Three experimental approaches to epistemic closure

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Intro I

Aims of this talk

1. The good news: There are now three x-phi papers on epistemic closure.
   $\rightarrow$ interesting studies with interesting findings!
2. The even better news: They disagree in their answer to what the folk intuition actually is.
   $\rightarrow$ we need to interpret the data!

Intro II

Epistemic closure (Closure of knowledge under known entailment)

If someone knows something and also knows that it entails something else, she know this as well.

$$K\varphi \wedge K(\varphi \Rightarrow \psi) \rightarrow K\psi$$

Examples

- I know that the meal is vegan. I know that if something is vegan it's lactose-free. Thus, I know that this meal is lactose-free.
- I know that Merkel is in Berlin today. I know that being in Berlin entails not being in Washington. Thus, I know that Merkel isn't meeting Trump in Washington today.

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Intro III

Highly intuitive?

The closure principle is often defended on the ground that it is highly intuitive. . .

Counterexamples?

. . . but there are also a lot of (seeming?) counterexamples, see the next two slides.

Intro IV

type of case	**entailing item** (A-item)	**entailed item** (B-item)
Limiting propositions		
External world	this is a hand	there are external objects
Past	I have slept for several hours	the universe is older than five minutes
Numbers	7 is prime	numbers exist
Perceptually indistinguishable propositions		
Wall	this wall is red	this isn't a cleverly illuminated white wall
Zebra	the animal in the pen is a zebra	the animal in the pen isn't a cleverly disguised mule

Intro V

type of case	A-item	B-item
Dogmatism		
Stove	I turned off the stove	evidence I didn't is misleading
Ravens	all ravens are black	all alleged sightings of non-black ravens have been non-veridical
Lottery-type propositions (Harman and Vogel)		
Safari	I can't afford a safari this year	I won't win the lottery
Car theft	my car is where I parked it an hour ago	my car hasn't been stolen
President	NN is the current president	NN hasn't suffered a lethal heart attack within the last five minutes

Intro VI

The car theft case

When Maxwell arrived at work this morning, he parked his car in C8. He kept in mind where he parked it because he wants to get home quickly after work. Now it's 5 p.m. and Maxwell leaves his office for the parking lot. While waiting for the elevator it comes to his mind that it's not unheard of for cars to be stolen. After considering this carefully for a moment, he thinks: "No, my car hasn't been stolen. It's parked in C8." [And he is right: His car hasn't been stolen and is parked in C8.]

A: Maxwell knows that his car is parked in C8. (yes/no)

B: Maxwell knows that his car has not been stolen. (yes/no)

Overview I

The car theft case (and conceptual replications: computer, supermarket, party) have been experimentally tested in three studies:

1. T Turri, John (2015): "An Open and Shut Case: Epistemic Closure in the Manifest Image", in: *Philosopher's Imprint* 15: 1–18.
2. BM Beebe, James & Monaghan, Jake (2018): "Epistemic Closure in Folk Epistemology", in: *Oxford Studies in Experimental Philosophy* 2.
3. KW Kraft, Tim & Wiegmann, Alex (2018): "Folk Epistemology and Epistemic Closure", in: *Oxford Studies in Experimental Philosophy* 2.

Overview II

	T	BM	KW
Closure	no	yes	yes
Folk closure	no, only source-specific	yes, occasional performance errors	yes, highly sensitive to strength of entailment
Design	within & between	within	within
Question format	choose from list	Likert	dichotomous forced choice
Sample	folk	folk & expert	folk
Conditions	source	source, reasoning skills	entailment

First key finding I

First key finding: Robust closure violations (T, BM, KW)

Participants violate closure in numbers significantly above chance, i. e. they accept

- NN knows that his car is parked in C8.
- NN doesn't know that his car hasn't been stolen.

Percentage of closure violation

- T 45% (exp. 2)
- BW 53% (exp. 1)
- KW 33% or 70% (exp. 1 and 2)

Note that these are only *near* replications: all within subjects, but slightly different vignettes and different question formats.

First key finding II

Methodological concerns about the question format

- Choose from list (T): not ticking an item is difficult to interpret
- Likert scale (BM): coding somewhat arbitrary, which pairs of answers are closure violations?
- Forced dichotomous choice (KW): may push participants towards more pronounced views than they actually wish to express

First key finding III

Methodological concerns about the vignette

- Dialogical or monological?
- "is parked in" vs. "is now in"?
- (Are the beliefs even true?)
- (Is the epistemic source sufficiently clear?)

First key finding IV

But. . .

These are important issues, but variations of Turri's original study resulted in the same key finding. It's a robust phenomenon.

Second key finding

2nd key finding: experts in reasoning (BM)

BM recruited 254 undergrads and 208 academic mathematicians and found a statistically significant difference: 41% of the students, but only 26% of mathematicians violated closure (exp. 4).

Interpretation

In general mathematicians are folk-like (no philosophical training, no special epistemological background), but had training in deductive resoning and can be considered experts in detecting entailments. This suggests that folk closure violations are due to being bad at deductive reasoning, not due to closure not being part of folk epistemology.

The performance error view I

The performance error view (BM)

Closure violations found in folk knowledge ascriptions are best interpreted as performance errors.

The performance error view II

Discussion: Interpreting mathematicians' performance

- The scepticism problem
  Mathematicians tend to be more sceptical about non-scientific empirical knowledge (see BM table 4, A-item 5.70 $\rightarrow$ 4.13 and 5.26 $\rightarrow$ 3.69). The data is consistent both with mathematicians being sceptics who, therefore, don't violate closure and with them being closure-fans who are, therefore, sceptical.
- The still too many errors problem
  Mathematicians should know from probability theory that an entailed proposition can't be less probable than the entailing proposition. How come that even their knowledge ascriptions go down and not up (see BM table 4, 4.13 $\rightarrow$ 2.46, 3.69 $\rightarrow$ 2.93)?

The performance error view III

Discussion: What explains bad performance by the folk?

- The missing mechanism problem
  The performance error view is uninformative. What is the mechanism/explanation here? Is the case supposed to be outlandish or too abstract? The vignette doesn't seem to rely on difficult to understand entailments.

Third key finding I

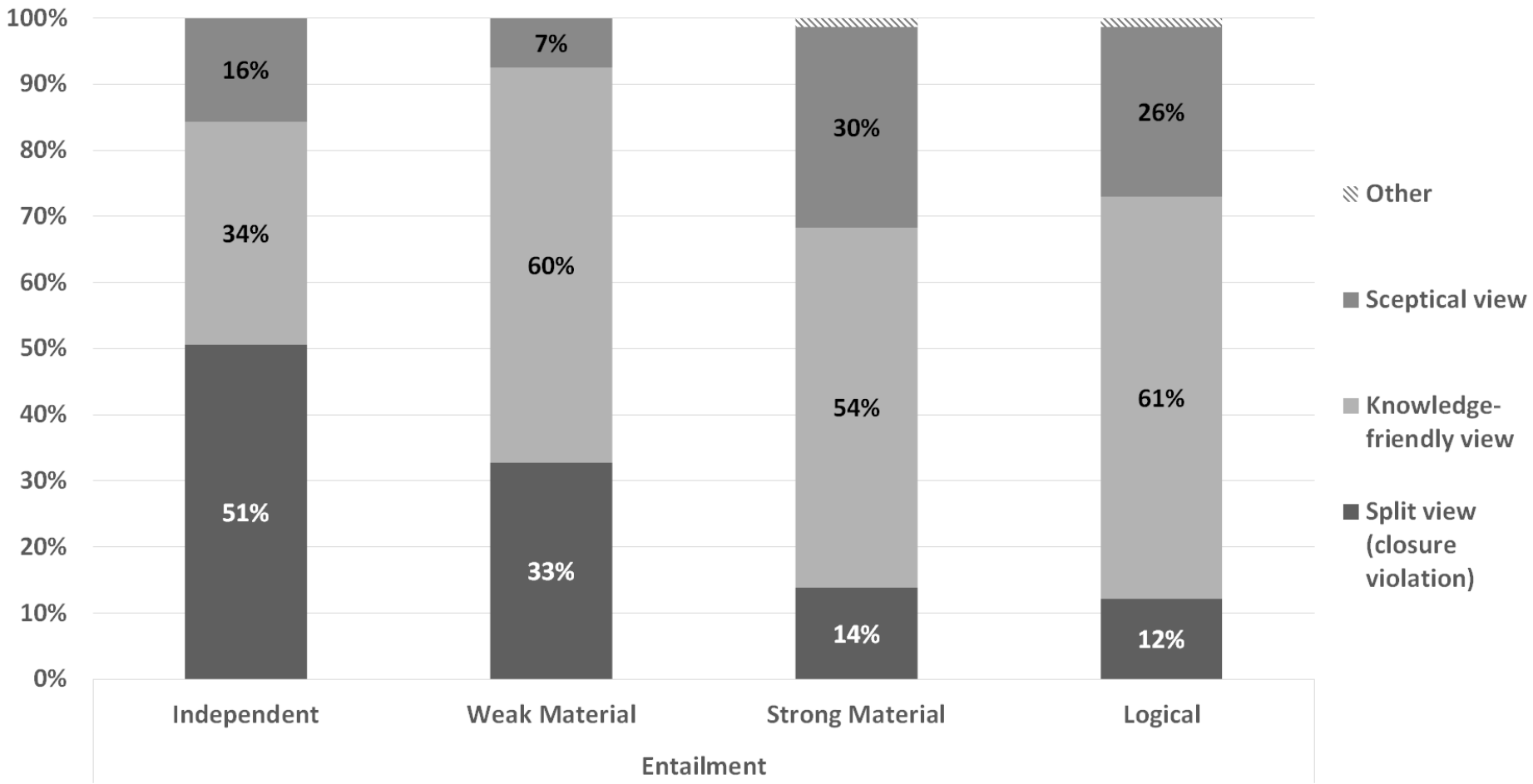
How to translate closure into a testable hypothesis

- The no counterexamples prediction (T and BM)
  If closure is a principle of folk epistemology, knowledge ascriptions should never (or at most at rates expected by chance) violate this principle.
- The influence on knowledge ascriptions prediction (KW)
  If closure is a principle of folk epistemology, knowledge ascriptions should *ceteris paribus* (same source, same degree of justification/reliability) be sensitive to entailment.

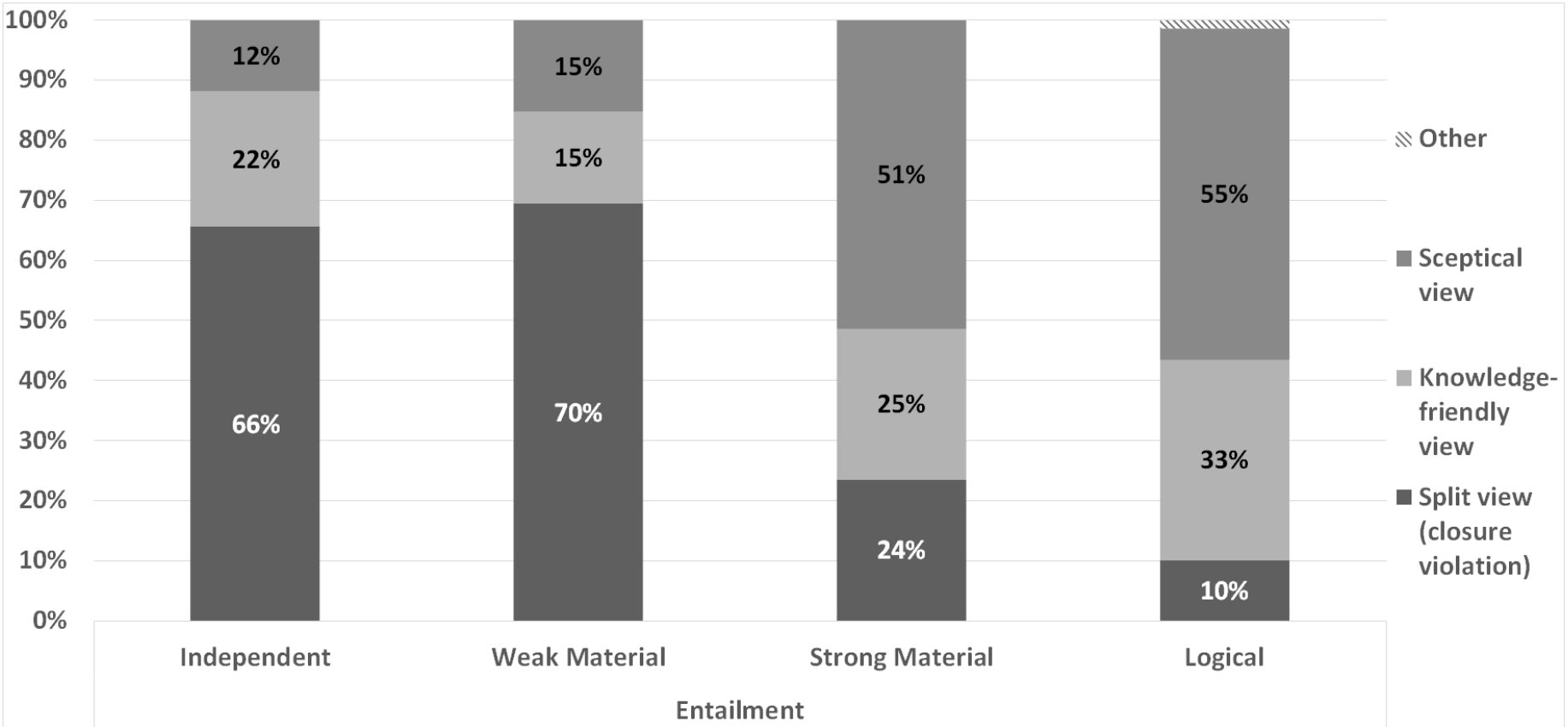
Third key finding II

Condition	A-item	B-item
Independent	car is in C8 now	car has not been damaged
Weak Material	car is parked in C8	car has not been stolen
Strong Material	car is in C8 now	car has not been stolen
Logical	car is in C8 now	car has not been taken away from C8 by thieves

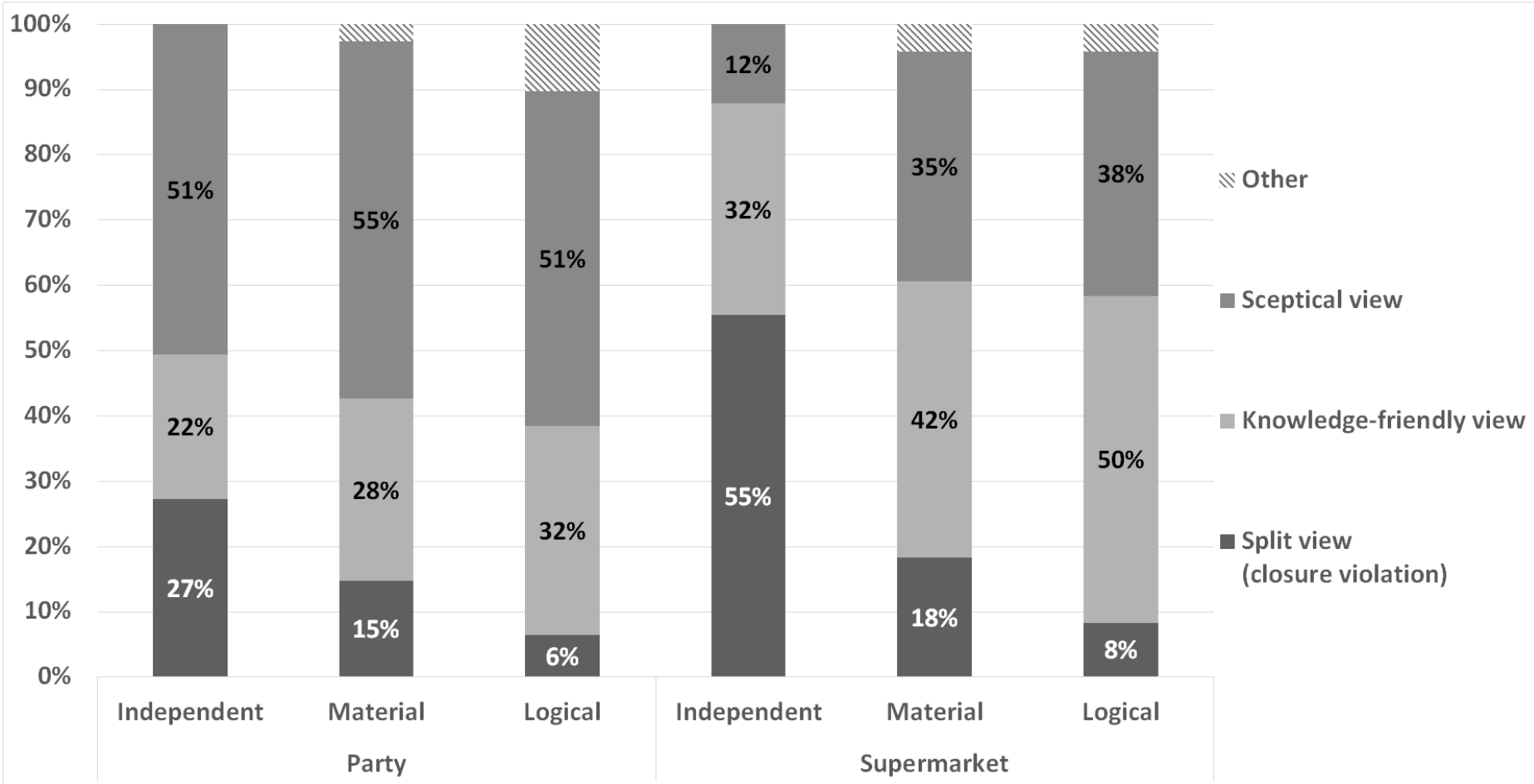
Third key finding III: KW exp. 1



Third key finding III: KW exp. 2



Third key finding III: KW exp. 3



The sensitivity to entailment view IV

The argument

Since the *epistemic status* of the items involved doesn't change, the change in response patterns can only be explained by the *difference in logical dependence* between the items.
$\Rightarrow$ Folk knowledge ascriptions are sensitive to entailment.

The sensitivity to entailment view V

More details

- We didn't merely observe adherence to closure, but see closure 'in work'.
- Some weird, difficult to pinpoint exactly pragmatic stuff is going on with "is parked in", but not with "is now in". But not all data are explained by pragmatics.
- The car theft is sandwiched between two cases. From one direction (looking from Logical) the number of closure violations is surprisingly high. From another direction (looking from Independent) the number of closure violations is surprisingly low. Any explanation of the data must explain both sides.

The sensitivity to entailment view VI

Discussion

- The relative vs. absolute numbers problem
  What really matters is the absolute number of closure violations in Logical, not the relative trend. *Reply:* Technically speaking closure is only about logical entailment, but it is a cheap way out to claim that one of epistemologists' most discussed counterexample to closure is not relevant at all to closure.

The sensitivity to entailment view VII

Discussion (cont.)

- The different propositions problem
  When changing the propositions involved you never know what explains the difference in responses. Number of words and syntactical complexity? Background beliefs? Or indeed the strength of entailment? *Reply:* (a) To some extent this is true, but the only way to rule this out completely is to work with artificial examples. (b) See exp. 4 for some evidence that the distinction between B-items contributes little to the difference in response patterns.
- The too many hints problem
  Don't you give too many hints in Logical of your favourite response? *Reply:* The closure principle was always intended to be entirely trivial. The "of course, nobody violates closure in Logical!" isn't an objection, but a result of closure's triviality.

Interpreting the key findings

Rival explanations

1. The paradox view
2. Pragmatic explanation (Douven)
3. Psychological explanations
   - Dual process view (Nagel)
   - Tracking entailments and multiple heuristics view (Roush+)

The paradox view I

Counterexample or paradox?

A Vogel-Harman case is a paradox. There is a triad of inconsistent statements all of which are intuitively true:

1. NN knows that his car is parked in C8.
2. NN doesn't know that his car hasn't been stolen.
3. Knowledge is closed under known entailment.

The paradox view II

Interpreting the experimental results

- Closure violations don't show that closure isn't intuitive.
- Closure violations are actually the correct response.
- Non-violators are led astray because they (erroneously) avoid inconsistency (which is bad in beliefs, but not in intuitions).

The paradox view III

Discussion

- Only convincing if it's a genuine, not just an apparent paradox.
- Only convincing if other explanations fail.

The pragmatic explanation I

Douven's pragmatic dissolution

Utterances of "my car is parked in C8" pragmatically convey that my car is parked in C8 *unless something extraordinary happened* (pragmatic enrichment). But then there is no entailment and no closure violation.

$\Rightarrow$ Closure is only apparently violated.

The pragmatic explanation II

Discussion

- Belief problem
  Pragmatics apply to utterances, not beliefs, but the problem seems to be same in the case of utterances and beliefs.
- Trigger problem I
  No plausible account of why the enrichment is triggered in utterances of the A-item, but not in utterances of the B-item.
- Trigger problem II
  No plausible account of why the enrichment is triggered in utterances of A-items in different conditions.

The dual process view I

Nagel's dual process view

- First-order judgments/beliefs
  Whether my car is parked in C8 is a system 1 issue, whether my car hasn't been stolen is a system 2 issue (negation, hypothetical scenario). Moreover, explicitly inferring the latter from the former requires activating system 2, too.
- Knowledge ascriptions
  Some are automatic/stereotypical ("she knows where her car is parked"), others ("she know that it hasn't been stolen") require activation of system 2.

The dual process view II

Applying Nagel's dual process view to closure

When considering Harman-Vogel cases we jump between two responses: A system 1 response to the A-item and a system 2 response to the B-item.

> *"the two apparently conflicting judgments in the pattern are naturally made in different modes of cognition" (2011: 3)*

The dual process view III

Discussion

- Incomplete
  The view explains in a highly abstract way how conflicting responses can occur, but says little about how knowledge ascriptions are made in the first place. Nagel doesn't want to claim that system 1 folk epistemology is necessarily fallibilist/moorean and system 2 folk epistemology necessarily sceptical.

The dual process view III

Discussion (cont.)

- Conflict resolved?
  Even if the two responses come from different systems, they are still in conflict with each other. How do participants make their peace with the conflict?
- Distinguishing system 1 and system 2 responses
  Nagel relies heavily on the claim that while negated hypotheticals always activate system 2, ascribing knowledge to others doesn't by itself trigger system 2. There is, as far as I know, no experimental evidence for this classification beyond extrapolation from other studies.

Tracking entailments and multiple heuristics view I

Keeping track of entailments

- Roush's observation
  Strictly speaking "I'm a BIV" doesn't entail "I don't have hands", "I'm not in Osnabrück", "there is a snake in my office" and so on. $\Rightarrow$ no closure violation in "I know that there is no snake in my office, but not that I'm not a BIV".
- Roush's thesis
  When talking about the BIV scenario we constantly switch between "I'm not a BIV" (when considering the non-conditional premise) and "I'm not a *handless* (*outside of Osnabrück*, and so on) BIV" (when considering the conditional premise).

Tracking entailments and multiple heuristics view II

Extending Roush's thesis

Unless the entailment is conspicuous (criterion: crucial word/phrase used in both items), we can switch between considering the items in isolation (whether it is known) and as dependent (whether it needs to be known).

Applying Roush's thesis to closure

Harman-Vogel cases contain items whose entailment relation isn't conspicuous. Depending on whether/how entailments are tracked participants...

- transfer their (positive) judgement on the A-item to the B-item
- transfer their (negative) judgement on the B-item to the A-item
- judge them independently

Tracking entailments and multiple heuristics view III

Multiple heuristics for (intuitive) knowledge ascriptions

1. Truth heuristic
2. Perception heuristic
3. Shared belief heuristic
4. Success heuristic
5. Closure heuristic

Tracking entailments and multiple heuristics view

Applying this view to closure

When different heuristics are relied on, closure violations occur – but only if the logical dependence isn't conspicuous.

Summary

1. Taken together studies suggest that closure is a principle of folk epistemology. Folk knowledge ascriptions are sensitive to entailments.
2. Taken together studies also suggest that there are several factors/heuristics driving folk knowledge ascriptions.

References

- Beebe, James & Monaghan, Jake (2018): "Epistemic Closure in Folk Epistemology", in: *Oxford Studies in Experimental Philosophy* 2.
- Douven, Igor (2007): "A Pragmatic Dissolution of Harman's Paradox", in: *Philosophy and Phenomenological Research* 74: 326–345.
- Kraft, Tim & Wiegmann, Alex (2018): "Folk Epistemology and Epistemic Closure", in: *Oxford Studies in Experimental Philosophy* 2.
- Nagel, Jennifer (2011): "The Psychological Basis of the Harman-Vogel Paradox", in: *Philosopher's Imprint* 11: 1–28.
- Roush, Sherrilyn (2010): "Closure on Skepticism", in: *Journal of Philosophy* 107: 243–256.
- Turri, John (2015): "An Open and Shut Case: Epistemic Closure in the Manifest Image", in: *Philosopher's Imprint* 15: 1–18.