Reasoning with polysemes: When default inferences beat contextual information

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*** Stereotypical inferences prevail even after defeating pre-verbal context * due to linguistic salience bias affecting irregular polysemy processing**

How, and how strongly, do default comprehension inferences shape verbal reasoning? When do they lead to fallacies?

FOCUS: When and why does the linguistic salience of ***senses of irregular unbalanced polysemes*** unduly influence inferences and lead to ***fallacious inferences***?

The **linguistic salience bias hypothesis** specifies conditions where subordinate uses of irregular unbalanced polysemes trigger defeasible default inferences that are supported only by the dominant sense but influence further cognition regardless

Appearance verbs
'look', 'appear', 'seem' are polysemous

(a) Belief attribution (dominant)
- attributes beliefs to patients (Brogaart, 2013; 2014)

'Jack appears dirty to Cath' ~ Cath believes that Jack is dirty

(b) Phenomenal (subordinate)
- describes viewers' subjective experience
- cancels belief-implications (Ayer, 1956/90; Maund, 1986)
- e.g. *Under red light, white lab coats seem reddish* (Fischer, Engelhardt, & Sytsma, 2021)

Hypothesis: Inappropriate belief inferences from phenomenal uses of appearance verbs

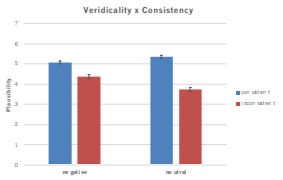
Processing
- **Retention/suppression strategy** (Giora 2003): doxastic patient features initially activated as part of the dominant situation schema (Rumelhardt 1980) need to be suppressed
- **Linguistic salience bias**

➤ H1: Suppression will remain incomplete and people will make belief inferences from appearance verbs, even where pre-verbal contexts invite phenomenal readings from the start

RESEARCH QUESTIONS
RQ1: Will the subordinate use also trigger the inference of interest where the disambiguating context *comes first,* and invites the subordinate interpretation *from the start*?

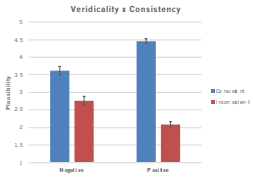
RQ2: And, if so, will this inference still be strong enough to influence subsequent judgment and reasoning?

STUDY 1: PLAUSIBILITY



Veridicality x consistency interaction
MEs: veridicality & consistency

STUDY 2: PLAUSIBILITY



Veridicality x consistency interaction
ME: consistency

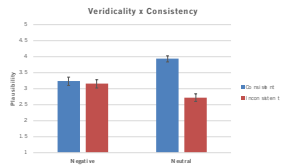
STUDY 2: RE-READING TIMES

consistency effects (INCON > CON)
in 3 regions of interest (source verb, source object, conflict adjective)

STUDY 3: RE-READING TIMES

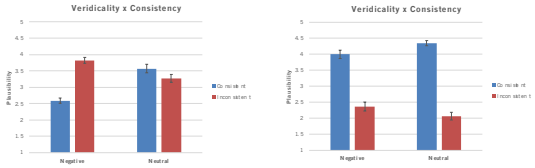
consistency effects (INCON > CON)
in 3 regions of interest (source verb, source object, conflict adjective)
main effect of group in the source regions (verb & adjective), from which the inappropriate inference originates (correct responders > biased responders)

STUDY 3: PLAUSIBILITY (WHOLE)



No difference in the negative condition
→ whole sample masking two different response patterns

STUDY 3: PLAUSIBILITY (2 GROUPS)



ME: consistency
Veridicality, consistency and group interaction

CORRECT RESPONDERS (N=26)
Criterion: CON ≤ INCON in Negative

BIASED RESPONDERS (N=22)
Criterion: CON > INCON in Negative

GROUP DIFFERENCES

* no similar group differences in Exp. 2 (only 4/45 correct responders)
* Re-analysis of Exp. 1 shows the same two response patterns from Exp. 3 (64 correct responders; 111 biased responders)

→ the neutral items are the most difficult to judge acting as reflection prompts
→ relevance of individual differences in reflectiveness (Frederick 2005) and inhibition (Hasher et al. 2007)

METHODS

Participants English native Undergraduates: **Study 1:** n= 175 (prolific) | **Study 2**: n=45 **Study 3**: n=48 (UEA Psychology)
Experimental procedure Plausibility task + Eye tracking study with cancellation paradigm, in EyeLink 1000 (Exp. 2&3)
Design Within-subjects 2x3x2: veridicality in S1 x verb in S2 x s-consistency in S3
Veridicality (viewing condition): **Study 1 & 3** : negative vs neutral **Study 2**: negative vs positive
Verb: *look / appear / seem*
S(tereotype)-consistency: s-consistent vs. s-inconsistent
Materials Participants read 96 three-sentence items (48 critical; 48 fillers) normed and controlled for length and word frequency in regions of interest, across conditions:

Negative (non-veridical)	Positive (veridical)	Neutral
The fishing rod was immersed in the water. The rod looked bent to the fisherman. He thought it was bent / straight.	The visitor stood in front of the house entrance. He appeared tall to the host. She believed he was tall / short.	The lighting in the room was odd. The hostess's dress seemed blue to Hannah. She thought it was blue / green.

Measures
Fixation times in 5 regions of interest; plausibility ratings on a 5-point Likert scale

The vessels waited far out at sea.[1] They looked[2] small[3] to Eve[4]. She thought they were small / big[5].

[1]Pre-verbal context [2]Source verb [3]Source adjective [4]Source object [5]Conflict adj

PREDICTIONS

1) Higher rereading times for source [2-4] or conflict [5] regions in stereotype-inconsistent items than in stereotype-consistent counterparts, even where pre-verbal contexts specify non-veridical viewing conditions. (INCON > CON)
2) Lower plausibility ratings for s-inconsistent than s-consistent items, even for items with non-veridical pre-verbal contexts. (INCON < CON)

Our predictions were borne out
(1) Provides evidence that the inference is triggered and (2) that the inference persists to influence subsequent judgments

LINGUISTIC SALIENCE BIAS (Fischer & Engelhardt, 2016, 2017a, 2017b, 2019, 2020, in press; Fischer & Sytsma, 2021; Fischer et al., 2021a, 2021b, 2022)
When
i. [Salience imbalance] one sense of a polysemous word has far higher linguistic salience than all others,
ii. the **retention/suppression strategy** is used to interpret utterances with a subordinate use,
iii.and **some**, not all, **features** associated with the dominant sense are **relevant** for interpreting the subordinate use,
Then
1. contextually inappropriate stereotypical inferences supported by dominant sense are triggered by the subordinate use *and*
2. influence further judgment and reasoning

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FINDINGS AND CONCLUSION

RQ1: Evidence from re-reading times: subordinate (phenomenal) uses of appearance verbs trigger default (belief) inferences that are supported only by their dominant sense, even when pre-verbal contexts invite subordinate interpretation *from the start*
RQ2: Evindence from plausibility ratings: these contextually inappropriate and epistemically deviant automatic inferences influence further cognition, though this is mitigated by reflection prompts
➤ Future directions: x-phi research on individual differences on reflectiveness and inhibition