Agentive Duality Reconsidered

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Abstract

A growing consensus in the literature on agentive modals has it that ability modals like 'can' or 'able to' have a *dual*, i.e. interpretations of 'must' or 'cannot but' which stand to *necessity* as ability stands to *possibility*. We argue that this thesis (which we call 'Agentive Duality') is much more controversial than meets the eye. While Agentive Duality follows from the orthodox possibility analysis of ability given natural assumptions, it sits uneasily with a wide range of alternative proposals which are unified by the idea that ability requires *control*. In particular, we show that against the background of a control requirement on ability, Agentive Duality can be used to derive absurd predictions featuring this dual. Far from being a purely definitional thesis, Agentive Duality thus affords a new lens through which to assess the long-standing debate between possibility analyses of ability and their discontents.

Keywords: agentive modals, ability, compulsion, possibility, duality

1 Agentive Duality

'Can', like other modal auxiliaries, takes many flavours. Depending on context, it can express (among others) *epistemic possibility* as in (1a), *deontic possibility* as in (1b), or *circumstantial possibility* as in (1c).

(1) a. Jill can't be the murderer, she wasn't even in the country on the night of the crime.
b. Jack can retake the exam; the school board has finally agreed.
c. Weeds can easily overgrow your entire lawn.

'Can' is also often used to ascribe *abilities* to agents (or a lack thereof):

(2) a. Jill can solve any equation.
b. Jack can't wiggle his ears.

A distinguishing feature of agentive uses of 'can' is that such uses are readily paraphrased with dedicated ability constructions like 'able' or 'has the ability'.

(3) a. Jill is able to solve any equation.
b. Jack does not have the ability to wiggle his ears.

Recently, it has been argued that the class of agentive modals is wider than previously appreciated. On this view, the agentive modals encompass not just *abilities* but also their duals, so-called *compulsions*, a modality standing to ability as necessity stands to possibility (see Mandelkern et al., 2017; Schwarz, 2020; Willer, forthcoming; Boylan, forthcoming).[1] The thought is initially compelling. Even if 'must' and 'can' take different flavours in different contexts, one would still expect these expressions to be duals on any *uniform* interpretation of the modals. So if there is an agentive reading of 'can', should there not also be an agentive reading of 'must'?

A quick glance at the data would appear to support this conjecture. Assuming that the dual of an ability modal is formed in the usual way (by placing a negation above and below the modal) we get that the dual of 'can' is '¬ can ¬', the dual of 'able' is '¬ able ¬' etc.[2] And this pattern seems to be realised in English in sentences like (4a-b) which feel equivalent to the corresponding constructions with 'must' or 'have/need to' as in (5a-b):

(4) a. Jill cannot but watch another episode.
    b. Jack cannot *not* climb that tree.

(5) a. Jill must watch another episode.
    b. Jack has/needs to climb that tree.

And so, on the face of it, the view that ability modals have a dual expressible in one of these ways holds a lot of plausibility. Nevertheless, in this paper we argue that the following thesis, which we call 'Agentive Duality', is much more controversial than meets the eye.

Agentive Duality: S must $\phi \leftrightarrow \neg\ S$ can $\neg\ \phi$

While **Agentive Duality** falls out naturally of the orthodox possibility analysis of ability, it sits uneasily with a wide range of alternative proposals which are unified by the idea that ability requires *control*.

For preview, our argument will be this. If ability requires control, then there'll be cases where for some agent S, and a pair of contradictory actions ϕ and not-ϕ, S cannot ϕ and S cannot not-ϕ. Given **Agentive Duality**, it would follow that such an agent *must* ϕ. But that is absurd. So either ability does not require control, or ability and compulsion are not duals in the usual sense. Far from being a purely definitional thesis, **Agentive Duality** thus affords a new lense through which to assess the long-standing debate between possibility analyses of ability and their discontents.

The plan is as follows. §2 contrasts standard possibility analyses of ability 'can' with various alternatives and argues that a concern with control is central to the case against possibility analyses. §3 argues that given these constraints on the agentive modalities, there are counterexamples to **Agentive Duality**. §4 considers objections and replies. §5 concludes by highlighting lessons to be drawn for the wider debate between standard and alternative semantics for agentive modals.

[1] Note that we're glossing over some of the subtleties of Schwarz's and Willer's accounts. For some of the earlier discussion of potential duals for ability 'can' see for instance Kenny (1976, p.211), Brown (1988, p.6), and Hackl (1998, §1.2).

[2] Throughout we assume that the prejacents of ability modals are verb phrases, not declarative sentences, so more precisely the dual of a string of the form $\ulcorner S$ can $\phi \urcorner$ is of the form $\ulcorner \neg\ S$ can $\neg\ \phi \urcorner$. There is an alternative proposal on which ability modals combine with propositions via a tacit operator 'brings it about that' as in Kenny (1976) or 'sees to it that' (stit) as in Horty and Belnap (1995). Where $\Diamond$ is a regular possibility modal, the logical form of ability statements would then be $\ulcorner \Diamond (S \textsc{ stit } p) \urcorner$. See §4.5 for the dialectic significance of this view.

2 Agentive 'can' and 'must'

At the heart of this paper is a thesis receiving increasing attention in the recent literature, i.e. that the 'can' of ability has a dual, agentive 'must', which stands to ability as possibility stands to necessity.

Proponents of what is sometimes called the "standard view" of natural language modals may not find the posited duality all that controversial. For on the standard theory all natural language uses of 'can' (and 'may' and 'might'), whether deontic, epistemic or circumstantial, are modelled as possibility modals, i.e. existential quantifiers over variously restricted possible worlds (see Hilpinen 1969, Lewis 1976 and Kratzer 1977, 1981). And so any given ability ascription will be equivalent to some suitably restricted possibility claim. Where '$\blacklozenge$' designates the relevant restricted possibility and 'can' is an ability modal, we'll have:[3]

AP-equivalence: S can $\phi \leftrightarrow \blacklozenge\ S\phi$s

Moreover, given the usual inter-definability of possibility and necessity, we'll get the following for the relevant restricted modality:

$\Diamond\Box$**-Duality**: $\blacklozenge\ S\phi\text{s} \leftrightarrow \neg\blacksquare\neg S\phi\text{s}$

So every agentive 'can' is *equivalent* to an expression which has some restricted necessity $\blacksquare$ as it's dual. It's then quite reasonable to think that some use of 'must' (or 'have to' or 'need to') should manage to pick out this particular necessity.[4] If that's the case, then there'd be a use of 'must' for which the following holds:

CN-equivalence: S must $\phi \leftrightarrow \blacksquare\ S\phi$s

Jointly, these assumptions imply **Agentive Duality**:

Agentive Duality: S must $\phi \leftrightarrow \neg\ S$ can $\neg\ \phi$

And so, for proponents of the standard view, the duality thesis is perhaps not all that controversial.

However, the situation is very different for the many authors who have objected to the standard view as applied to the agentive modalities opting instead for sophisticated conditional analyses (see Mandelkern et al. 2017, Boylan forthcoming) or for two-layered quantificational accounts (see Horty and Belnap 1995, Brown 1988, Hackl 1998, Jaster 2020, Fusco 2020). On these non-standard views, it is not at all clear that the thesis that ability 'can' has a dual is in fact borne out. Indeed we'll show that to the extent that non-standard theories are motivated by the intuition that ability requires control, they sit uneasily with **Agentive Duality** in ways not previously appreciated in the literature.

[3] Of course how the modal is restricted will vary across contexts. So '$\blacklozenge$' will designate different restricted modalities in different contexts. Nevertheless, for each context, there'll be some true instance of AP-equivalence which can then be used to derive Agentive Duality in the way set out in the main text.

[4] This step is perhaps more substantive. It might just be really hard to pick out the relevant restricted modality using a natural language 'must', just like in English, it is difficult to pick out an epistemic modality using non-negated 'can', or in German 'zu haben/zu sein' cannot easily express epistemic or circumstantial possibility. However, the data in (4) and (5) above, would seem to suggest that there *are* uses of 'must' which have the intended readings. Thanks to Wolfgang Schwarz for raising this issue with us.

The departure from standard possibility analyses of agentive modals is usually motivated on the basis of the intuition that ability requires *control*.[5] In very broad strokes the argument is this: Ability requires control. Possibility (even if highly restricted) does not. So no view on which ability is analysed as a possibility can be correct.

First, it is often argued that there are direct counterexamples to the claim that possibility, even if suitably restricted, implies ability. Since the 'can' of ability is not epistemic or deontic, it is usually assumed that the only plausible candidate for a restricted possibility modal would be a *circumstantial possibility*, possibility in view of certain (contextually variable) truths about the agent and their circumstances (see Kratzer, 1981, p.52f.). The claim then is that there are direct counterexamples to the view that circumstantial possibility implies ability, i.e. cases where sentences of the form of (6) or (7) are intuitively false on the intended reading although a circumstantial possibility claim of the form of (8) is true:

(6) *S* can ϕ.

(7) *S* has the ability to ϕ.

(8) It can happen that *S* ϕs.

For instance, varying a classic example due to Kenny (1976), Mandelkern et al. (2017, p.304) envisage a game of darts between friends. The next person to hit the bull's-eye will win the game. One of the players' overzealous young child Susie, who has never even managed to make a dart stick, wants to take the shot. She exclaims:

(9) I can hit the bull's-eye on this throw.[6]

Intuitively, (9) is not true in the envisaged case. Still, unlikely as it may be that Susie will hit the bull's-eye, it is hard to deny that a circumstantial possibility claim like (10) is still true in this case.

(10) It can happen that Susie hits the bull's-eye on this throw.

After all, what is required for the truth of (10) on the relevant circumstantial reading is merely that *it is not ruled out* by relevant facts about Susie's properties and circumstances that she hit the bull's-eye on the next throw.

By contrast, that such facts about Susie and her circumstances don't rule it out that Susie should hit the bull's-eye, would not yet appear to licence the truth of (9) on the relevant agentive reading. What's amiss? The standard line is that having the ability to ϕ requires that ϕ is *within the agent's control* (see Mandelkern et al. 2017, p.302, Boylan forthcoming, p.1). Since the same is not required for the mere possibility that the agent ϕs, even a highly restricted possibility does not imply ability on this view.

[5] The control requirement is invoked in the debate on free will, e.g. by van Inwagen (2000), McKay (1996), Frost (2020), and Steward (2020), as well as in the debate on the semantics of ability ascriptions, e.g. by Brown (1988), Mandelkern et al. (2017), Willer (forthcoming), and Boylan (forthcoming).

[6] To steer clear of issues surrounding the *genericity* implicit in many ability attributions, we focus on abilities to do things at specific times. So throughout, ϕ is to be instantiated by time specific actions. It is helpful to distinguish between time specific and generic ability ascriptions, where the former ascribe abilities to perform time specific actions (able to ϕ at *t*) while the latter ascribe an ability to perform a generic action (able to GEN ϕ) (see Mandelkern et al., 2017, §1). This is *not* the same distinction as that between "general" and "specific" abilities prominent in the literature, roughly the contrast between skill and opportunity. Wondering whether a skilled but dartless darts player has the time specific ability to hit the dart board *now*, there is still a sense in which they can—they have the skill—and a sense in which they can't—they lack the opportunity.

The view that ability requires control would also appear to be at the heart of more formal arguments against the view that possibility implies ability. Kenny (1976) famously argues that unlike a possibility restricted by certain truths about the agent and their circumstances, the 'can' of ability does not obey an analogue of the modal axiom **T**$\Diamond$:

$\mathbf{T_{ability}}$: $S\ \phi\text{s} \rightarrow S$ can ϕ

Worse, Kenny argues that the 'can' of ability does not even have a normal modal logic (and so cannot be modelled within Kripke frames) since it would not appear to license a principle derivable given the modal axiom **K**, i.e. distribution over disjunction:

$\mathbf{K}\vee_{\mathbf{ability}}$: S can $(\phi \vee \psi) \rightarrow S$ can $\phi \vee S$ can ψ

Once more, it would appear to be intuitions about control which guide the proposed counterexamples.

Start out with $\mathbf{T}_{\text{ability}}$. Kenny (1976, p.214) notes that in fact hitting the bull's-eye need not imply the ability to hit the bull's-eye. For instance, if in the above case Susie were to hit the bull's-eye, it would be by sheer luck. Hitting the bull's-eye is not within Susie's control, and so, intuitively, whether or not she in fact ends up hitting the bull's-eye, the relevant ability ascription would not appear to be true.[7]

Next consider $\mathbf{K}\vee_{\mathbf{ability}}$. Presumably *anyone* who has the ability to hit the dart board has the following ability: to hit the top or to hit the bottom. Still, inuitively, the less advanced of those players possess neither the ability to hit the top nor the ability to hit the bottom. For where the dart lands on the board is not within their control. And so even if such poorer players have the ability to bring about the disjunctive outcome (the dart hits the top or it hits the bottom), they may well lack the ability to bring it about that the dart hits the top as well as the ability to bring it about that the dart hits the bottom. Once more it is concerns with control which underlie failures of the relevant principles.

Given the centrality of control intuitions in the rejection of the standard view as applied to agentive modals, it is then no surprise that the accounts of agentive modals proposed as alternatives to the standard view all build such a control requirement into their theories in some way or another, whether it is by requiring that something the agent does is such that it *would result* in the agent's ϕ-ing (e.g. Mandelkern et al. 2017, Boylan forthcoming) or *necessitates* that they ϕ (e.g. Brown (1988), Horty and Belnap (1995), Fusco (2020)), or results in the agent's ϕ-ing *in a sufficiently large proportion* of relevant cases (e.g. Jaster 2020). In what follows, we aim to show that a commitment to the view that ability requires control yields absurd compulsion predictions against the background of **Agentive Duality**. That agentive 'can' has a dual defined in the usual way is then a thesis that doesn't sit easily with non-standard theories.

[7] There are a number of subtle issues complicating these observations, though. First, the point seems most convincing for *generic* ability ascriptions ('S can GEN ϕ') for which there is an alternative explanation of **T**-failures, i.e. that the generic operator GEN does not obey **T** (GENϕ does not imply ϕ). The role of genericity is discussed by Mandelkern et al. (2017), Bhatt (ms) and Maier (2018). Secondly, there are interesting issues regarding *tense* and *aspect* commonly glossed over. For instance that one *did* ϕ seems to imply that one *was able* to ϕ. See Hacquard (2006), Bhatt (ms), and Boylan (forthcoming) for discussion.

3 The Argument

In this section, we argue that if ability requires control, **Agentive Duality** is subject to counterexamples. These are cases where an agent, due to a lack of control, lacks the ability to *not*-ϕ, and yet it seems plain wrong to say that this agent *must* ϕ. We conclude that either ability does not require control, or ability and compulsion are not duals in any ordinary sense.

Since the scopal relations between agentive modals and negation matter here, we'll take care to mark scope in our examples. We'll use 'It is not the case that S can ϕ' to indicate wide-scope negation ($\neg$ S can ϕ). And we'll use 'S can not ϕ' to indicate narrow scope negation (S can $\neg$ ϕ).

A final caveat. Given the range of different views which the argument seeks to target, we will not endeavour to make precise the notion of *control* relevant to the slogan that ability requires control. Instead we'll be relying on an intuitive understanding of this notion.[8]

3.1 First Case: Inexact Abilities

The first counterexample builds on the following case:

> **Cards.** Ada is a gambling addict who cannot resist an opportunity to play at cards. On one occasion, Ada is challenged to draw a red card from a shuffled deck of cards with as many red as black cards.

If ability requires control, it is natural to think that although (11) is true neither (12a) nor (12b) is true in the envisaged scenario.

(11) Ada can draw either red or black on the next try.

(12) a. Ada can draw red on the next try.
b. Ada can draw black on the next try.

For intuitively, neither drawing red nor drawing black is within Ada's control. Of course, it can happen that Ada draws red and it can happen that Ada draws black. But as we have seen, those who think that ability requires control will insist that that's not enough to warrant the truth of (12a) or (12b) on the intended agentive reading of 'can'. Indeed, we have precisely the sort of case that has moved proponents of a control requirement to conclude that ability modals fail to distribute over disjunction (see §2). We then get (13a-b):

(13) a. It's not the case that Ada can draw red on the next try.
b. It's not the case that Ada can draw black on the next try.

[8] There are at least three different traditions for thinking about control. In a Davidsonian tradition, New-Dispositionalists like Vihvelin (2004) or Fara (2008) typically think of control as a (non-deviant) causal link between one's mental states and one's actions. Neo-Aristotelians like Steward (2012, 2020) or Alvarez (2013) by contrast understand control in terms of two-way powers; for ϕ to be within one's control is for one to have the power to ϕ and the power to $\neg$ ϕ. Finally, there is a tradition in which control is closely linked to the absence of luck (see Hawley 2003, Setiya 2012). As far as we can see our counterexamples go through on each of these conceptions, but see note 11 below. Thanks to Carlotta Pavese and Vera Flocke for helpful discussions of this point.

Moreover, brief reflection reveals that if ability requires control, (14a-b) cannot be true in the envisaged case either:

(14) a. Ada can not draw red on the next try.
b. Ada can not draw black on the next try.

We can reason as follows in the case of (14a): For Ada to be able to *not* draw red she'd have to either have the ability to not draw at all or the ability to draw black. By hypothesis, Ada does not have the ability to not draw at all. And as registered in (13b), Ada does not have the ability to draw black either. *Mutatis mutandis* for (14b). It follows that both (15a) and (15b) are true:

(15) a. It is not the case that Ada can not draw red on the next try.
b. It is not the case that Ada can not draw black on the next try.

But now consider the following instances of **Agentive Duality**:

(16) a. Ada must draw red iff it's not the case that Ada can not draw red.
b. Ada must draw black iff it's not the case that Ada can not draw black.

Combining (15a-b) with (16a-b) respectively, we can then derive the following compulsion predictions:

(17) a. Ada must draw red on the next try.
b. Ada must draw black on the next try.

Not only is each prediction, considered on its own, deeply implausible in the envisaged case. It is even harder to see how both could be true! So much the worse for the control intuition, argues the fan of duality. So much the worse for duality, argues the control enthusiast.[9]

3.2 Second Case: No Options

For the second kind of counterexample consider the following case:

> **Coma.** Billy is in a coma. Though his body moves and twitches occasionally, Billy doesn't act in any way whatsoever.

Against the background of this case, consider (18a-b):

(18) a. Billy can leave the room right now.
b. Billy can stay in the room right now.

[9] As Wolfgang Schwarz has pointed out to us, the problems faced by control enthusiasts are not limited to **Agentive Duality**. Given a control requirement on ability, our cases put equal pressure on the view that strings of the form '¬ *S* can ¬ϕ' are equivalent to the natural language '*S* cannot *not* ϕ' or '*S* cannot but ϕ'. After all 'Ada cannot but draw red/black' is as bad a prediction as 'Ada must draw red/black'.

(18a) is clearly false. Admittedly, (18b) sounds true. But notice that on views on which ability requires control, we should think that it isn't true. After all, staying in the room is no more within Billy's control than leaving it. It is something merely happening to him. So if 'can' is to be read as the 'can' of ability, and ability requires control, it is difficult so see how (18b) could be true. Billy, it would seem, is not able to *do anything* while in his comatose state.[10] Proponents of the control requirement would then have to accept (19a-b):[11]

(19) a. It is not the case that Billy can leave the room right now.
b. It is not the case that Billy can stay in the room right now.

But then (20a-b) would not be true either:

(20) a. Billy can not leave the room right now.
b. Billy can not stay in the room right now.

For to have the ability to not leave the room, Billy would have to have the ability to stay in the room.[12] Likewise, to have the ability to not stay in the room, Billy would have to have the ability to leave the room. Since we have argued that Billy lacks these latter abilities, he lacks the former abilities as well. So we get:

(21) a. It's not the case that Billy can not leave the room right now.
b. It's not the case that Billy can not stay in the room right now.

But now consider the following instances of **Agentive Duality**:

(22) a. Billy must leave the room right now iff it's not the case that Billy can not leave the room right now.
b. Billy must stay in the room right now iff it's not the case that Billy can not stay in the room right now.

Combining (21a-b) with (22-b) respectively, we can then derive the following compulsion predictions:

(23) a. Billy must leave the room right now.
b. Billy must stay in the room right now.

[10] That's of course compatible with thinking that Billy retains his generic abilities, i.e. abilities to do various things under normal conditions, i.e. when not comatose. It is also compatible with thinking that he retains various non-agentive abilities, abilities the manifestations of which are not actions, e.g. the ability (of his body) to digest food. There may then also be the non-agentive ability (of Billy's body) to stay in the room. But—as proponents of the control view stress time and again—at issue in their discussions are agentive abilities.

[11] Does the argument go through if control is tied to an absence of luck (see note 8 above)? After all, it is not just a matter of luck that Billy stays in bed, it is explained by his condition. And so maybe Billy does have the ability to stay in bed, even if ability requires control. For this objection to succeed, one would have to be willing to take the absence of luck to be a *sufficient* condition for control. But one might find that implausible. If someone hits my knee cap to test my reflexes, it is not a matter of luck that my leg goes up, but it would be a bit of an own goal for the control fan to declare *that* movement to be under my control. Of course we cannot rule out that there are other theories of control which can handle the Billy example, though in that case there'd still be questions about Ada. Thanks to Carlotta Pavese for asking us to clarify this point.

[12] One might think that other abilities would suffice so long as their exercise amounts to Billy's staying in the room, such as the ability to lie in bed. But note that lying in bed is no more within Billy's control then staying in the room. Thanks to Emanuel Viehbahn and Barbara Vetter for pressing us on this point.

(23a) is clearly false in the envisaged scenario. What is more, (23a) and (23b) are certainly not *both* true in the case at hand.

Our arguments show that one cannot have both: an agentive 'can' that requires control and a dual for such a 'can' defined in the usual way. These findings are philosophically significant since they bring out that **Agentive Duality** not, as one might have thought, an obvious, purely definitional thesis. Instead the principle affords a new lens through which to assess the long-standing debate between possibility analyses of ability modals and their discontents.

4 Objections and Replies

We have argued that if ability requires control, there'll be counterexamples to **Agentive Duality**. In this section, we'll respond to five natural objections to our argument.

4.1 Objection from Equivocation

One might complain that the argument does not suitably distinguish between being able to do something, and being able to do something *at will* or *intentionally*. Ada might be able to draw a red card if she's lucky. But in that case it would still be false that she was able to draw a red card *at will*. And Billy is able to stay in bed though he is not able to stay in bed *intentionally*. Someone objecting along these lines might thus grant that (24a) is false and yet insist that (24b) is true:

(24) a. Ada can draw red at will on the next try.
b. Ada can draw red on the next try.

Likewise, they may grant that (25a) is false, while insisting that (25b) is true:

(25) a. Billy can intentionally stay in the room right now.
b. Billy can stay in the room right now.

But (24) and (25) cannot be used to derive the problematic predictions against the background of **Agentive Duality**, at least assuming that, as is plausible, not being able to $\neg\, \phi$ at will or intentionally does not imply not being able to $\neg\, \phi$.[13]

Reply: We'd like to register that this line of response is not, in fact, an objection to our argument. After all, those who pursue it will agree with our thesis that *if* what we may call *bare* 'can' (as opposed to, e.g., 'can at will') requires control, *then* Agentive Duality yields implausible compulsion predictions. It's just that they deny that bare 'can' requires control. But of course those who deny that bare 'can' requires control have no reason to part ways with the standard view in the first place. But we've already acknowledged that our argument will not get off the ground on the standard view according to which Agentive Duality can be derived in the way set out in §2. Perhaps distinguishing between bare 'can' and 'can at will' or 'can intentionally' might be useful in explaining away arguments against the standard view. But this is a different topic and has little to do with our argument. All that we claim is that an agentive 'can' that requires control yields implausible compulsion predictions against

[13]Thanks to Sanja Dembić, Ben Holguín, and Barbara Vetter for pressing us on this point.

the background of **Agentive Duality**. And that conclusion remains unscathed by the objection from equivocation.[14]

4.2 Objection from Indeterminacy

We have argued that if ability requires control, it is natural to think that neither (12a) nor (12b) is true in the above cards case:

(12) a. Ada can draw red on the next try.
b. Ada can draw black on the next try.

But following Mandelkern et al. (2017), one might argue that (13a-b) are not clearly true either:

(13) a. It's not the case that Ada can draw red on the next try.
b. It's not the case that Ada can draw black on the next try.

Instead, one might think that both (12a-b) and (13a-b) are *indeterminate* and that, consequently, they cannot be used to derive the problematic compulsion prediction from (16a-b).

Reply: We see two issues with this line of response. First, although the problematic prediction would not be determinately true on the proposed view, it would still be indeterminate rather than determinately false, and one might think that that's bad enough. Secondly, the response doesn't generalise since it does not apply to the coma case. We'll take these points in turn.

For the objection from indeterminacy to be of any use in blocking the problematic compulsion predictions, we'd have to ensure that (14a-b) are not (determinately) false.

(14) a. Ada can not draw red on the next try.
b. Ada can not draw black on the next try.

Since in the envisaged case, Ada can not draw red (black) only if she can draw black (red), and the starting point for the objection is the claim that it's indeterminate whether she can draw black (red), it's natural to think that the objector will want to insist that (14a-b) are indeterminate. But on standard semantics for indeterminacy (whether truth-functional or supervaluationist), it'll be the case that if p is indeterminate, so is ¬p. So we'll get that (15a-b) are indeterminate, too.

(15) a. It is not the case that Ada can not draw red on the next try.
b. It is not the case that Ada can not draw black on the next try.

But now consider again the relevant instances of **Agentive Duality**:

(16) a. Ada must draw red iff it's not the case that Ada can not draw red.
b. Ada must draw black iff it's not the case that Ada can not draw black.

[14]Schwarz (2020) argues that ability 'can' is systematically ambiguous between a standard (contextually restricted) possibility modal which does not require control and something similar to 'can at will' which does. So long as it is agreed that **Agentive Duality** breaks down for the control requiring meaning of 'can', this sort of view is not at odds with what we argue.

On standard semantics for indeterminacy (whether truth-functional or supervaluationist), it'll be the case that determinately materially equivalent sentences get the same truth-value. Now presumably those who think that agentive 'can' and 'must' are duals will also think that all instances of **Agentive Duality** are determinately true.[15] And so we'd get that (17a-b) below are indeterminate:

(17) a. Ada must draw red on the next try.
b. Ada must draw black on the next try.

But you might think that *that* prediction is bad enough since it is difficult to see on what reading of 'must' (17a-b) are not straightforwardly false. So while bringing in indeterminacy may appear to soften the blow of the bad prediction, it is by no means a satisfactory response to the issues for **Agentive Duality** which we raise.[16]

Our second response to the indeterminacy objection is that it fails to generalise to all cases. In cases of inexact abilities such as the cards case, the appeal to indeterminacy is not implausible. But the same is not true in the coma case. Consider again (18a-b):

(18) a. Billy can leave the room right now.
b. Billy can stay in the room right now.

Since (18a) is clearly false, the only way to avoid the problematic prediction is by accepting (18b) as determinately true.

But as already argued, that is at odds with the control intuition. As we've noted above, staying in the room is no more within Billy's control than leaving it. So if the 'can' is to be the 'can' of agentive ability rather than the 'can' of circumstantial possibility or the 'can' of the non-agentive abilities of Billy's body (see note 10 above), then either Billy does not have the ability to stay in his room, or else ability does not require control. In the former case, we face the problematic prediction. In the latter case, it is unclear why we should give up on the uniform analysis of ability 'can' as a possibility modal proposed by the standard theory in the first place. After all giving up on uniformity comes at a significant theoretical cost (see Schwarz 2020 and Willer forthcoming) so if the control intuition is to be jettisoned, we may as well go back to the standard theory. In conclusion, the indeterminacy response does not get to the heart of the problem.

4.3 Objection from Opacity

The third line of response is to insist that (12a-b) are after all true. Suppose the cards from which Ada is to draw are spread out on the table. *This* card is red and *that* card is black. Since both drawing this card and drawing that card are under Ada's control, we'd expect (26a-b) to be true:

[15] It's natural to think that the axioms and theorems of a *logic* of ability are true on every way of resolving the vagueness to which the agentive modals give rise, and hence that the logic of ability is closed under determinacy. However, we acknowledge that this is not obvious and would require further argument.

[16] Though notice that if indeterminacy is dissolved supervaluationally at least one of the above issues would be avoided: "Ada must draw red and Ada must draw black" will come out as determinately false. While there'll be some sharpenings of the relevant vague vocabulary on which "Ada must draw red" will be true and others on which "Ada must draw black" will be true, there'll be no sharpening on which both will be true. That, at least, is one advantage of bringing indeterminacy into the picture and resolving it supervaluationally.

(26) a. Ada can draw this card on the next try.
b. Ada can draw that card on the next try.

And so (12a-b) should be true also.

(12) a. Ada can draw red on the next try.
b. Ada can draw black on the next try.

It's just that Ada cannot—*under the guise of drawing red*—draw a red card.[17] However, she can—*under the guise of drawing this card*—draw red. The idea is then to insist that the kind of control required for ability is not at the level of representation but concerns control over one's actions, independently of how they are represented. Since Ada has this kind of control, (12a-b) are true.

Reply: We see two issues with this line of response. The first is that it is not entirely obvious to us that the 'can' of ability is transparent in the way assumed by the objection. The second is that it's insufficiently general. Not only does it not help with the coma case since Billy's troubles are evidently not at the level of representation. It also would not help with a slightly varied version of the cards case. We'll take these in turn.

Although we cannot settle this issue here, we'd like to flag that the assumed transparency of ability 'can' is not beyond doubt. Those who take the 'can' of ability to be relevant to practical deliberation might have good reason to think that ability 'can' *is* sensitive to available modes of presentations. Suppose your father is seriously ill and you need to raise a lot of money to pay for his treatment. If you can put all your money on the winning horse, you should. Misty Mountains is the winning horse, and you can put all your money on Misty Mountains. Should you? There is a case to be made that you should not, since it would be reckless. Reflections along these lines raise doubts as to whether the 'can' of ability really is as transparent as the objection assumes.

Crucially, *even if one agrees* with separating modes of presentation from control, our objection that control sits uneasily with **Agentive Duality** would not lose its force. To see this, consider the following variation of the cards case:

> **Darts.** Ada is a sports addict who cannot resist a sports challenge. Recently Ada has taken up darts as a hobby. Although she is a poor darts player who can just about make the darts stick, someone challenges Ada to hit a red tile on a dartboard with alternating red and green tiles.

Against the background of this case, consider (27a-b):

(27) a. Ada can hit a red tile on the next try.
b. Ada can hit a green tile on the next try.

On a view on which ability requires control, (27a-b) should be false: Hitting the dartboard might be within Ada's control, but hitting a specific tile is not. Now suppose *this tile* is red and *that tile* is green and consider (28a-b):

(28) a. Ada can hit this tile on the next try.

[17] See for instance Schwarz (2020), Fusco (2020).

b. Ada can hit that tile on the next try.

In the envisaged case, (28a-b) strike us as no better than (27a-b). No matter how the action of hitting red is represented, it is not within Ada's control.[18] And so the opacity objection does not get off the ground. But then we can run an analogous argument to the one above to derive (29):

(29) a. Ada must hit a red tile on the next try.
b. Ada must hit a green tile on the next try.

This prediction is as absurd as the previous one. Consequently, even if the kind of control required for ability is not sensitive to how the action is represented, the duality of agentive 'can' and 'must' remains problematic. It is control, not opacity, which is at the heart of the problem.

4.4 Objection from Agency Presuppositions

A fourth line of response builds on the claim that agentive 'must' and 'can' carry an agency presupposition. Take a sentence of the form $\ulcorner S$ can/must $\phi \urcorner$, where 'can' receives an agentive reading. Perhaps (the use of) such a sentence presupposes that whatever is substituted for S in the schema refers to an *agent*. Now, admittedly (30a-b) sound a bit odd:

(30) a. This rock can breathe.
b. This rock must breathe.

Likewise for (31a-b):

(31) a. Carla can swim and so can her beach ball.
b. Carla must stay put in front of her TV and so must her couch.

The supposed agency presupposition would provide straightforward explanations of these data. One might then suggest that in investigating **Agentive Duality**, it is crucial to stick to cases in which such an agency presupposition is satisfied to guard against mistaking infelicity for falsity. Clearly, rocks lack both the ability to breathe and the ability to not breathe, but it would be silly to take this to undermine **Agentive Duality** by deriving the absurd prediction that rocks *must* breathe. Rocks aren't agents. Likewise Ada with her addiction and Billy in his comatose state are not (fullblown) agents either. No wonder that we can derive weird predictions given **Agentive Duality**!

Reply: It is easy to see that the objection is unsuccessful. For suppose, as the objector does, that (i) ascribing an agentive modal to someone presupposes that they are an agent and that (ii) neither Ada nor Billy are agents. Then, we'd expect ability ascriptions to Ada and Billy to feel "gappy" or "squeamish". But, this prediction is simply not borne out. Consider first

(32) a. Ada can draw a card.

[18] For a natural way of modelling such inexact abilities using Williamsonian margins of error models see Fusco (2020).

b. Ada can hit the board.

These sentences sound impeccable.[19] Consider also

(33) a. Billy can stay in the room right now.
b. Billy must stay in the room right now.

(34) a. Billy can leave the room right now.
b. Billy must leave the room right now.

At least to our ears, these sentences don't sound gappy or squeamish. To us, (33a-b) sound true while (34a-b) sound false. Notice also that we don't get the kind of infelicity we found in (31) here. Suppose Billy shares a room with Mark, who can read and write and talk, but whose lower body is paralysed. Now consider

(35) a. Mark cannot leave the room and neither can Billy.
b. Mark must stay in the room and so does Billy.

To our ears (35a-b) sound absolutely fine. But if Billy were a non-agent and sentences where an agentive 'can' or 'must' is preferred triggered an agency presupposition, (35a-b) should sound similarly odd as (31a-b). We conclude that either agentive modals do not carry an agency presupposition, or else, Ada and Billy *are* agents and thus meet the agency presupposition. Either way, the objection is unsuccessful.[20]

4.5 Objection from Scope Distinctions

There is an important tradition on which ability modals combine with propositions via a tacit operator 'brings it about that' as in Kenny (1976) or 'sees to it that' (stit) as in Horty and Belnap (1995); Horty (2001). Where $\Diamond$ is a regular possibility modal, the logical form of ability statements would then be $\ulcorner \Diamond\ S\ \textsc{stit}\ p \urcorner$. On such a view, negated ability ascriptions are ambiguous between a reading where negation takes wide scope and one on which it takes narrow scope relative to stit. We get:

WS Negation: $\neg\ S\ \textsc{stit}\ p$

NS Negation: $S\ \textsc{stit}\ \neg\ p$

The objection now is this. (15a-b) which were used to derive the problematic compulsion predictions in Adas case may be true on the narrow scope reading. But they are hardly plausible on the wide scope reading. Consider:

(15) a. It is not the case that Ada can not draw red on the next try.
b. It is not the case that Ada can not draw black on the next try.

If we adopt the stit analysis in which negation takes narrow scope we get:

[19] We owe this point to an anonymous reviewer for this journal.

[20] A similar reply would be available to a slightly modified version of this objection according to which agentive modals don't presuppose *agency* but rather presuppose that the subject's option set is non-empty. Since, as stipulated, there is nothing Ada and Billy can do, this view would predict that (32)–(34) are gappy or squeamish. But it is not clear that they are. So either there *is* after all something Ada and Billy can do, or else ascribing agentive modals does not presuppose a non-empty option set. Either way, the objection does not succeed.

(15) a.$_{NS:}$ $\neg \Diamond$ Ada STIT $\neg$ Ada draws red on the next try.
b.$_{NS:}$ $\neg \Diamond$ Ada STIT $\neg$ Ada draws black on the next try.

(15a) is true, because it is not possible for Ada to ensure that the card she'll draw is not a red one. And (15b) is true, because it is not possible for Ada to ensure that the card she'll draw is not a black one. By contrast, and this is crucial, the wide scope readings of these claims are straightforwardly false:

(15) a.$_{WS:}$ $\neg \Diamond \neg$ Ada STIT Ada draws red on the next try.
b.$_{WS:}$ $\neg \Diamond \neg$ Ada STIT Ada draws black on the next try.

After all it *is* possible that Ada does not see to it that she draws red/black. All she has to do to *not see to it* that she draws red/black is to randomly draw a card. And of course it is possible for Ada to do that. (15a-b) are false and so we cannot plug them into **Agentive Duality** to derive the problematic compulsion predictions. There is then a natural way of blocking the argument even if ability requires control. All we need to do is opt for a wide scope STIT analysis of 'can' and 'must'.

Reply: We grant that this is a natural way of resisting our argument for anyone sympathetic to the STIT tradition.[21] However, we believe that even STIT enthusiasts should not take too much comfort in this. For not only does the wide scope reading block bad compulsion predictions. It equally blocks perfectly good ones. Two cases will serve to illustrate this point. First, consider Loquacious Jack. Jack is extremely loquacious, he simply cannot hold his tongue. Intuitively 'Jack cannot but speak' or 'Jack has to speak' are true on the intended reading of compulsion modals. Yet, there is a good sense—even where 'possible' is suitably restricted—in which it is possible that Jack doesn't *see to it* that he speaks; he might not be paying attention at all. Next consider Kleptomanic Katie. Since Katie suffers from Kleptomania, it seems right to ascribe a compulsion to her: Katie cannot not steal. But isn't it possible for her to not see to it that she steals? Intuitively it is, she might catch herself and just walk out of the shop. Or she might try and fail—perhaps because the items are glued to the shelves, perhaps because a security guard intervenes. None of these factors would intuitively do away with her compulsion to steal. Nevertheless, since STIT is meant to be *factive* (Horty and Belnap 1995, p.595; Horty 2001, p.17), the wide scope STIT analysis would predict that Kleptomanic Katie lacks the compulsion to steal in these cases.[22] The wide scope reading undergenerates compulsion predictions.

In sum, we suspect that proponents of STIT views face a dilemma when it comes to analysing agentive 'must'. They can adopt a wide scope reading and make false compulsion predictions by undergenerating compulsions. Or, they can adopt a narrow scope reading and make false compulsion predictions by overgenerating compulsions. Either way, they'd seem to make false compulsion predictions. So while we accept that a wide scope STIT analysis of (15a-b) would block our argument, we think this is of limited comfort to proponents of such views. And while these considerations may not be the final word on this point, at the very least, they go some way towards showing that the challenge presented in this article is one which concerns many of those working in STIT traditions, too.

[21] Thanks to an anonymous reviewer for this journal for urging us to clarify this point.

[22] If proponents of a STIT view were willing to give up on the assumption that STIT is factive, they might have more leeway here. For instance, they might link the case of Kleptomatic Katie to a more general puzzle about certain other necessity modals, like deontic 'must' (Ninan, 2005): Just like 'Katie must go to church, but she won't' sounds odd, 'Katie cannot not steal, but she won't' sounds odd too. Thanks to an anonymous reviewer of this journal for bringing this parallel to our attention.

5 Concluding Remarks

We have argued that an idea gaining increasing traction in the recent literature on ability modals—that ability 'can' has a dual defined in the usual way—sits uneasily with another view widely held according to which ability requires control. For if ability requires control, there are counterexamples to **Agentive Duality**. These findings are philosophically significant since they locate what would appear to be a purely definitional thesis, **Agentive Duality**, in the centre of the the long-standing debate between possibility analyses of ability modals and their discontents. As argued in §2, a central pivot point of that debate is the question whether, and if so, to what extent, ability requires control. Our arguments show that one cannot have both: an agentive 'can' that requires control and a dual for such a 'can' defined in the usual way.

Proponents of the standard view are likely to welcome the result as further evidence that there is no control requirement on ability. One might think that the dialectical position of their opponent is more delicate. While control enthusiasts can reject **Agentive Duality**, they would still need to explain the data in §2 which suggests that 'must', 'have to' or 'need to' have readings equivalent to those of 'cannot but' or 'cannot *not*'. However, this way of framing the discussion overlooks a natural response on behalf of the control enthusiast.

Conditional on ability requiring control, our findings provide good reason to reject that agentive 'can' and 'must' are duals. What is more, the nature of the problem cases is itself suggestive of an alternative way of defining agentive 'must' in terms of 'can':

Agentive Definability: S must $\phi \leftrightarrow S$ can $\phi \wedge \neg\, S$ can $\neg\, \phi$

After all, what went wrong in our cases was precisely that they ascribed a compulsion to ϕ to an agent unable to ϕ. It's absurd to claim that Ada must draw red/black because (if ability requires control) Ada lacks the ability do draw red/black. Likewise, it's false that Billy must stay/leave because (if ability requires control) he lacks the ability to stay/leave. Proponents of a control requirement would therefore draw a different moral from our findings. On their view it was a mistake—a mistake all too natural for those assuming the standard account—to model the relationship between agentive 'must' and 'can' in close parallel to the relation between *necessity* and *possibilty*. They might then insist that rather than being duals, 'must' and 'can' stand in a different relation of inter-definability, just like *necessity* and *contingency* which are interdefinable despite not being duals.[23] Opting for **Agentive Definability** would also have the advantage of explaining the data in Hackl (1998) and Willer (forthcoming) which suggests that, contrary to what **Agentive Duality** would predict, 'can't' does not imply 'cannot but not'.

To conclude, both proponents of the standard view and those of control-centred alternatives have options to build on our findings. Still our results afford interesting new considerations against which to assess their long-standing debate. For evidence to the effect that agentive 'can' and 'must' are in fact duals is evidence for the standard view. And evidence that 'can' and 'must' are not duals (though perhaps

[23] Where 'Cp' represents 'it is contingent whether p', we'd have: $\Box p \leftrightarrow p \wedge \neg Cp$, where C can, in turn, be defined as follows: $Cp \leftrightarrow \neg\Box p \wedge \neg\Box\neg p$. Thanks to Alexander Roberts for proposing this alternative way of inter-defining 'must' and 'can' as well as highlighting the parallel to contigency.

inter-definable in the way suggested above) is evidence for control-centred theories. In sum, **Agentive Duality** deserves more thorough scrutiny.

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