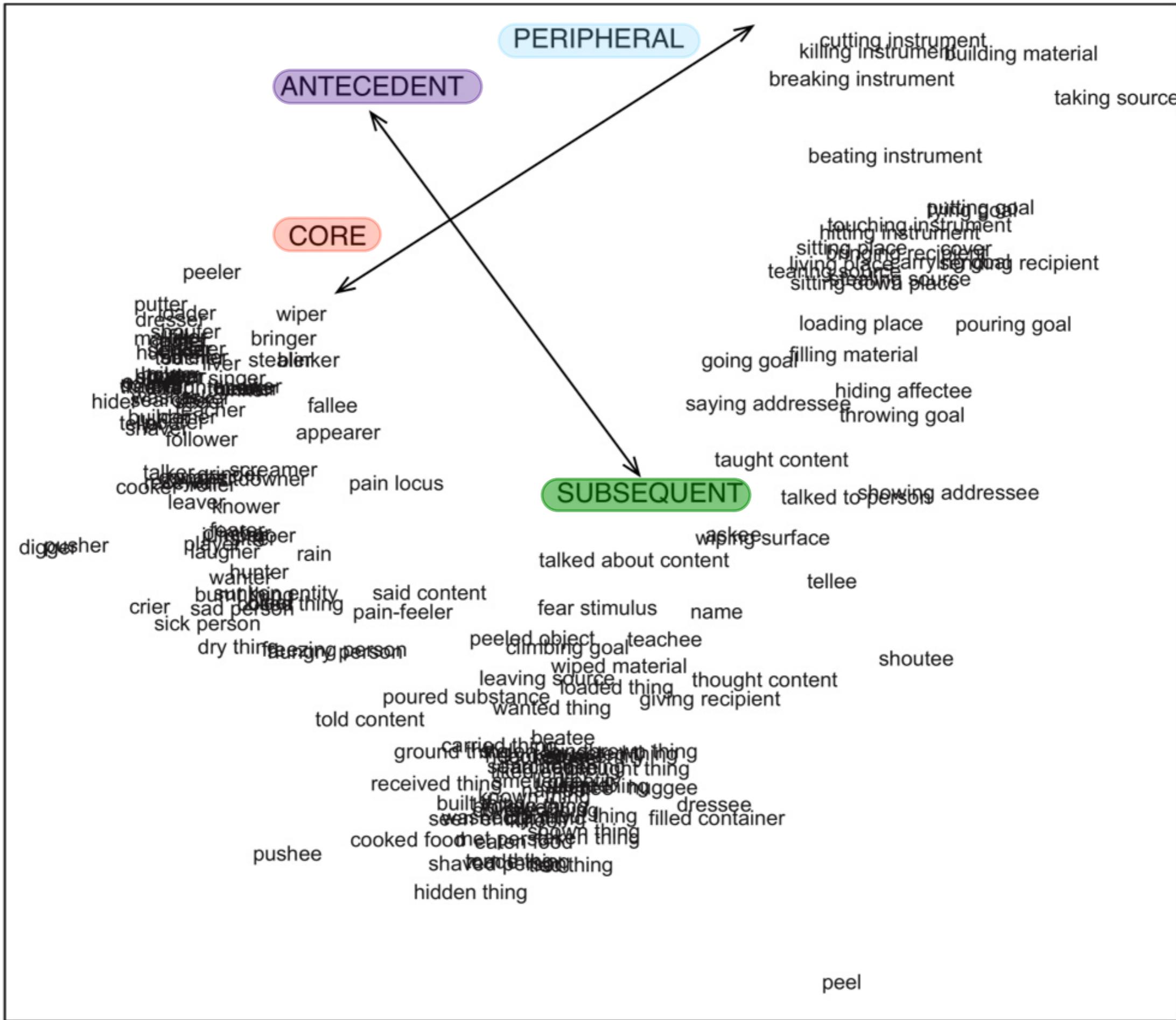


# Crosslinguistic encoding of microroles (participant roles)

- Grammatical realization of semantic roles varies by individual predicates
- One can analyze a more fine-grained classification of verb-specific semantic roles, called participant roles (Goldberg 1995) or microroles (Hartmann et al. 2014)

# Crosslinguistic encoding of microroles (participant roles)

- Hartmann et al. analyzed the grammatical realization of 189 microroles of 87 predicates in 25 languages from the Leipzig Valency database
- They performed a multidimensional scaling analysis, which produces a spatial model of semantic similarity based on grammatical expression of the microroles

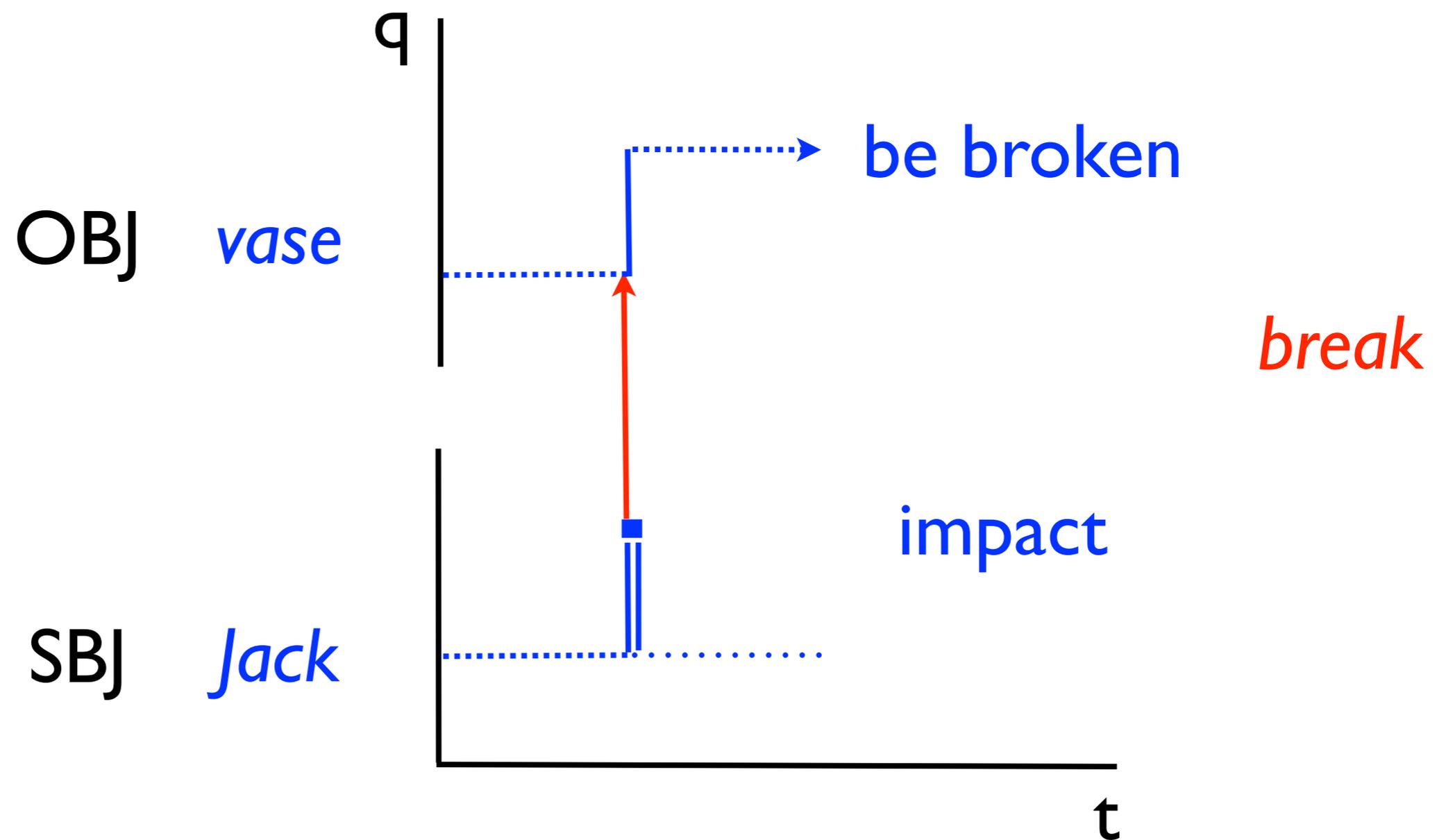


# Unifying the two models of causation

- The key to unifying the two models is to decompose the event structure such that each participant has its own subevent
- The subevent can be thought of as what the participant does/undergoes over the time course of the event
- A participant acting on another participant = the first participant's subevent causing the second participant's subevent

# The three-dimensional analysis

*Jack broke the vase.*

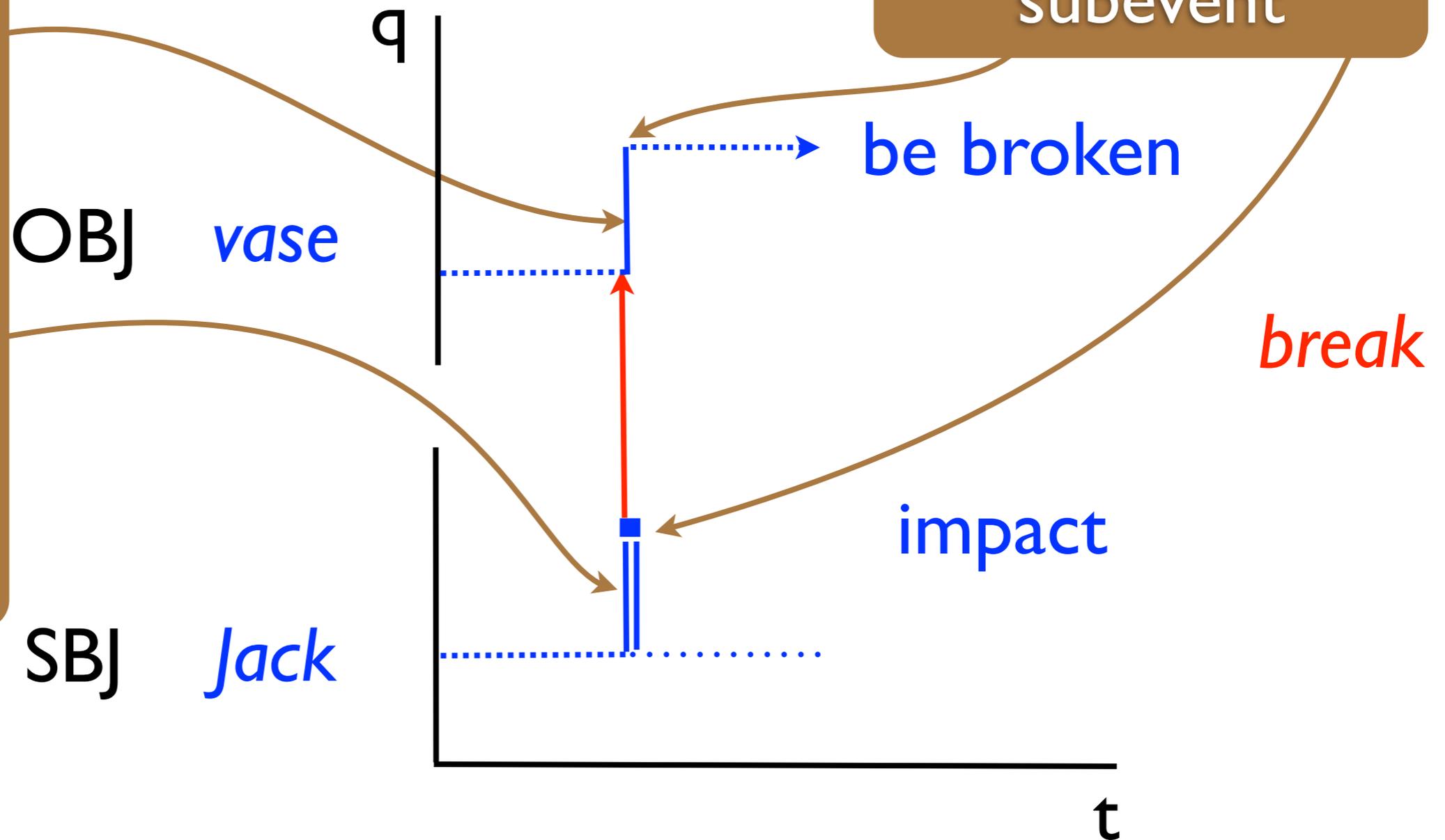


# The three-dimensional analysis

*Jack broke the vase.*

each participant has its own subevent

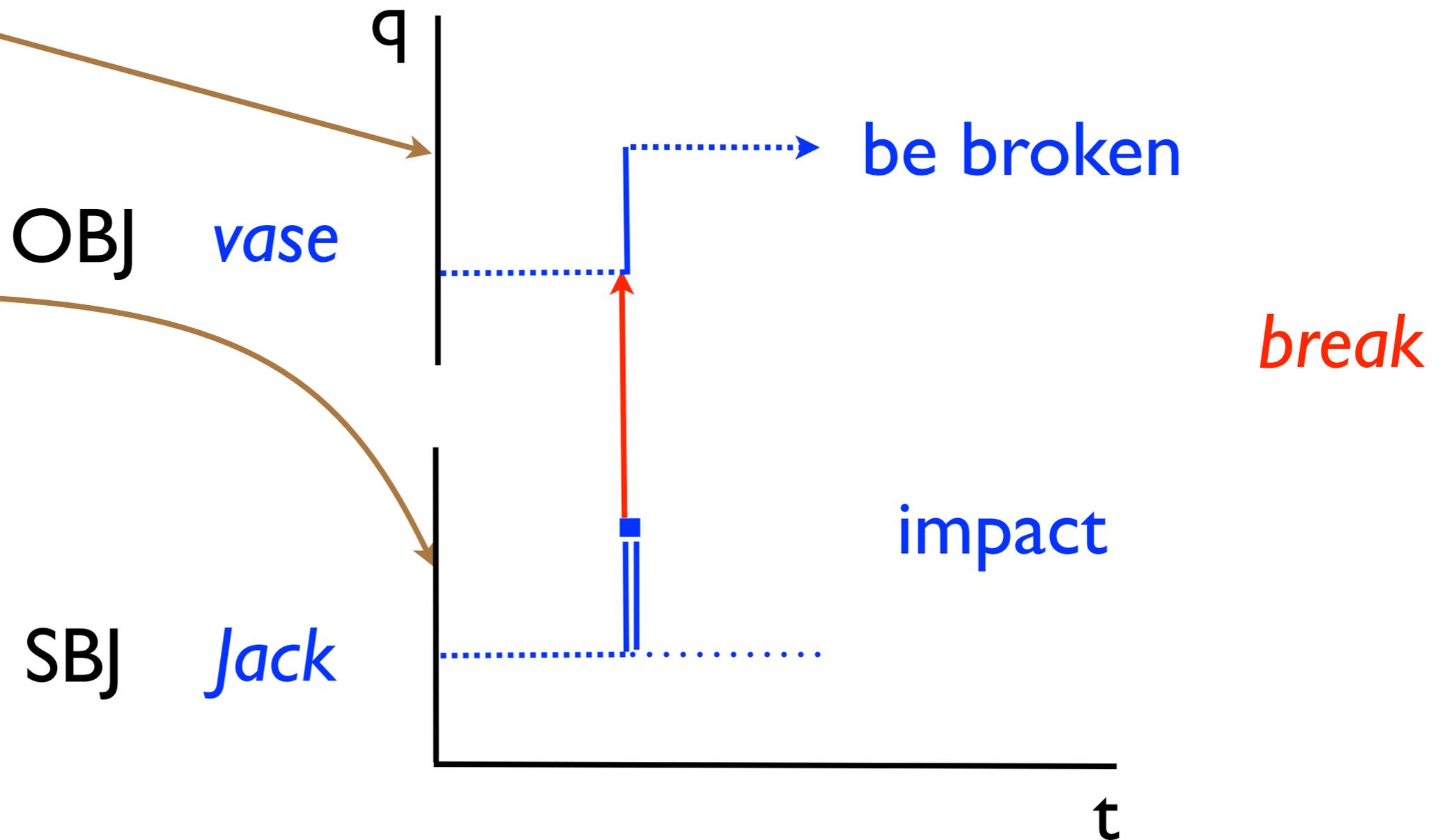
Event structure represents how the event unfolds over time, with a phasal model of aspect



# The three-dimensional analysis

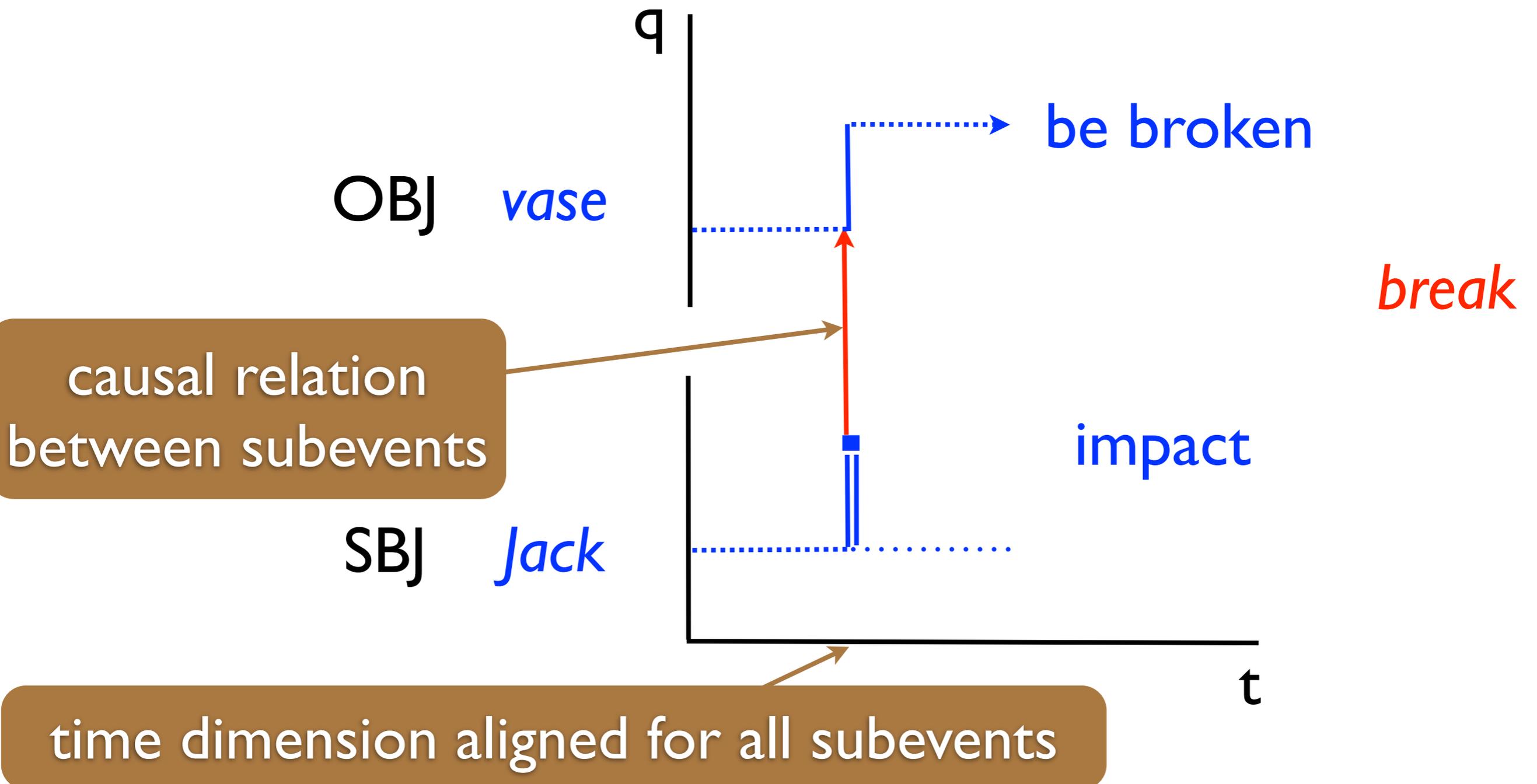
*Jack broke the vase.*

The quality scale is split for each participant's subevent



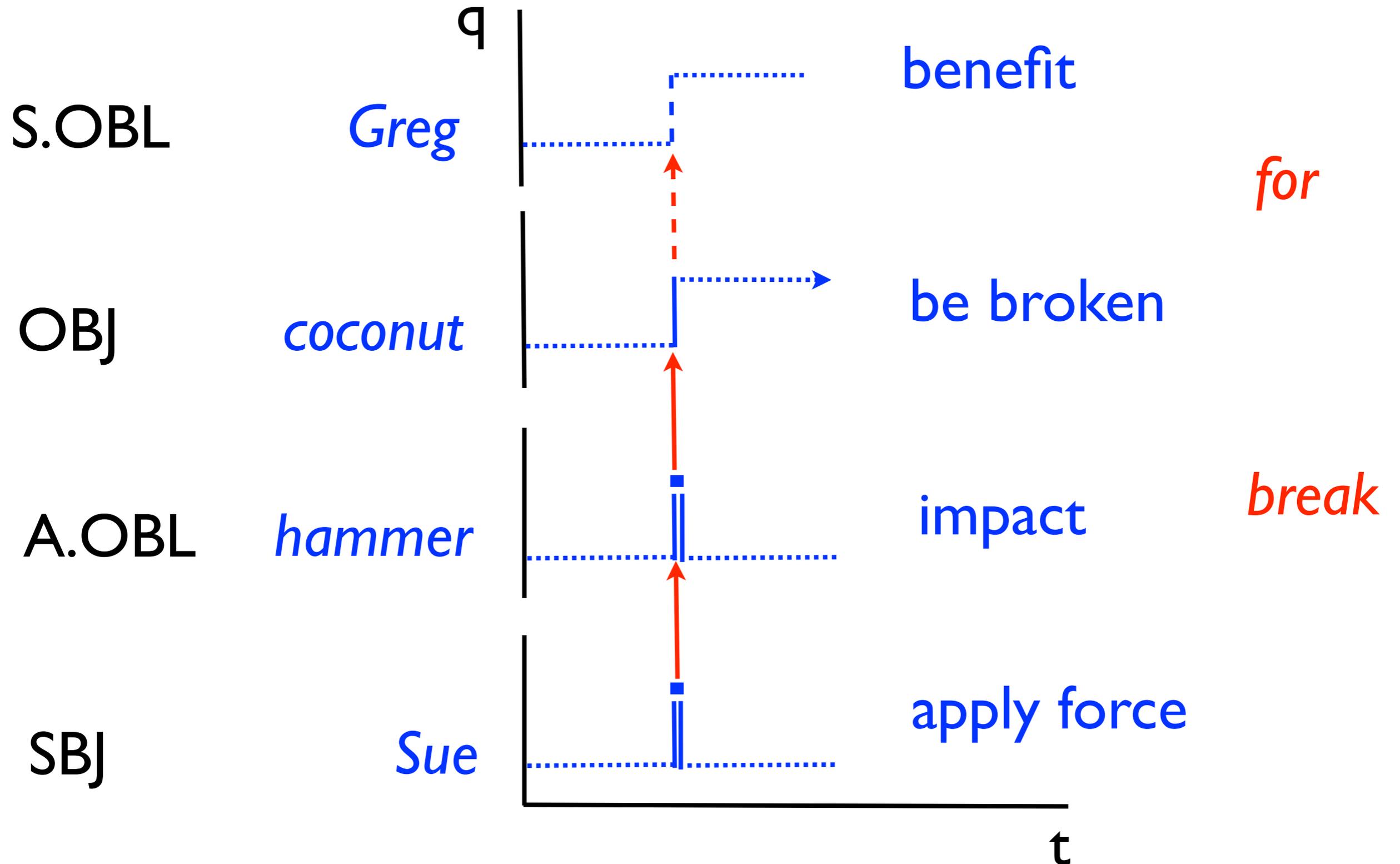
# The three-dimensional analysis

*Jack broke the vase.*



# Examples

*Sue broke the coconut for Greg with a hammer.*



# Examples

*Jane read "War and Peace".*

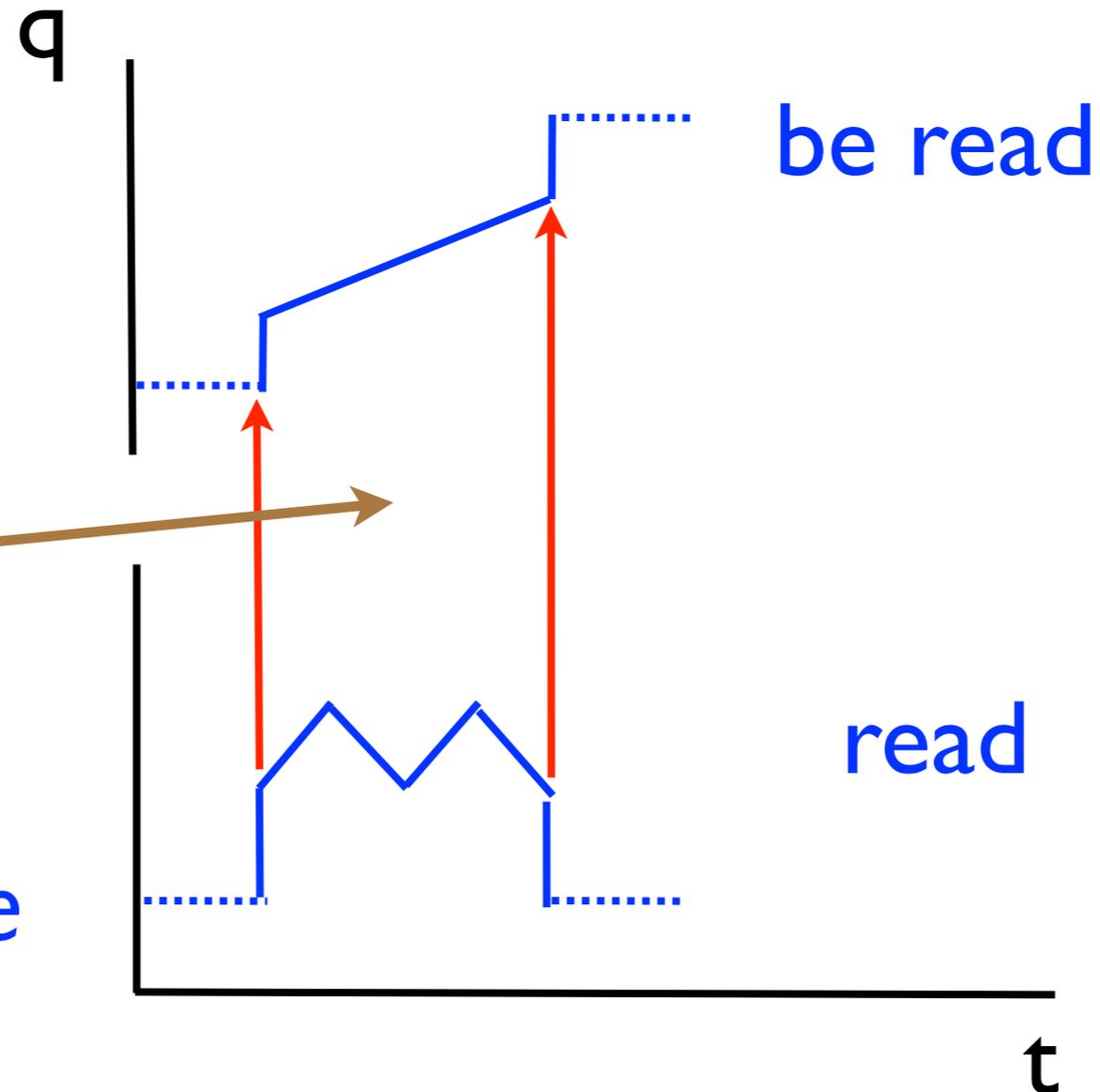
OBJ

*"War and Peace"*

force applied for entire interval between causal arrows

SBJ

*Jane*



# Examples

*Jane read "War and Peace".*

directed  
change determines overall  
aspectual construal

only one directed  
change per predication (cf.  
Tenny 1994:11)

OBJ

*"War and  
Peace"*

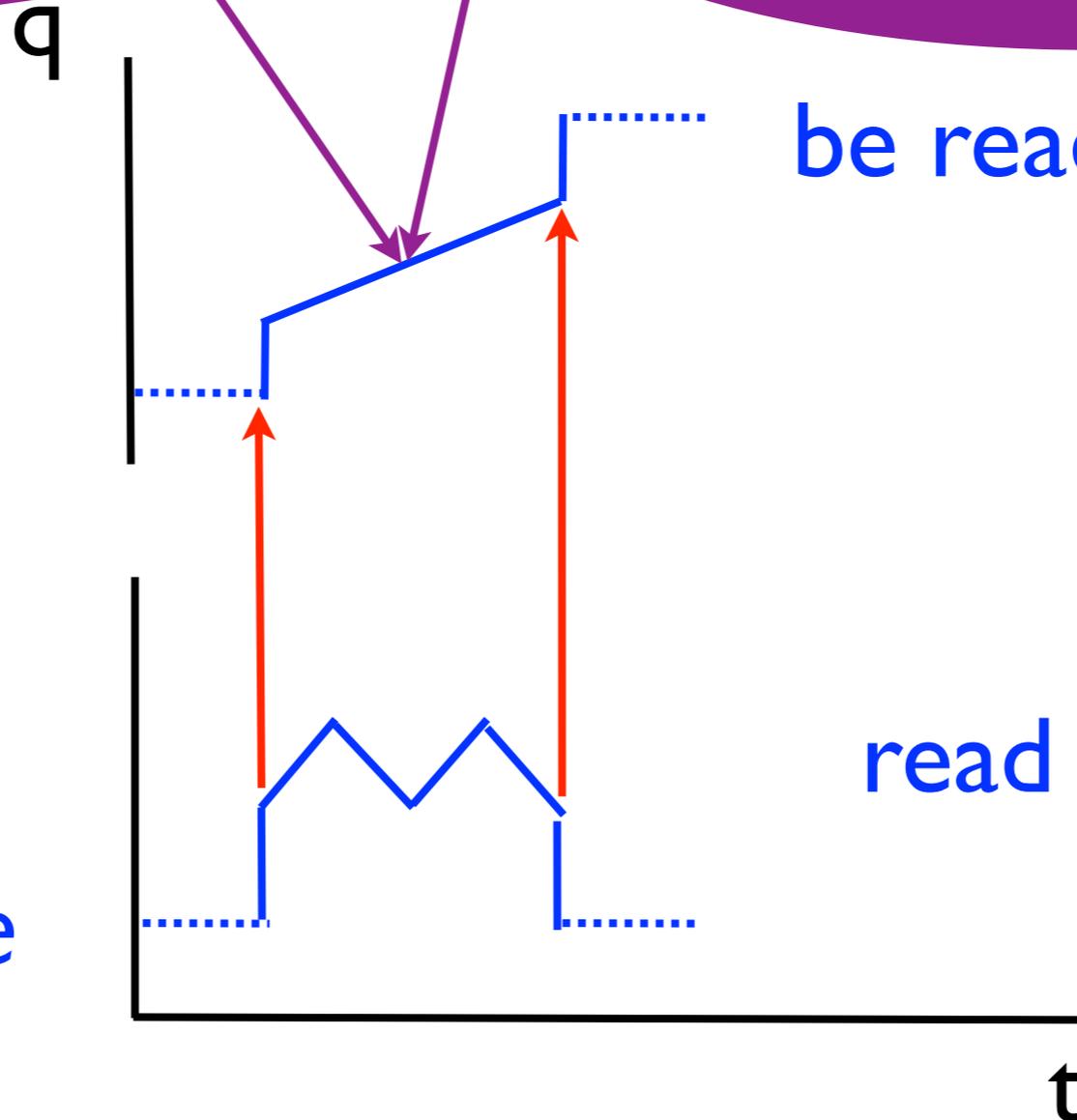
be read

*read*

SBJ

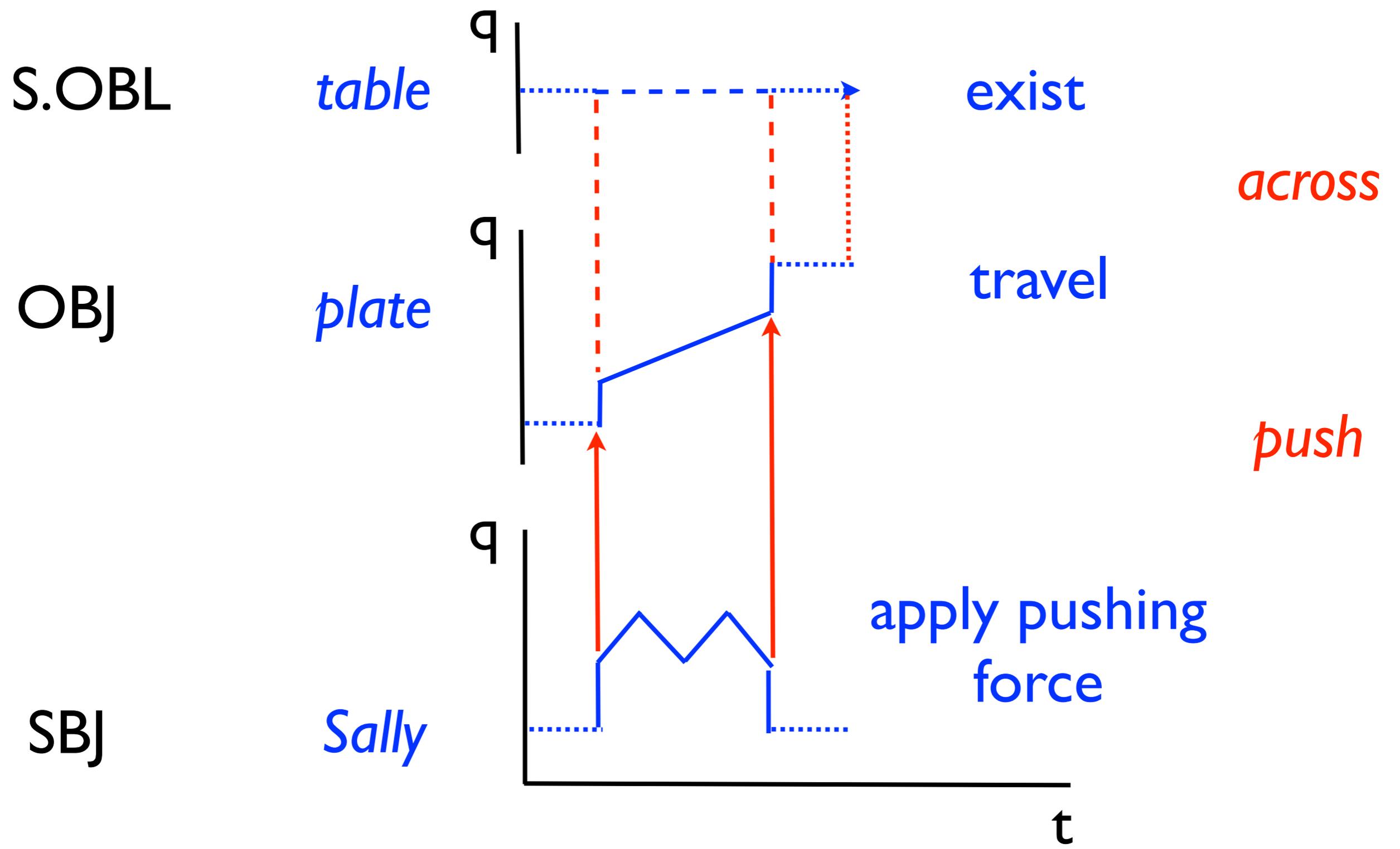
*Jane*

read



# Examples

*Sally pushed the plate across the table.*



# Subevents realized directly as event nominals

- For many predicates, participant subevents are expressed directly as event nominals, as in the RISK semantic frame (Fillmore and Atkins 1992)
- We analyze these as arguments, proposing three hypotheses

*Why did **he** risk **his life** for a man he did not know?*

(Fillmore & Atkins 1992, 88)

*He had risked **two of his submarines** by sending them to the edge of the American beaches (ibid., 90)*

# Subevents realized directly as event nominals

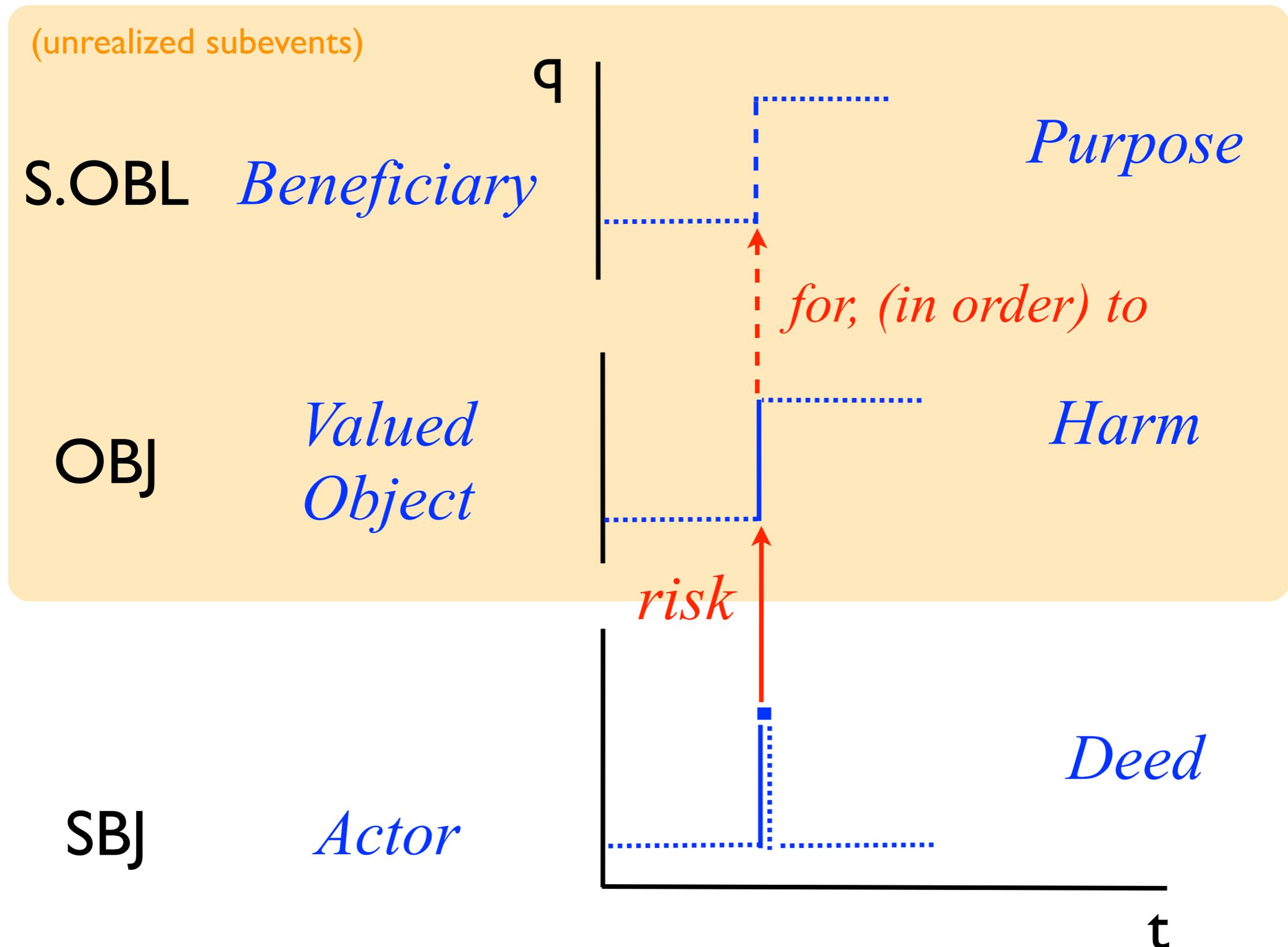
- Event nominals denote participant subevents
- Event nominals follow the same argument realization rules as participant nominals
- A participant is antecedent to its subevent when both are expressed

*Why did **he** risk **his life** for a man he did not know?*

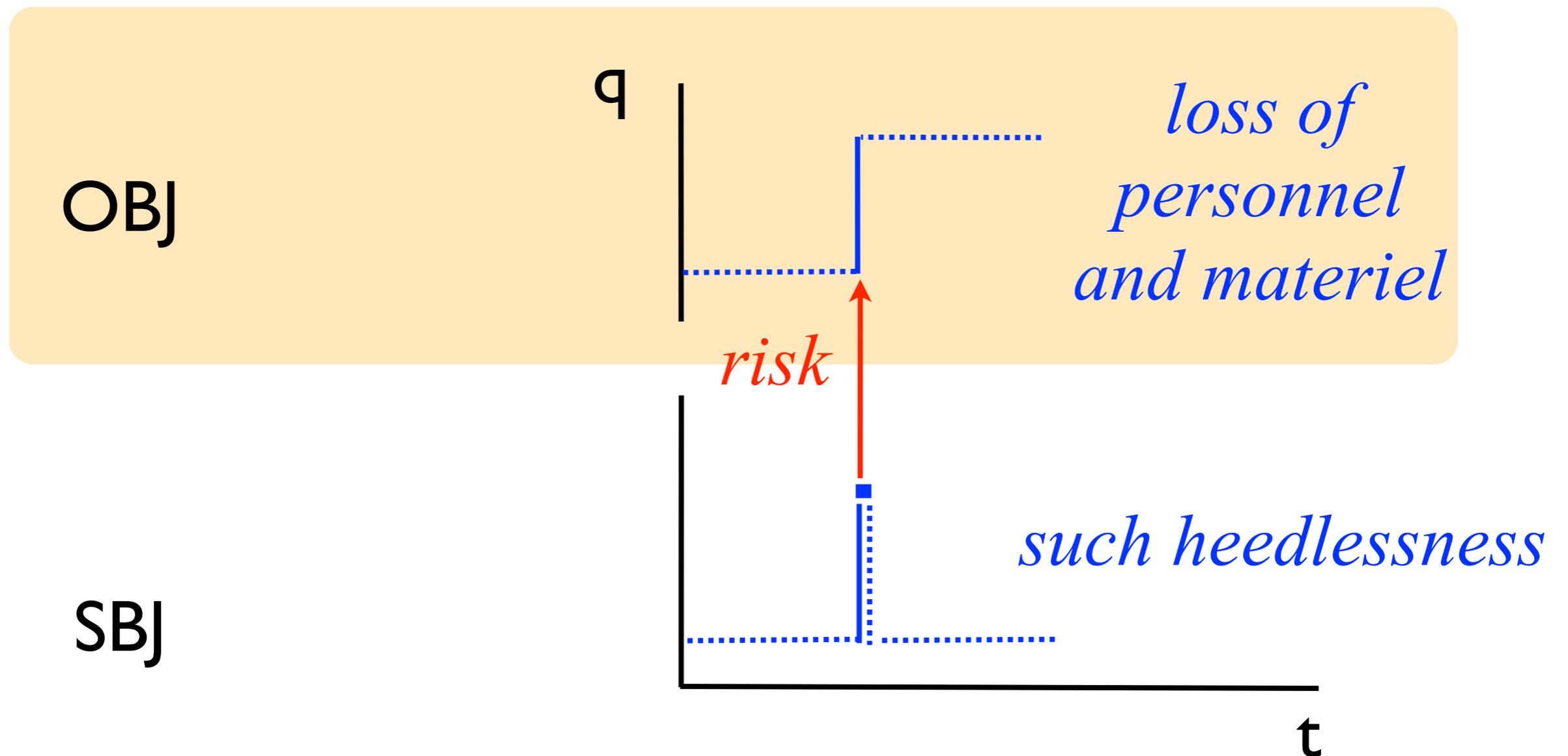
(Fillmore & Atkins 1992, 88)

*He had risked **two of his submarines** by sending them to the edge of the American beaches* (ibid., 90)

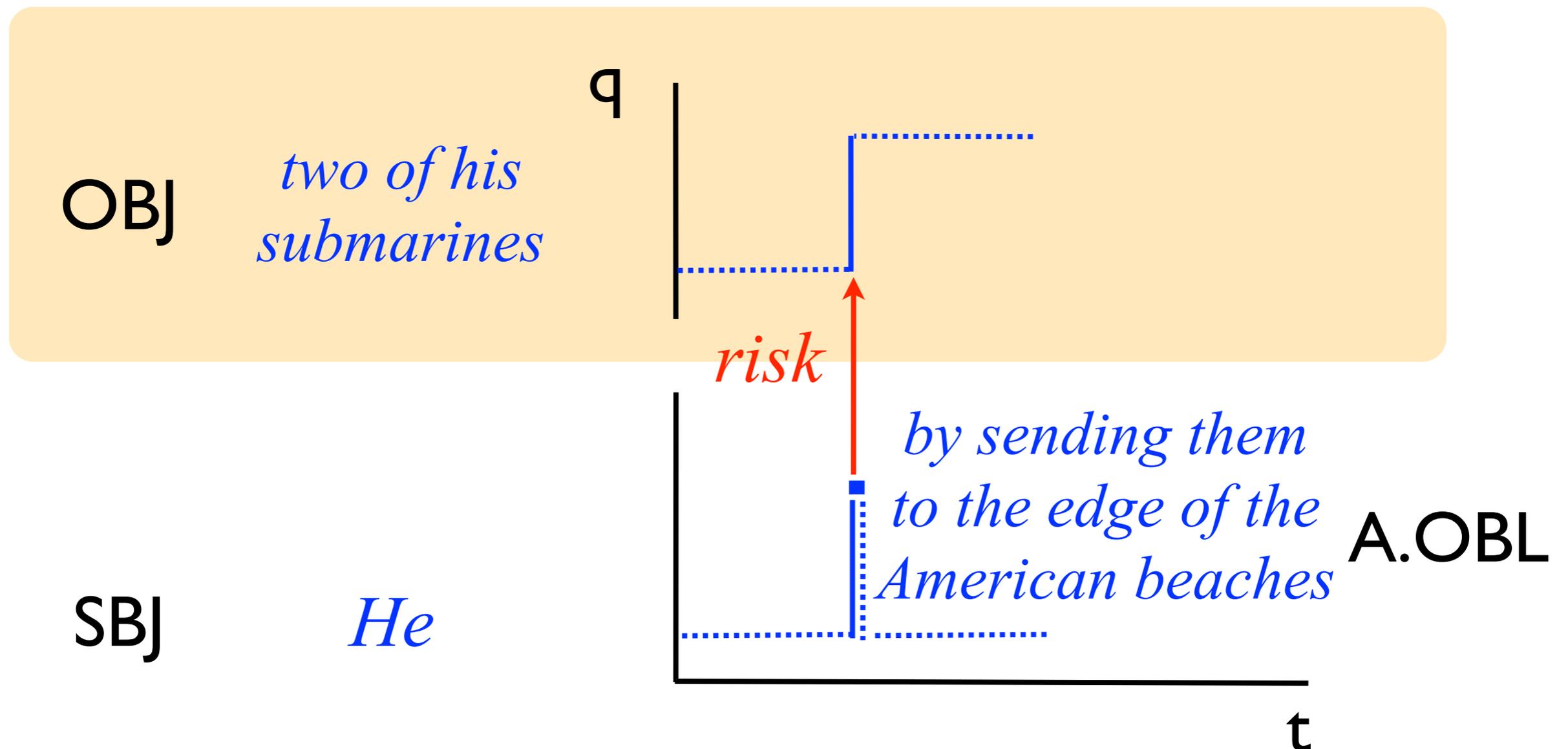
# Risk frame participants, subevents



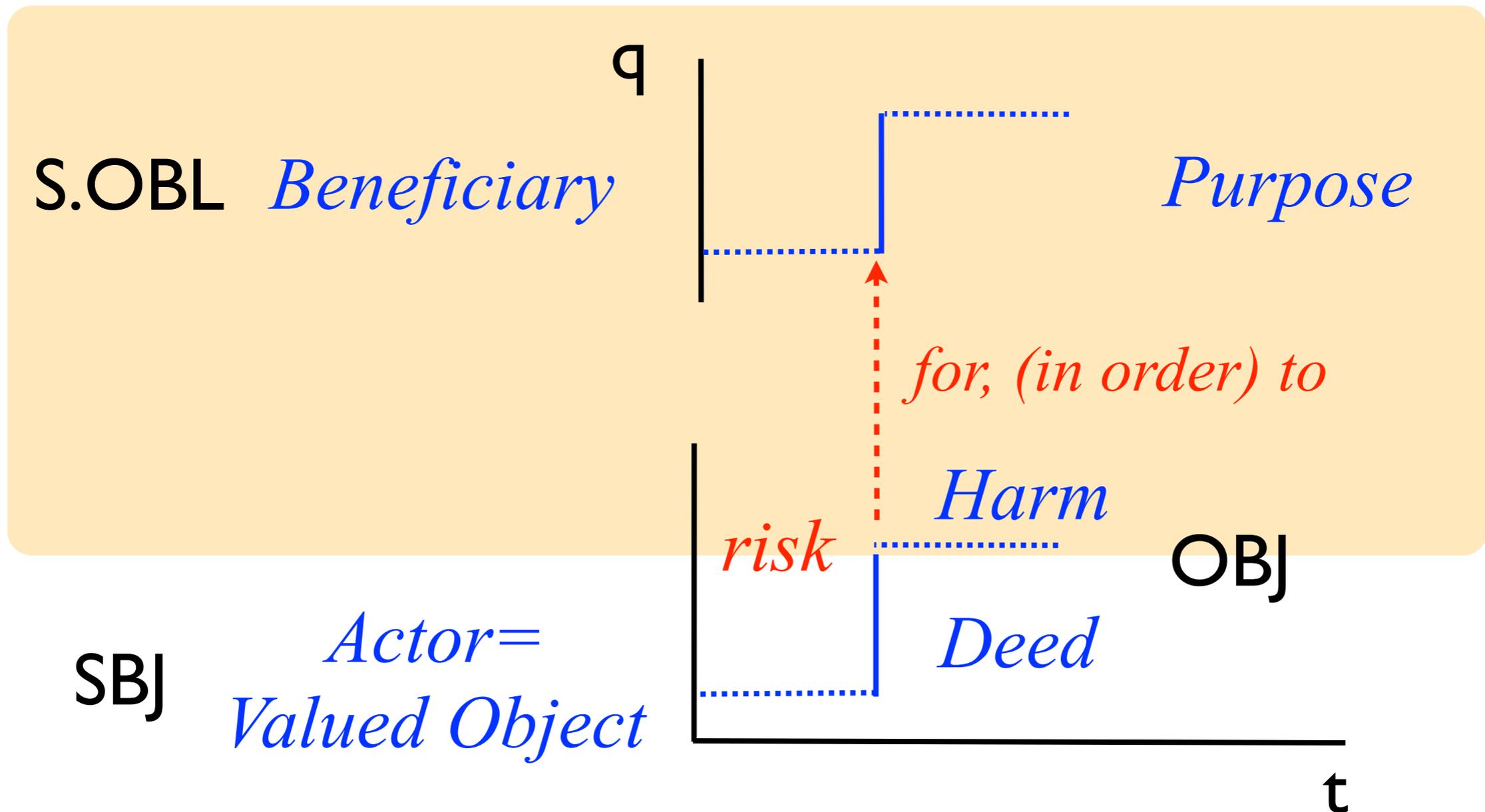
*Aye, such heedlessness—such invitation to injury, as if to a friendly playmate—can imperil our battle planning, **risking** loss of personnel and materiel (FrameNet)*



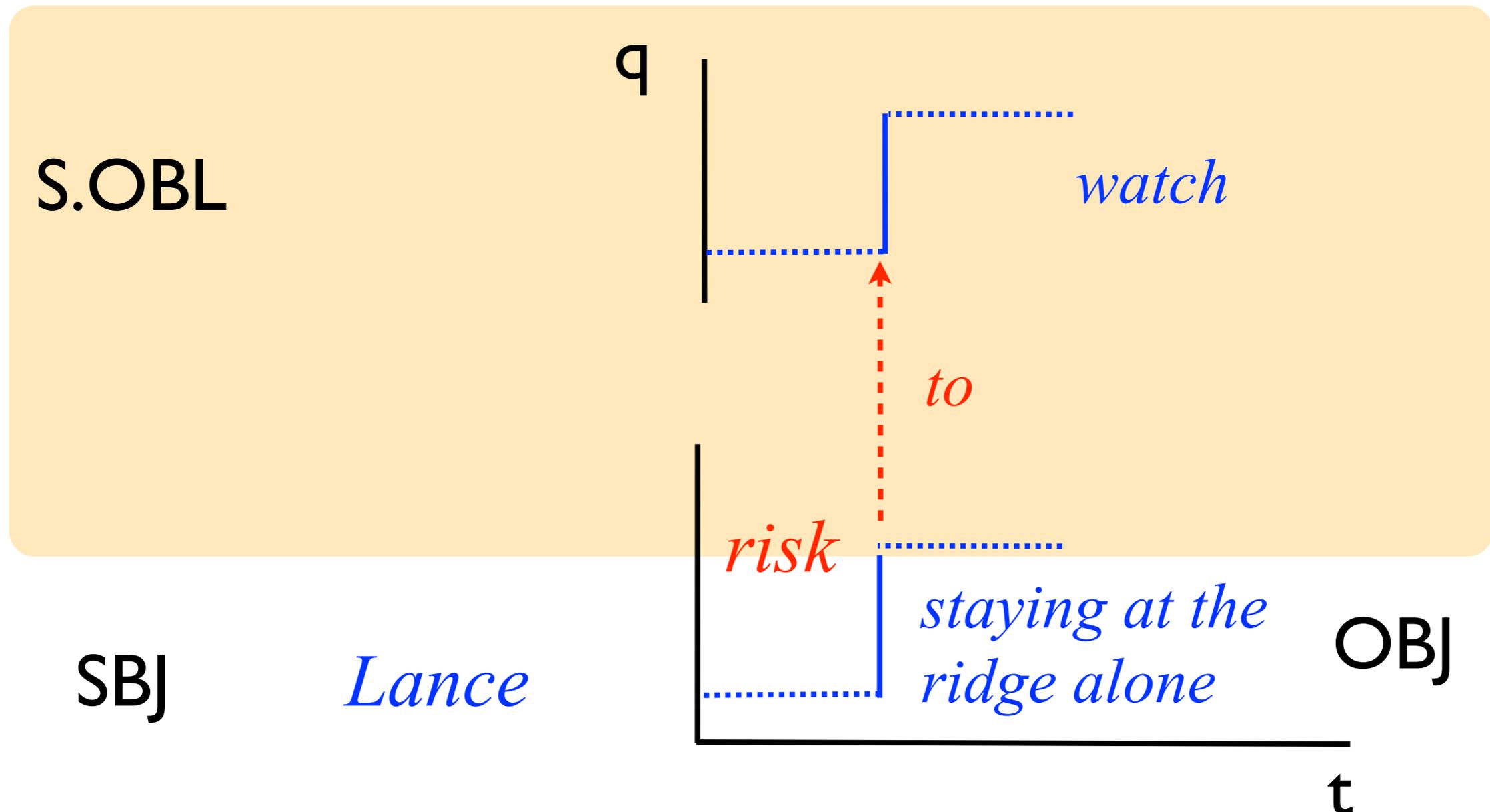
*He had **risked** two of his submarines by sending them to the edge of the American beaches. (Fillmore and Atkins 1992, 90)*



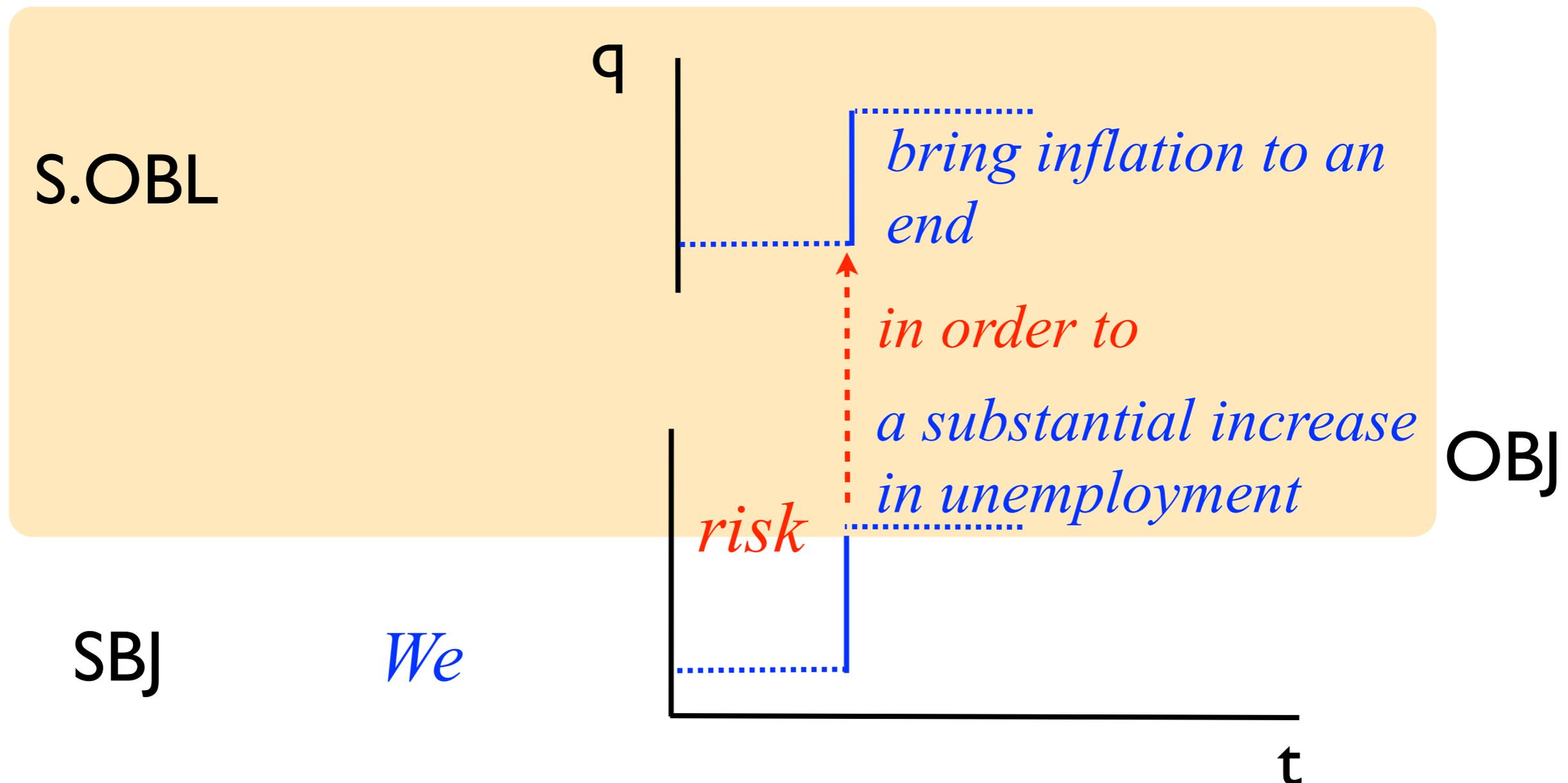
# *RISK frame when Actor = Valued Object*



*Lance risked staying at the ridge alone to watch.*  
(Fillmore and Atkins 1992, 96)



*We are prepared to **risk** a substantial increase in unemployment in order to bring inflation to an end.*  
(Fillmore and Atkins 1992, 94)



# Conclusions

- The models of causation between events and causation as transmission of force can be reconciled, if events are decomposed so that each participant has its own subevent
- This allows us to retain the crosslinguistic generalizations about argument realization and argument structure constructions that are explained by the transmission of force model
- The analysis appears to generalize to constructions with event nominals as arguments, although more work needs to be done here

# References

- Bowerman, Melissa. 1983. Hidden meanings: the role of covert conceptual structures in children's development of language. *The acquisition of symbolic skills*, ed. D. R. Rogers & J. A. Sloboda, 445-70. New York: Plenum.
- Bowerman, Melissa. MS. When a patient is the subject: sorting out passives, anticausatives, and middles in the acquisition of English.
- Clark, Eve V. and Kathie L. Carpenter. 1989. The notion of source in language acquisition. *Language* 65.1-30.
- Croft, William. 1991. *Syntactic categories and grammatical relations: The cognitive organization of information*. Chicago: University of Chicago Press.
- Croft, William. 1993. Case marking and the semantics of mental verbs. *Semantics and the lexicon*, ed. James Pustejovsky, 55-72. Dordrecht: Kluwer Academic.
- Croft, William. 1998. Event structure in argument linking. *The projection of arguments: lexical and compositional factors*, ed. Miriam Butt and Wilhelm Geuder, 1-43. Stanford: Center for the Study of Language and Information.
- Fillmore, Charles J. and Beryl T. Atkins. 1992. Toward a frame-based lexicon: the semantics of RISK and its neighbors. *Frames, fields and contrasts: New essays in semantic and lexical organization*, ed. Adrienne Lehrer and Eva Feder Kittay, 75-102. Hillsdale, N. J.: Lawrence Erlbaum Associates.
- Goldberg, Adele E. 1995. *Constructions: A construction grammar approach to argument structure*. Chicago: University of Chicago Press.

# References

- Hartmann, Iren, Martin Haspelmath and Michael Cysouw. 2014. Identifying semantic role clusters and alignment types via microrole coexpression tendencies. *Studies in Language* 38.463-84.
- Langacker, Ronald W. 1987. *Foundations of Cognitive Grammar, vol. I: theoretical prerequisites*. Stanford: Stanford University Press.
- Lehmann, Christian. 1982/1995/2002. *Thoughts on grammaticalization: a programmatic sketch, Vol. I*, Arbeiten des Kölner Universalien-Projekts, 48, Köln: Institut für Sprachwissenschaft. Revised edition published by LINCOM Europa, München, 1995. Revised edition reprinted as Arbeitspapiere des Seminars für Sprachwissenschaft der Universität Erfurt, 9. Erfurt: Seminar für Sprachwissenschaft der Universität.
- Luraghi, Silvia. 2001. Syncretism and the classification of semantic roles. *Sprachtypologie und Universalienforschung* 54.35–51.
- Sweetser, Eve. 1990. *From etymology to pragmatics: Metaphorical and cultural aspects of semantic structure*. Cambridge: Cambridge University Press.
- Talmy, Leonard. 1976. Semantic causative types. *The grammar of causative constructions*. (Syntax and Semantics, Vol. 6.), ed. Masayoshi Shibatani, 43-116. New York: Academic Press.
- Talmy, Leonard. 1988. Force dynamics in language and cognition. *Cognitive Science* 12.49-100.
- Tenny, Carol L. 1994. *Aspectual roles and the syntax-semantics interface*. Dordrecht: Kluwer.