

Experimenting with modals

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Whether a proposition is epistemically possible is a relative matter: p may be epistemically possible relative to some body of evidence and not others, owing to it being compatible with the first and not the second. Yet the language used to express epistemic possibilities is not, on its face, relativized in this way:

(1) The keys might be in the drawer.

Modal contextualism resolves this mismatch by holding that, contrary to first impressions, (1) expresses a proposition that is about some salient body of evidence (Hacking (1967), Kratzer (1981, 1991), DeRose (1991), Stanley (2005), Dowell (2011)). As such, in different contexts, (1) may express different propositions, depending on what body of evidence is salient in those contexts. By contrast, according to modal relativism, (1) expresses a proposition (that it is epistemically possible that the keys are in the drawer) whose truth value is relative to a body of evidence (Egan *et al.* (2005), Egan (2007), Stephenson (2007), MacFarlane (2011, 2014)). Modal relativism resolves the above mismatch not by making modal propositions about particular bodies of evidence, but rather by letting modal propositions be true or false relative to bodies of evidence.

In this paper, we offer new experimental evidence that challenges existing versions of both modal contextualism and modal relativism. Unlike much of the existing work on epistemic modals, our data does not rely on the truth value judgments of particular epistemic modal utterances. Rather, our data concerns ordinary judgments about the incompatibility of two claims. In particular, we explore whether ordinary individuals think two modal claims (or assessments of modal claims) are incompatible (at least one must be false) or compatible (maybe both are true).¹

We discuss two types of cases, which we distinguish as **Conflicting Utterances** and **Conflicting Assessments**. In the **Conflicting Utterances** case, speaker A has evidence which leaves open the possibility of p and speaker B has evidence which rules out the possibility of p . In different contexts, speaker A utters ‘‘might p ’’ and speaker B utters ‘‘cannot p ’’ (both epistemic modals, one the negation of the other). We then asked readers to rate how strongly they agreed or disagreed with the following statement:

(*) At least one of the speakers’ claims must be false.

Agreement with (*) indicates that the reader thought that A and B’s claims were incompatible, while disagreement with (*) indicates that the reader did not think that A and B’s claims were incompatible. What do modal contextualism and relativism predict about the **Conflicting Utterances** case? Modal contextualism allows for ambivalence regarding (*) – if readers judged A and B to be talking about different evidence, contextualism predicts they should disagree with (*), but if readers judged A and B to be talking about the same evidence, contextualism predicts they should agree with (*). By contrast, modal relativism does not allow for ambivalence regarding (*)

¹This approach allows us to evaluate contextualism and relativism while abstracting away from various possible metasemantic theories they may be combined with, and as such, our evaluation is more general than many existing critical discussions (cf. Dowell (2011), Yalcin (2011), Knobe & Yalcin (2014)).

– relativism predicts readers should think the two claims incompatible (since relative to no context of assessment can both be true), and hence should agree with (*).

In the **Conflicting Assessments** case, a single speaker, X, has evidence which leaves open the possibility of p and then utters \lceil might p \rceil . Speaker A and speaker B are watching X make this assertion in separate context (they are each watching X on TV from their respective homes). As before, speaker A has evidence which leaves open the possibility of p and speaker B has evidence which rules out the possibility of p . Speaker A utters, “What X said is true,” and speaker B utters, “What X said is false.” Just as with the **Conflicting Utterances** case, after reading the story, readers were asked to rate how strongly they agreed or disagreed with (*) (the vignette made it clear we were asking about speakers A and B, not X).

For the **Conflicting Assessments** case, neither theory allows for ambivalence regarding (*). Modal contextualism predicts that speaker X asserts a single proposition, which is either true or false, and hence conflicting truth value assessments are incompatible. And modal relativism predicts the same – even though the truth value of the proposition speaker X asserts varies by context, relative to a single context two conflicting truth value assessments are incompatible (at most one is correct).

Our study compared judgments about (*) across modal and non-modal versions of **Conflicting Utterances** and **Conflicting Assessments** cases. We summarize the results here:

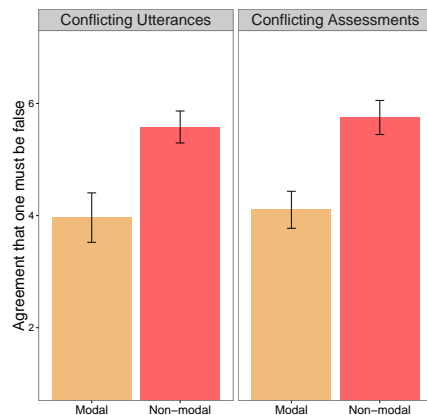


Figure 1: Participants’ mean level of agreement. Errors bars indicate $\pm 1SE$.

The crucial finding is that readers reported ambivalence towards (*) (as indicated by the clustering of agreement ratings around the midpoint, 4) in *both* the modal versions of the **Conflicting Utterances** and **Conflicting Assessments** cases.²

This experimental result is not predicted by either contextualism or relativism. Remember, contextualism predicts ambivalence toward (*) in **Conflicting Utterances** but not in **Conflicting**

²Crucially, the difference between means in modal and non-modal versions in both cases was significant. To determine this, we analyzed participants’ compatibility ratings with a 2 (Claim: Modal vs. Non-modal) x 2 (Case: Conflicting Utterances vs. Conflicting Assessments) ANOVA. Participants’ ratings were significantly affected by whether or not the assertion involved an epistemic modal, $F(1, 116) = 22.922, p < .001, \eta_p^2 = .165$, such that they strongly agreed that one of the inspector’s claims must be false when they uttered/assessed the non-modal assertion ($M = 6.67, SD = 1.65$), but much less agreed that one of the inspectors’ claims must be false when they uttered/assessed the epistemic modal assertion ($M = 4.04, SD = 2.05$), $t(118) = 4.82, p < .001, d = .882$. We did not observe a significant difference in between the Conflicting Utterances and Conflicting Assessment cases $F < 1$, or an interaction effect between these two variables, $F < 1$.

Assessments, and relativism predicts agreement with (*) in both cases. We take our finding to be a challenge to both views, and to motivate an alternative theory which can predict it.

Our theory combines three ideas:

1. Situation semantics for epistemic modal claims.
2. Contextualism about the contents of epistemic modals.
3. Contextualism about truth/falsity-ascriptions.

Situation semantics allows for intra-world variance in the truth value of an epistemic modal sentence, holding fixed the context in which the sentence is uttered. The idea is that the proposition expressed by an epistemic modal sentence (at a context) is true or false relative to a situation, where a situation is a part of a world. Contextualism about the contents of epistemic modals is the view that epistemic modal claims are claims about some contextually salient body of evidence. We distinguish *Situation Variant* from *Knower Oriented* domain functions:³

Situation Variant

For any situation s , $f^*(s) = \{w : w \text{ is compatible with the evidence available in } s\}$.

Knower Oriented

For some epistemic agent N , time t , and situation s : $f_{N_t}(s) = \{w : w \text{ is compatible with what } N \text{ knows at } t \text{ at the world of } s\}$.

Finally, contextualism about truth/falsity-ascriptions is the view that “is true”/“is false” in context c expresses the property of being true/false relative to the salient situation in c .

Drawing on these pieces, here is (roughly) how our theory predicts our results. We predict ambivalence towards (*) in **Conflicting Utterances** because there is an interpretation of each speakers’ modal claim (the knower-oriented interpretation) in which they are talking about their respective evidence. Since A may be correct that her evidence leaves open the possibility of p , and B also be correct that *her* (B’s) evidence does not leave open the possibility of p , there is an interpretation of A and B’s claims on which they are compatible. We also predict ambivalence towards (*) in **Conflicting Assessments**. In that case, there is an interpretation of X’s utterance of “might p ” (the situation-variant one) in which its truth value varies according to what situation it is evaluated relative to. Given contextualism about truth/falsity-ascriptions, when speaker A says, “What X said is true,” A may be ascribing the property *true-at- s_A* to X’s claim, and when speaker B says, “What X said is false,” A may be ascribing the property *false-at- s_B* to X’s claim. Given the situation-variant interpretation of X’s claim, this claim may be true at s_A and false at s_B , and hence we predict the possibility that A and B’s assessments are compatible. However, since there are other interpretations of X, A, and B’s claims, we also predict this is not the only possible answer given the setup of the case – and hence, we predict ambivalence towards (*) in **Conflicting Assessments**.

We emphasize that this is not the only theory that can predict our experimental results. In the paper, we discuss in more detail the crucial structural features required for a theory to be in a

³A domain function is a function from a situation to a set of worlds, and it gives the domain over which the epistemic modal quantifies. “might p ” is true relative to a domain function f and situation s iff $\exists w \in f(s) : p$ is true at w .

position to predict the results of our experiment. For us, the crucial point is to establish the new data point for theories of epistemic modals to predict, and to explore the range of possible theories which may predict it.

References

- DeRose, Keith. 1991. Epistemic Possibilities. *The Philosophical Review*, **100**(4), 581–605.
- Dowell, Janice. 2011. A Flexible Contextualist Account of Epistemic Modals. *Philosophers' Imprint*, **11**(14), 1–25.
- Egan, Andy. 2007. Epistemic Modals, Relativism, and Assertion. *Philosophical Studies*, **133**(1), 1–22.
- Egan, Andy, Hawthorne, John, & Weatherson, Brian. 2005. Epistemic Modals in Context. *Pages 131–170 of: Preyer, George, & Peter, George (eds), Contextualism in Philosophy: Knowledge, Meaning, and Truth*. Oxford: Oxford University Press.
- Hacking, Ian. 1967. Possibility. *The Philosophical Review*, **76**, 143–68.
- Knobe, Joshua, & Yalcin, Seth. 2014. Context-sensitivity of epistemic possibility modals: experimental data. *Semantics & Pragmatics*, **7**(4), 1–21.
- Kratzer, Angelika. 1981. The Notional Category of Modality. *Pages 38–74 of: Eikmeyer, H. J., & Rieser, H. (eds), Words, Worlds, and Contexts. New Approaches in Words Semantics*. Berlin: de Gruyter.
- Kratzer, Angelika. 1991. Modality. *Chap. 23, pages 639–650 of: von Stechow, Arnim, & Wunderlich, Dieter (eds), Handbuch Semantik*. Berlin and New York: de Gruyter.
- MacFarlane, John. 2011. Epistemic Modals are Assessment-Sensitive. *Pages 144–178 of: Egan, Andy, & Weatherson, Brian (eds), Epistemic Modality*. Oxford: Oxford University Press.
- MacFarlane, John. 2014. *Assessment Sensitivity: Relative Truth and its Applications*. Oxford: Oxford University Press.
- Stanley, Jason. 2005. Fallibilism and Concessive Knowledge Attributions. *Analysis*, **65**(2), 126–131.
- Stephenson, Tamina. 2007. Judge Dependence, Epistemic Modals, and Predicates of Personal Taste. *Linguistics and Philosophy*, **30**(4), 487–525.
- Yalcin, Seth. 2011. Nonfactualism About Epistemic Modality. *Pages 295–332 of: Egan, Andy, & Weatherson, Brian (eds), Epistemic Modals*. Oxford: Oxford University Press.