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# *Anyone* might but *everyone* won't*

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**Abstract** This paper investigates the interaction between quantifiers and epistemic modals, focusing on the contrast between *every* and *any*. It builds on observations made in von Fintel & Iatridou 2003, who noted that quantifiers seem unable to take wide scope across an epistemic modal. The proposal at the heart of the paper is that modes of epistemic access to domains of quantification play a role in accounting for apparent restrictions on scope. The paper takes the characterization of conceptual covers in Aloni 2001 as a starting point to argue that in the context of epistemic modals, constraints on epistemic access to the domain of quantification can give rise to scope illusions.

**Keywords:** quantification, epistemic modality, conceptual covers, Epistemic Containment Principle

## 1 Introduction

This paper investigates a scope puzzle for quantifiers in the context of epistemic modality. It draws mainly on two strands of work. One is the observation first made in von Fintel & Iatridou 2003 to the effect that quantifiers over individuals do not take inverse scope over epistemic modals. This means

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that in a sentence with *everyone* and *might*, for example, *everyone* won't take inverse scope over *might*. The other is a proposal made by Aloni 2001 regarding epistemic access to domains of quantification in the context of epistemic modality. Many of Aloni's examples were characterized as cases in which universal *any* scoped over *might*. This paper draws first on Aloni's insights to investigate why it appears that *everyone* won't take scope over *might*, and then points to differences between *every* and *any* to explain why it appears that *anyone* does.

Let us begin with von Fintel & Iatridou 2003, where the scope puzzle was first noted. In that paper, von Fintel and Iatridou presented a number of examples to illustrate restrictions on quantifier scope in the context of epistemic modals. Here is the first one:

(1) We are standing in front of an undergraduate residence at the Institute. Some lights are on and some are off. We don't know where particular students live but we know that they are all conscientious and turn their lights off when they leave. So, we clearly know that not all of the students are out (some lights are on and they wouldn't be if the students were away). It could in fact be that all of them are home (the ones whose lights are off may already be asleep). But it is also possible that some of them are away. Since we don't know which student goes with which light, for every particular student it is compatible with our evidence that he or she has left. With this background, consider the following sentence:

  a. Every student may have left.

As noted by von Fintel and Iatridou, (1a) is judged false in the scenario described. The conclusion in their paper is that universal *every* cannot take inverse scope over epistemic *may*. A movement structure along the lines of *every student x (may x have left)* is claimed not to be available to (1a), only *may (every student have left)* is possible (and the sentence is consequently judged false).

The discussion of (1a) in von Fintel & Iatridou 2003 is part of a broader investigation into the scope-taking possibilities of quantifiers with respect to epistemic modals. Their proposal is that quantifiers are not actually able to QR across an epistemic modal (a constraint they dub *Epistemic Containment Principle*: ECP). Other examples presented to illustrate this point include (2a)-(2c), which would only be reasonable under a wide-scope reading for *every*. The fact that the sentences are infelicitous is taken as indication that such a reading is unavailable: *every* won't take wide scope, lending support to the ECP.

(2) a. #Every student may have left but not everyone of them has.
b. #Every student may be the tallest person in the department.
c. Half of you are healthy. #But everyone may be infected.

The formulation of the ECP given by von Fintel and Iatridou specifically targets epistemic modals. They show that with other types of modality, a quantifier taking inverse scope over a modal does not seem to be as problematic. They offer the following deontic example:

(3) Most of our students must get outside funding —
a. for the department budget to work out.
b. the others have already been given university fellowships.

The sentence in (3) can be seen to be ambiguous, with the two continuations highlighting the different scope options.

The challenge, as set up by von Fintel and Iatridou, is to explain why quantifiers won't take inverse scope over epistemic modals, with the ECP offering a syntactic solution. Examples in which *every* interacts with existential *may/might* are particularly enlightening since they do not in principle confound scope relations in the way that e.g. *every* and *must* would.[1] Subsequent literature has followed up on von Fintel and Iatridou's original observation, with various authors noting concern about the structural account presented there. Some authors have worried about the lack of a principled reason why the ECP should target epistemic modals, e.g. Tancredi 2008, some have worried that a structural account does not quite do justice to the graded judgements and the variety of contextual factors that seem to affect them e.g. Anand & Hacquard 2013, Jeong 2017. The proposal to be explored here addresses some of these concerns, giving context a role to play.[2]

Interestingly, Aloni 2001 developed an approach to quantification in epistemic environments that did not foresee any scopal restrictions on such interaction. Aloni's objective (quite distinct from von Fintel and Iatridou's) was

1 The examples we shall use from now on are of this type, but see von Fintel & Iatridou 2003 for more options. See also Tancredi 2008 and Huitink 2008 for some cross-linguistic discussion.

2 Readers are also referred to Swanson 2010, who offers a defence of the view that quantifiers can scope over epistemic modals drawing on arguments from the semantics of conditionals. My proposal here will agree on the view about possible scope, but focuses on offering an account of the von Fintel and Iatridou data, not discussed by Swanson.

to provide an extension of Modal Predicate Logic (MPL) that could account for a range of longstanding puzzles, with focus on quantifying into belief contexts, questions, and the interaction between quantifiers and modals in a dynamic framework. The kind of examples that Aloni used to illustrate universal quantifiers scoping over epistemic *may/might* actually involved *any* instead of *every*. *Any*-examples are illustrated below:

(4) a. Anyone might be the culprit.
  b. Any student might have left.

Contrary to *every*, examples with *any* easily give rise to the intuition that a universal scopes over an epistemic modal. This difference between *every* and *any* is highlighted by von Fintel and Iatridou, but they did not find it problematic for the basic insight behind the ECP: it is usually considered that although indefinite *any* gives rise to universal quantification intuitions, it does not actually have the semantics/status of a 'real' universal quantifier (and thus lies outside the scope of the ECP). Aloni herself did not contrast *any*- with *every*-examples, focusing instead on the extension of MPL that would be able to account for the interaction between $\forall$ and $\Diamond$, using *any*-sentences to illustrate $\forall$. The question of why *every* won't scope over epistemic *might* while *any* appears to do so remained unexplored in her work.

The study of the interaction between quantification and epistemic contexts has a long tradition, with beginnings in philosophy. We find views ranging from Quine's early concerns about quantification into propositional attitudes (*'a dubious business'*, Quine 1956: p. 179), to current literature that considers quantification a useful diagnostic to probe into the bigger picture surrounding epistemic modals, such as dynamic vs. static accounts of modality, e.g. Yalcin 2015, probabilistic approaches to meaning, e.g. Moss 2018, and transworld identity of individuals, e.g. Ninan 2018. Discussions so far have targeted the interaction between quantification and modality in natural language via a translation to a language of logic, as illustrated by Aloni 2001, setting aside differences in how quantificational effects are obtained linguistically. The focus in this paper is on examining how variation in linguistic strategies for quantification affects the impact of epistemic access to the domain, with the goal of accounting for the contrasting intuitions associated with *every* and *any*.

The idea at the heart of the paper is that we can shed light on the scope puzzle observed by von Fintel and Iatridou by paying attention to differences in how domains of quantification are epistemically accessed. The proposal locates the puzzle within a broader family of problems surrounding the interaction between quantificational expressions and epistemic operators. Aloni's theory of quantification in epistemic contexts was designed to address (some of) those problems and will provide an explicit framework in which to investigate von Fintel and Iatridou's scope puzzle. (Alternative ways of modelling epistemic access may also be able to capture the relevant generalizations, but an exploration of other frameworks lies outside the scope of this paper.[3])

Aloni's theory of quantification in epistemic contexts builds on the key insight that the epistemic access we have to a domain of quantification, the way we conceptualize individuals in the domain, affects our judgments about epistemic modal claims.[4] To capture this, Aloni proposed an account in which quantification over individuals in epistemic contexts takes place under conceptual covers that model the speaker's access to the domain. Standardly, individuals in a domain of quantification are characterized as unstructured, simple objects. Aloni demonstrates that a view that construes them as complex objects, with an intensional dimension, has much to offer across a range of topics, including our understanding of questions, belief contexts and epistemic modals.

The paper builds on the idea that when quantifying over individuals as in example (1a), we can only track individuals distinctly across epistemic possibilities if previous discourse has fixed a particular type of epistemic access to identify individuals in the domain. If context does not presuppose a specific epistemic access to the domain of quantification, any epistemic state in which the universal quantifier wide scope reading of examples like (1a) is true will include a world in which all the individuals in the domain have the property under discussion. This will entail the quantifier narrow scope reading, creating the *scope illusion* that only the narrow scope reading is available. Aloni's theory of quantification under covers will provide a framework to formally spell out this proposal. In accordance with von Fintel and Iatridou's position on this point, the case of *any* will be kept separate from that of *every*. The paper is structured as follows: Section 2 presents a brief overview of

3 Ninan 2018 offers a comparison between conceptual covers vs. counterpart relations in quantification in epistemic contexts. An extension of Ninan's discussion to the scope puzzle or the relation between *every* and *any* remains for future work.

4 Aloni traces back this view in the literature to Quine, and cites e.g. Quine 1953: p. 151 to the effect that a modal claim '*does not properly apply to the fulfillment of conditions by objects apart from special ways of specifying them*' Aloni 2001: p. 47, as well as Hintikka 1967, 1969 and Gerbrandy 1997, 2000 (a.o.). See also Moss 2018 for a discussion on quantification in hyperintensional contexts and Ninan 2018 for a more recent discussion of Quine's insight.

Aloni's theory of quantification under covers, Section 3 investigates *every* in relation to *might* from the perspective of covers, and Section 4 investigates *any*. Section 5 offers concluding remarks.

## 2 Quantification under covers: Aloni 2001

Aloni 2001 makes a proposal to capture how perspectives on individuals affect the interpretation of epistemic claims. The principal contribution is the view that quantification takes place under *conceptual covers*. A conceptual cover is a set of individual concepts (functions from worlds to individuals). Appealing to conceptual covers when quantifying into epistemic contexts allows Aloni to provide insights into a range of puzzles, including de re belief ascription and anaphora in epistemic modal environments.

I will only briefly review some of the key ingredients of Aloni's proposal, focusing on the version put forward in Chapter 2 of Aloni 2001. Aloni's proposal is presented as an extension of MPL, and I will somewhat adapt the ideas in my presentation here. A conceptual cover identifies individuals by spelling out a set of concepts. Covers ($c_1$, $c_2$) are illustrated with a toy-example in (5), from Aloni 2001: p. 65:

(5) Where D = {Ann, Bea} and W = {$w_1$, $w_2$},

  a. $c_1$ = {λw. Ann, λw. Bea}
  b. $c_2$ = {λw. the woman on the right in w, λw. the woman on the left in w}

While the members of $c_1$ are constant functions that identify the same individual in all possible worlds, the members of $c_2$ may not be constant (e.g. if Bea is the woman on the right in $w_1$ but Ann is the woman on the right in $w_2$).

Quantification will be interpreted in relation to a contextually supplied set of covers CC (where $c_1$ and $c_2$, for example, could be members of CC). According to Aloni, a quantificational sentence will be true if there is a cover member of CC according to which the quantificational claim is true.[5] I will use *c* as a variable ranging over covers in CC and *x, y* as variables ranging over concepts (type <s, e>). A simple example is provided below:

5 See e.g. Aloni 2001: p. 67. With Aloni, I am making the assumption that a single variable assignment handles all quantification.

(6) $[\![\text{Someone sneezed}]\!]^{w_@,g,CC} = 1$ iff
$\exists c \in CC\,.\, \exists x \in c\,.\, x(w_@)$ sneezed in $w_@$.

According to (6), the sentence *Someone sneezed* will be true in $w_@$ iff there is a cover c in CC that includes a concept x such that the value for x in $w_@$ sneezed in $w_@$.

Conceptual covers earn their keep when combined with operators that manipulate them. Here is an example of covers at work provided by Aloni 2001: p. 105:

(7) **The butler**. Suppose a butler and a gardener are sitting in a room. One is called Alfred and the other Bill. We don't know who is who. In addition, assume that the butler committed a terrible crime. Consider now the following two discourses:

a. The gardener didn't do it. So it is not true that anybody (in the room) might be the culprit.

b. Alfred might be the culprit. Bill might be the culprit. So anybody (in the room) might be the culprit.

Aloni considers that both (7a) and (7b) could be truthfully uttered in the right circumstances, i.e. if we identify the individuals from different perspectives. Consider the following two covers: $c_1 = \{\lambda w.\ \text{Bill}, \lambda w.\ \text{Alfred}\}$ vs. $c_2 = \{\lambda w.$ the butler in w, $\lambda w.$ the gardener in w$\}$. The truth conditions for (7b) would be as below, in accordance with Aloni's characterization of *anyone* as a universal (I return to *any* in Section 4):

(8) $[\![\text{Anyone might be the culprit }]\!]^{w_@,g,CC} = 1$ iff
$\exists c \in CC\,.\, \forall x \in c\,.\, \exists w' \in Acc_{w_@}.\ x(w')$ is the culprit in w',
where $Acc_{w_@}$ is the set of worlds epistemically accessible from $w_@$.

Given (8), the universal claim regarding concepts will be true if CC includes $c_1$ (it is epistemically possible that Alfred is the culprit and it is epistemically possible that Bill is the culprit), but false if CC only includes $c_2$ (it is not epistemically possible that the gardener is the culprit). In the case of (7a), it will be the other way way around: the sentence will be false if CC includes $c_1$, and true if it only includes $c_2$.

Aloni restricts covers to sets of concepts that fulfill two conditions: each individual is identified by at least one concept in each world (existence), but in no world is an individual counted more than once (uniqueness). With Aloni, I will make the simplifying assumption that the domain of individuals is kept stable across worlds, using D for the contextually salient set. The existence constraint on covers makes sure that all individuals in a world are visible for quantification, whereas the uniqueness constraint makes sure that no individual counts more than once. The definition of cover is thus restricted to make sure that the concepts in a cover "*exhaustively and exclusively cover the set of individuals*" Aloni 2001: p. 64:

(9) Given a set of possible worlds W and a universe of individuals D, a *conceptual cover* c based on (W, D) is a set of functions $W \to D$ such that:
$\forall w \in W\colon \forall d \in D\colon \exists! x \in c\colon x(w) = d$ based on Aloni 2001: p. 64

As Aloni notes, given the constraints on conceptual covers, each cover will have the same cardinality as the domain of individuals. In her words: "*In a conceptual cover, each individual is identified by one and only one concept. Different covers constitute different ways of conceiving one and the same domain*" Aloni 2001: p. 65.

With the right contextual support, it is possible to invoke more than one conceptual cover in the interpretation of a single sentence (an instance of what Aloni calls *cover-shift*). Aloni discusses an example inspired by Paul Dekker:

(10) **The soccer game**. Suppose you are attending a soccer game. All of the 22 players are in your perceptual field. You know their names, say a, b, c,.... but you don't recognize any of them.

a. Anyone might be anyone.

The sentence in (10a) can be uttered in this situation. By appealing to distinct conceptual covers in CC, the proposal sketched so far could capture the correct interpretation:

(11) $[\![\text{Anyone might be anyone}]\!]^{w_@, g, CC} = 1$ iff
$\exists c_1 \in CC.\ \exists c_2 \in CC.\ \forall x \in c_1.\ \forall y \in c_2.\ \exists w' \in Acc_{w_@}.\ x(w') = y(w')$, where
$c_1$ is assigned:
$\{\lambda w.$ the player to my right in w, $\lambda w.$ the player to my left in w, ...$\}$
and $c_2$ is assigned:
$\{\lambda w.$ the player called a in w, $\lambda w.$ the player called b in w, ...$\}$

The interpretation of (11) highlights the fact that CC may include more than one cover.

## 3 *Everyone* and *might*

Let us return to our original example. For ease of presentation, I will begin with a simpler variant of von Fintel and Iatridou's target sentence set against the same background:

(12) We are standing in front of an undergraduate residence at the Institute. Some lights are on and some are off. We don't know where particular students live but we know that they are all conscientious and turn their lights off when they leave. (...)

a. Everyone may have left.

Taking covers into account, we can offer a new perspective regarding von Fintel and Iatridou's original example. In this scenario, we are outside the building looking at the lights in the windows. There is a very salient cover for the domain (call it $c_4$) that associates individuals with their locations (i.e. the person in this room, the person in that room...). Under this cover, the prediction is that the quantifier wide scope reading of (12a) will be false:

(13) $[\![\text{Everyone may have left}]\!]^{w_@, g, \{c_4\}} = 1$ iff
$\forall x \in c_4.\ \exists w' \in Acc_{w_@}.\ x(w')$ has left in w',
where $c_4 = \{\lambda w.$ the person at the bottom-left window in w,
$\lambda w.$ the person at the first-floor-left window in w, ...$\}$

Given that it is incompatible with what we know that e.g. the student in the bottom-left window has left (the light is on), the universal claim will be false in relation to $c_4$. This seems to matter in the evaluation of (12a). Even though CC may contain a cover under which the sentence is true (e.g. a rigid cover corresponding to the students' names), the light in the bottom left window proves fatal. We can explain our intuitions about the falsehood of (12a) with the hypothesis that universal *every* places a stronger condition than *any*: it is not sufficient that the universal claim be true under *some* way of epistemically accessing the domain, it must be true under *all* ways of epistemically accessing the domain. The availability of a cover in CC falsifying the universal claim will result in the sentence being false. The proposed quantifier wide scope truth conditions for (12a) are provided below:[6]

6 Aloni 2001: p. 142 suggested that in the absence of a salient cover, a quantificational claim would still be true iff it was true under <u>all</u> covers. This is a way of proposing that, in the limit case, a quantificational claim can still be true as long as the cover does not matter. I do

(14) $[\![\text{Everyone may have left}]\!]^{w_@,g,CC} = 1$ iff
$\forall c \in CC.\ \forall x \in c.\ \exists w' \in Acc_{w_@}.\ x(w')$ has left in w'.

Given that CC includes a cover under which the universal claim is false ($c_4$ as described above), the prediction is that (14) will be false, matching speakers' intuitions. Aloni's original characterization of *any*, on the other hand, would predict that in the same context, (15) could be true:

(15) $[\![\text{Anyone may have left}]\!]^{w_@,g,CC} = 1$ iff
$\exists c \in CC.\ \forall x \in c.\ \exists w' \in Acc_{w_@}.\ x(w')$ has left in w'.

The sentence in (15) would be true, for example, if CC included a cover identifying students by their names.[7]

The proposal that the interpretation of *every* requires truth for all members of the domain no matter how they are epistemically accessed helps us make sense of intuitions in von Fintel and Iatridou's scenario, in which there is arguably a salient falsifying cover. It can also help us make sense of the scope puzzle for *every* more generally. Let us grant that in out-of-the-blue cases, there isn't a specific access to domains of quantification (i.e. domains are not 'epistemically individuated'). I will model lack of a specified epistemic access (a kind of 'ignorance') with the idea that CC includes <u>all</u> covers for the domain. Consider the example in (16) (a variant of one of von Fintel and Iatridou's examples):

(16) Everyone might be infected.

Out of the blue, the most natural interpretation for (16) requires that it be epistemically possible for everyone to be infected (note the oddness of a continuation like *"....# but not everyone is"*). Given my proposal for *every*, (16) will only be true if universal quantification over concepts is true under all covers:

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not follow Aloni in this respect, but the proposal I am making for *every*, in a sense, lexicalizes the conditions that Aloni proposed for *any* in the limit case. (See also Schwager 2007: p. 257 for the view that in the absence of a salient cover, a Principle of Cooperative Identification delivers results that amount to adopting supervaluations over ways of describing the domain.)

7 I am grateful to a reviewer for reporting the intuition that the sentence *Almost everyone may have left* can indeed be interpreted with a wide-scope reading for the quantifier (e.g. in a situation in which it was known that at least half of the individuals were asleep). Addressing *almost* in such examples, however, would require an investigation of the modal dimension of *almost* (e.g. Morzycki 2001) in relation to epistemic *may*, which lies outside the scope of my current work.

(17) $[\![\text{Everyone might be infected}]\!]^{w_@,g,CC} = 1$ iff
$\forall c \in CC.\ \forall x \in c.\ \exists w' \in Acc_{w_@}.\ x(w')$ is infected in w'.

The fact that all covers count matters for our intuitions about scope: if truth requires truth under all covers, a wide-scope reading for *everyone* will only be true in epistemic states in which the narrow-scope reading is also true. The result will be the scope-illusion that only the narrow scope reading is available for the quantifier.

I present an informal discussion of this point by considering a variety of epistemic states and covers, where the domain of individuals D consists of three people {$a$, $b$, $c$} and there are three epistemically accessible worlds ($Acc_{w_@}$), the actual world and two more: {$w_@$, $w_1$, $w_2$}. To start with, consider the cover $c_5$ = {λw. the person on the right in w, λw. the person on the left in w, λw. the person in the middle in w} and suppose we are knowledgeable about who is in each position (I will refer to this as a situation of transparent epistemic access to the domain). Each concept in $c_5$ will be a constant function and the result will be a 'rigid' cover:

(18) $$c_5 = \left\{ \begin{bmatrix} w_@ & \rightarrow & a \\ w_1 & \rightarrow & a \\ w_2 & \rightarrow & a \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & b \\ w_1 & \rightarrow & b \\ w_2 & \rightarrow & b \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & c \\ w_1 & \rightarrow & c \\ w_2 & \rightarrow & c \end{bmatrix} \right\}$$

Imagine also an epistemic state ($E_1$) such that $a$ is infected in $w_@$, $b$ is infected in $w_1$ and $c$ is infected in $w_2$ (and nobody else is infected). For every individual in D there is a world in $Acc_{w_@}$ in which that individual is infected, but it is not compatible with what we know that more than one individual is infected. What would happen with the *everyone* wide-scope reading of (19) under this particular cover?

(19) $[\![\text{Everyone might be infected}]\!]^{w_@,g,\{c_5\}} = 1$ iff
$\forall x \in c_5.\ \exists w' \in Acc_{w_@}.\ x(w')$ is infected in w'.

The prediction is that (19) would be true under $c_5$ in $E_1$. For each x member of $c_5$ there is an epistemically accessible world w such that x(w) is infected in w (the ordered pairs that 'lead to truth' will be <$w_@$, $a$>, <$w_1$, $b$> and <$w_2$, $c$>). The same would be the case if we quantified under $c_6$, an 'ignorant' cover:

(20) $$c_6 = \left\{ \begin{bmatrix} w_@ & \rightarrow & a \\ w_1 & \rightarrow & c \\ w_2 & \rightarrow & b \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & c \\ w_1 & \rightarrow & b \\ w_2 & \rightarrow & a \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & b \\ w_1 & \rightarrow & a \\ w_2 & \rightarrow & c \end{bmatrix} \right\}$$

However, given (17), the sentence will only be true if it is true under <u>all</u> covers. In a state like $E_1$, in which at most one individual is infected in each accessible world, the sentence cannot be true under all covers. If at most one individual is infected in each possible world, there will be some cover in CC with a concept consisting of all the ordered pairs <w(orld), i(ndividual)> that lead to truth, for example, $c_7$:

(21) $$c_7 = \left\{ \begin{bmatrix} w_@ & \rightarrow & a \\ w_1 & \rightarrow & b \\ w_2 & \rightarrow & c \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & b \\ w_1 & \rightarrow & c \\ w_2 & \rightarrow & a \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & c \\ w_1 & \rightarrow & a \\ w_2 & \rightarrow & b \end{bmatrix} \right\}$$

The sentence in (16) cannot be true under $c_7$. All the ordered pairs that lead to truth are in one concept, and since the members of concepts cannot overlap, two of the concepts in $c_7$ will falsify the universal claim in (16) (the concepts aligned second and third in (21)). Of course, if we were in an epistemic state in which there was an accessible world in which *a*, *b*, and *c* were all infected (e.g. $\{$x: x is infected in $w_1\} = \{a, b, c\}$) that would be enough to guarantee the truth of (16) under all covers, i.e. of (17) (since no concept can have more than one output for any input possible world, the ordered pairs leading to truth in that world, i.e. $w_1$, would have to be evenly distributed amongst the various concepts in the cover). But such an epistemic state would also validate the narrow-scope reading for *everyone* in relation to *might*. Is it unavoidable that we end up in an epistemic state that includes a world where all the individuals are infected if (16) is to be true under all covers? The answer is yes. What is the greatest number of individuals that could be infected in an epistemically accessible world before we end up in an epistemic state in which there is a world where all three individuals are infected? Two per world. Imagine one such epistemic state and call it $E_2$. Given $E_2$, there will be a total of six ordered pairs <w, i> that lead to truth (where i is infected in w). But, whatever $E_2$ looks like, it will be possible to construct a cover where those six pairs are grouped in two concepts, leaving a third concept with no ordered pair that leads to truth, thus falsifying the universal claim in (16). An epistemic state in which each accessible world has at most two infected individuals cannot guarantee the truth of (16) under all covers. Only an epistemic state with an accessible world where all individuals are infected can do that, giving rise to the illusion that we are actually dealing with a narrow scope interpretation of *everyone* (a confounded wide-scope reading).[8,9]

Let us turn back to von Fintel and Iatridou's original examples. What would be the effect of an overt restriction?

(22) Every patient might be infected.

We can understand *patient* in (22) as providing a restriction as follows:

(23) $[\![\text{Every patient might be infected}]\!]^{w_@,g,CC} = 1$ iff
$\forall c \in CC.\ \forall x \in c$: $x(w_@)$ is a patient in $w_@$. $\exists w' \in Acc_{w_@}$. $x(w')$ is infected in w'.

Would the truth conditions in (23) give rise to a scope illusion? The answer is yes. Imagine, as before, $D = \{a, b, c\}$ and $Acc_{w_@} = \{w_@, w_1, w_2\}$. But suppose that only *a* and *b* are patients in $w_@$. Even though any cover based on (W, D) will have three concepts as members, only the two concepts that deliver patients in the evaluation world will be relevant for (23): the ones containing $<w_@, a>$ and $<w_@, b>$. Imagine again an epistemic state in which at most two individuals are infected in each accessible possible world, but in none of them is it the case that both *a* and *b* are infected. Could (23) be true in such a state under all covers? No. If at most two individuals are infected in each possible world, there will be at most a total of six ordered pairs leading to truth. There will be a cover that groups those six pairs into two concepts, meaning that there will be a (third) concept in the cover that falsifies the modal claim in (23). This will be the concept whose members are three $<w, i>$ pairs such that i is not infected in w. Since there isn't a world where both *a* and *b* are infected, one of those ordered pairs will be $<w_@, a>$ or $<w_@, b>$.

8 One might wonder whether an epistemic state just like $E_2$ but with an additional world $w_3$ where, let's say, a is infected, would not be sufficient to make (19) true under all covers. After all, this would give us an additional ordered pair leading to truth ($<w_3, a>$), which could then be a member of the third concept in the cover described above. However, adding ordered pairs leading to truth in this way will not provide a general solution, since it will now be possible to construct a cover where $<w_3, a>$ is a member of the one of the concepts that have the other ordered pairs leading to truth, and there would still be a third concept that would falsify the universal claim.

9 Discussion of potential confounds in scope relations between quantifiers and modals can also be found in Aloni 2001, especially in Chapter 3 dealing with quantifiers in dynamic semantics, e.g. Aloni 2001: p. 104. Aloni's discussion, however, was framed as a problem for identifying the correct characterization of variables in a dynamic framework in order to avoid problematic entailments, and the proposal did not address the actual behaviour of *every* in relation to modals. My own discussion is not concerned with dynamic frameworks.

But that will make the third concept one of the concepts that actually matters for the evaluation of (23) (since it satisfies the restriction). The prediction (given the existence of this cover) is that if *a* and *b* fail to be both infected in some accessible possible world, the universal claim in (23) cannot be true under all covers. The conditions that allow (23) to be true under all covers will give rise to the scope illusion that we are already familiar with.[10]

As noted by von Fintel and Iatridou, there is a contrast between the scope readings available to epistemic vs. deontic modals. As we saw in (3), it can be quite straightforward to obtain a (transparent) wide scope reading for a quantifier interacting with a deontic modal. Here are some additional examples:

(24) a. Every student in our department may park in this spot (the university parking regulations allow all university members to park here).

b. Every member of this conclave may be elected Pope (they are all over 80).

c. Every player may take over from the goal keeper (but only one at a time).

In the case of deontic modals, interaction with *every* does not lead to scope illusions and we access a transparent *every*-wide-scope interpretation without problems. Why? One possibility could be that in the context of deontic modals, quantification is not made under covers at all. It may be that in these cases we access individuals directly, and so no scope illusions arise. It is worth noting that the intuitions for the deontic version of the Aloni example in (7) discussed above do not provide as clear support for covers as the epistemic version:

(25) **The butler 2**. Suppose a butler and a gardener are sitting in a room. One is called Alfred and the other Bill. We don't know who is who. In addition, suppose that household employees are in general allowed to

10 While this paper targets the contrast between *every* and *any*, constraints on epistemic access could have an impact on other cases, such as numerals. We could aim to develop an account of scope illusions for sentences like *#Two friends of John's may have visited him last weekend, but they cannot both have done so* (after von Fintel & Iatridou 2003) by characterizing the numeral as an existential quantifier restricted to two cases which requires truth under all covers. If so, as in the case of *every*, only epistemic states that verify the quantifier narrow scope reading will also allow for the truth of the quantifier wide scope reading, generating the familiar scope illusion. Exploring the feasibility of fully generalizing the proposal to all quantificational expressions, however, remains for future work.

park in the spot close to the tennis courts, but Alfred has exceptionally had his right revoked due to impolite behaviour. Consider now:

a. Everyone (in this room) may park in the spot by the tennis courts.

If I knew that one of the people in the room was Alfred and of his special circumstances, I would obviously not assert (25a). What if I didn't know? What if all I knew was that one was the butler and the other the gardener? I might utter (25a) in such a context. But I would have said something false. The truth of the deontic claim does not depend on my epistemic access to the domain, though my willingness to make deontic claims might. Given a contextually supplied measure of what counts as good/better, there is a fact of the matter regarding what is allowed/best, independently of the epistemic access I may have to the domain of quantification.

Instead of advocating for the view that covers 'disappear' in the context of deontic modals, I would like to defend the more conservative view that they can become inert. I will claim that deontic modals allow for an interpretation in which the truth of the quantificational claim depends on the actual properties of the members of the domain of quantification, independently of the epistemic access to the domain that is available to the speaker. This is a way of cashing out the view that deontic modals allow for an interpretation that is 'objective' and independent of the speaker's epistemic state.[11] This interpretation arises when the deontic modal does not bind the world argument associated with the variable in its scope, allowing it to be set to the evaluation world. If the modal does not bind the world argument of the variable, covers will have no impact in the interpretation, generating an 'objective' deontic reading that allows the quantifier to transparently take wide scope over the modal (and falling in line with Aloni's observation that covers only matter in the presence of operators that manipulate them). The case of epistemic modals is different, I claim, in that they obligatorily bind the world argument of the variable in their scope, giving rise to the scope confound under discussion. I illustrate the difference between the two cases with an example below, where the BEST-worlds are the worlds quantified over by the deontic modal (given the relevant measure of goodness) and the EPIS-worlds are the worlds quantified over by the epistemic modal:

11 The relation between a speaker's epistemic state and their obligations is notoriously complex but a full discussion remains for future research.

(26) $[\![\text{Every student may remain at home}]\!]^{w_@,g,CC} = 1$ iff

a. Epistemic reading:
$\forall c \in CC.\ \forall x \in c$: $x(w_@)$ is a student in $w_@$. $\exists w \in \text{EPIST-Acc}_{w_@}$. $x(w)$ remains at home in w.

b. Deontic reading:
$\forall c \in CC.\ \forall x \in c$: $x(w_@)$ is a student in $w_@$. $\exists w \in \text{BEST-Acc}_{w_@}$. $x(w_@)$ remains at home in w.

Let us grant that the sentence in (26) has two universal wide-scope readings: an epistemic one (26a) targeting students' current whereabouts and a deontic one (26b) targetting students' permitted whereabouts. Suppose that {x: x is a student in $w_@$} = {$a$, $b$} and EPIST-Acc$_{w_@}$ = {$w_@$, $w_1$,$w_2$} are as follows:

(27) a. {x: x remains at home in $w_@$} = {$a$}
b. {x: x remains at home in $w_1$} = {$b, c$}
c. {x: x remains at home in $w_2$} = {$a, c$}

As we have seen before, (26a) would not be true under all covers given this scenario. The following cover, for example, would falsify it:

(28) $$c_{10} = \left\{ \begin{bmatrix} w_@ & \rightarrow & a \\ w_1 & \rightarrow & b \\ w_2 & \rightarrow & c \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & c \\ w_1 & \rightarrow & c \\ w_2 & \rightarrow & a \end{bmatrix}, \begin{bmatrix} w_@ & \rightarrow & b \\ w_1 & \rightarrow & a \\ w_2 & \rightarrow & b \end{bmatrix} \right\}$$

Only the first and third concept in (28) are relevant to the evaluation of (26a) (only they satisfy the restriction). But the third concept falsifies the modal claim: no member of that concept leads to truth in any of the (epistemically) accessible worlds. So, given EPIST-Acc$_{w_@}$ as in (27), (26a) would be false (there is a cover that falsifies the universal claim). Let us now consider (26b), with the assumption that the deontically-accessible (BEST-Acc$_{w_@}$) worlds are $w_3$, $w_4$ and $w_5$ as in (29):[12]

(29) a. {x: x remains at home in $w_3$} = {$a$}
b. {x: x remains at home in $w_4$} = {$b, c$}
c. {x: x remains at home in $w_5$} = {$a, c$}

12 Note that in this toy example, the BEST-worlds and the EPIS-worlds are totally disjoint. This is not, however, crucial to the point being made. What matters is the world argument associated with the variable in the scope of the modal.

According to (26b), the modal does not bind the world variable associated with wide-scope *every student*. Within the scope of the deontic modal, individuals are identified on the basis of the evaluation world $w_@$. Consider again $c_{10}$. As before, only the first and third concept in (28) will be relevant in the evaluation of the quantifier. But now the modal claim will be true iff there is a BEST-accessible world where the relevant values in $w_@$ remain at home. And this is true in the scenario described (29): there is a BEST-accessible world where *a* remains at home (e.g. $w_5$) and there is a BEST-accessible world where *b* remains at home ($w_4$). What we observe is that in the deontic case, contrary to what happens in the epistemic case, the modal quantifier *may* does not affect the coordinates for evaluating the concept in its scope. Only the evaluation world matters for that. The result is that as long as there is some BEST-world where the relevant individuals (students) remain at home, the modal claim will be true regardless of the overall distribution of the concepts. When the modal does not bind the world argument of the cover in its scope, a sentence like (26b) will be true, no matter the cover, as long as for each individual in the (restricted) domain there is some accessible world where the individual satisfies the predicate in question. In these kinds of cases, the truth of the wide-scope reading of *every* under all covers does not give rise to scope illusions.The result is a transparent *every*-wide scope reading.[13]

In his discussion of the ECP, Tancredi (2008) noted that the addition of *objectively, apparently, allegedly* and *reportedly* appears to facilitate a wide-scope reading for *every*. Here is Tancredi's example with *objectively*, which does not lead to infelicity (though the narrow scope reading of *every student* presumably would):

(30) Objectively speaking, every student may be Jones. (Tancredi 2008: p. 6)

Tancredi's discussion of this class of examples focuses on *objectively*, with the observation that it forces a metaphysical interpretation of *may* (which is how Tancredi characterizes a type of modality sometimes dubbed in the literature 'objective epistemic'). One possible way of understanding this case (as

13 In the current proposal, the fact that the epistemic modal obligatorily binds the world associated with the variable in its scope is stipulated. There is something intuitive about the view that an epistemic modal will bind the world argument associated with the covers that provide epistemic access to the domain of quantification. It would be desirable to derive this independently.

well as the other adverbs mentioned above) is to think that *objectively* forces the modal to receive an interpretation that is not really epistemic (this is also Tancredi's conclusion, which as he notes places such examples outside the scope of von Fintel and Iatridou's ECP). If so, we could explain cases like these in a manner similar to what we have proposed for deontic cases like (26b): the modal does not bind the world argument associated with the variable in its scope, which is set to the evaluation world. It then follows that the sentence can be true with a wide-scope reading for *every* under all covers without generating scope illusions. That is the reason why we have the intuition that a wide-scope reading is available in (30), but not in epistemic modal cases like (26a). The correct characterization is not that *objectively*-cases allow for a wide-scope reading of *every* while epistemic modal cases don't. They can both be true in an *every*-wide scope reading. But while *objectively*-cases can be true in a wide-scope reading out of the blue without giving rise to scope illusions, epistemic modal cases cannot.

As noted earlier, the literature reports some variation in the availability of wide scope readings for quantifiers interacting with epistemic modals. Jeong (2017), for example, presents experimental results indicating that *which*-questions as QUDs facilitate transparent wide-scope readings (she describes these as cases that allow von Fintel and Iatridou's ECP to be violated). In terms of our examples:

(31) a. A: Which patients were infected?
     b. B: Every patient might have been infected.

Jeong reports a contrast between examples like (31) and examples with *how*-questions as QUDs, which do not seem to facilitate transparent wide-scope readings. Why would the difference in QUD matter? In her analysis of *which*-questions, Aloni (2001) proposed that they are interpreted in relation to a particular salient cover. We could make sense of the fact that *which*-questions like (31a) facilitate transparent wide scope readings for *every* in (31b) if we understand that (31b) inherits the cover from (31a), narrowing CC to a single/specific cover. In these circumstances, even though *every* triggers universal quantification over members of CC, no scope illusions will arise.

I will not be able to do justice to the complex problem of explaining when/how the CC set of covers is narrowed down, but I would like to suggest that a context in which a particular epistemic access to the domain of quantification has been presupposed facilitates transparent wide scope readings for quantifiers. In addition to the effects noted above with *which*-questions, we also find greater availability of transparent quantifier wide scope readings in the presence of partitive constructions (observed by Tancredi 2008). Here is von Fintel and Iatridou's original example, and a version with a partitive:[14]

(32) Half of you are healthy. #But everyone may be infected.

(33) Half of you are healthy. But everyone of you may be infected.

We can explain the infelicity of the original example in (32) by noting that the universal claim would have to be true under all covers. This would require that there be an epistemically accessible world where everyone is infected, which would be incompatible with the assertion of the first sentence (assuming that it conveys that there isn't an epistemically accessible world where all the individuals are infected). What about the felicitous partitive version in (33)? Why would this sentence more easily allow for a transparent wide scope reading for the universal? Here I can only speculate that the partitive construction identifies a particular cover for the universal claim. Under standard views, partitives identify a domain of quantification on the basis of parts of a plural definite ( see e.g. Ladusaw 1982, Barker 1998, Schwarzschild 2002; it should be noted that there has been much debate as to the exact nature of restrictions on partitives and the nature of parts). In an example like (33), *everyone* would quantify over the (atomic) parts of the plurality corresponding to *you*, with *of* responsible for accessing the parts of the plurality. It has been argued by Schwarzschild (1996) that the semantics of plurals presupposes a contextually salient cover over the plural entity, and Ionin, Matushanksy & Ruys (2006) have proposed a semantics for partitives in which such covers are responsible for identifying the parts distributed over. The speculation would be that the interpretation of a partitive construction presupposes a cover corresponding to the parts of the plurality. This would have a similar effect to that of *which*-questions noted earlier: the CC set would be restricted to the presupposed cover and the interaction of *every* with an epistemic modal would not give rise to scope illusions.[15]

Distributivity comes up again if we consider the case of *each*. Tancredi (2008) noted that quantifiers with a strong distributive component, like *each*,

14 I am grateful to Christopher Tancredi for pointing out this contrast.

15 In order to relate the discussion of Schwarzschild-type covers to Aloni's views it would be necessary to adopt an intensional version of Schwarzschild's covers, a mapping from the set of epistemically possible worlds to parts/subsets of the plurality. There is clearly more work needed for a satisfactory integration of the use of covers to account for epistemic uncertainty and the use of covers in the semantics of plurals, but this is beyond the scope of what I can do here.

seem better able than *every* to give rise to transparent wide scope readings, as evidenced by his examples below:

(34) Each student may be Jones.

(35) #Every student may be Jones.

Tunstall (1998) offers an analysis of *each* vs. *every*, noting that *each*, contrary to *every*, leads to complete distributivity. She associates this with a *Differentiation Condition*:

(36) The Differentiation Condition
A sentence containing a quantified phrase headed by *each* can only be true of event structures which are totally distributive. Each individual object in the restrictor set of the quantified phrase must be associated with its own subevent, in which the predicate applies to that object, and which can be differentiated in some way from the other subevents. (Tunstall 1998: p. 100)

The Differentiation Condition requires that there be a way of differentiating amongst the members of the domain of quantification in order for *each* to be felicitous. According to Tunstall, differentiation can take place along different dimensions and is subject to pragmatic constraints. In choosing *each*, a speaker signals the relevance of differentiation and indicates that the individual objects are "of interest" (Tunstall 1998: p. 102). In this view, the use of *each* presupposes finding a relevant way to differentiate the objects in the domain, which can be linked to the claim that a particular epistemic access to the domain must have been established. In such a context, we expect scope illusions to be absent and transparent wide scope readings more easily available.

The speculative remarks above strengthen the link between the availability of a transparent quantifier wide scope reading and a presupposed epistemic access to the domain of quantification. One question that remains open is to what extent domains of quantification that come with highly conventionalized individuation conditions also facilitate transparent wide scope readings for quantifiers. Swanson (2010) offers the following example of a quantifier scoping over an epistemic modal:[16]

16 Swanson (2010) presents (37) for reasons independent of our discussion here. By making the point that the quantifier is interpreted as taking scope over epistemic *could*, Swanson wishes to argue against views that would treat epistemic modals as 'force modifiers' in-

(37) Every moment you spend with your child could be the one that really matters.

In this example, it seems unproblematic for *every* to transparently scope over epistemic *could*. One could imagine that in this case there is a salient epistemic access to the domains of times (minutes, hours) that can function as a natural cover, bypassing the circumstances that give rise to scope illusions. The sentence in (37) will be true as long as for each of those moments that are also moments you spend with your child there is an epistemically accessible world in which it is the moment that really matters.

## 4 *Anyone* and *might*

As already noted in Section 1, Aloni's discussion of the interaction between universal quantifiers and epistemic modals centers on natural language examples with *any, anyone*, as opposed to *every*. It can be quite straightforward to obtain a 'universal wide-scope' effect in such cases. We have already seen some examples, which I repeat below:

(38) a. Anyone might be the culprit.
b. Any student might have left.

*Any* and *every* are explicitly differentiated by von Fintel & Iatridou (2003). They claim that *any* gives rise to a universal quantifier effect without actually having the semantics of a universal quantifier, and thus lies outside the scope of the ECP. In this section, I will explore some current views on the universal flavor of indefinite *any*, incorporating Aloni's insights regarding epistemic access to domains. The question to be addressed is why it is so much simpler to derive transparently wide-scope interpretations with *any* than with *every*.

The universal flavor of *any* has been described in the literature (e.g. Dayal 1998, 2004), with a variety of views as to its semantic characterization. Much has been written about *any* in recent literature and I will not attempt a fully-developed account in what follows. I will simply build on an early proposal by Chierchia (2006) in order to explore the effects of incorporating covers on the interpretation of *any*. Building on insights in Kratzer & Shimoyama 2002, Chierchia 2006 proposes to derive the universal effect of

capable of interacting compositionally with the content of a sentence. One could wonder whether *might/may* and *could* are 'equally' epistemic, but I leave this for future consideration.

*any* as an anti-exhaustivity implicature arising from its characterization as a *domain widener*. What follows is a sketch, developed within a Hamblin-semantics along the lines in Kratzer & Shimoyama 2002, Alonso-Ovalle 2006, Menéndez-Benito 2010. We will start with a brief reminder of the Kratzer and Shimoyama anti-exhaustivity proposal and move on to covers later on. Here is the *any*-version of (19):

(39) Anyone might be infected.

Let us assume the domain of individuals D = $\{a, b, c\}$, with $\mathrm{Acc}_{w_@}$ the set of worlds epistemically accessible to the evaluation world $w_@$. In a Kratzer and Shimoyama-style Hamblin-semantics, the domain-widening indefinite *anyone* will pick out $\{a, b, c\}$ and (39) will be true in $w_@$ roughly in the conditions as follows:[17]

(40) $\exists w \in \mathrm{Acc}_{w_@}.\ a$ is infected in w $\vee$ $b$ is infected in w $\vee$ $c$ is infected in w

Following Chierchia 2006 and Kratzer & Shimoyama 2002, the choice of the *any* widening indefinite is claimed to give rise to a distributivity implicature (free-choice in the epistemic domain):

(41) $\exists w \in \mathrm{Acc}_{w_@}.\ a$ is infected in w $\wedge$
$\exists w \in \mathrm{Acc}_{w_@}.\ b$ is infected in w $\wedge$
$\exists w \in \mathrm{Acc}_{w_@}.\ c$ is infected in w

The implicature is argued to arise through Gricean reasoning about the justification for widening. Given that the speaker had the choice to use a regular non-widening indefinite, the choice of the widening indefinite is justified on the basis of the intention of avoiding (false) exhaustivity inferences. So all disjunctive alternatives are epistemically possible.

What would a Kratzer and Shimoyama-style account of *anyone* look like if domains of individuals are accessed through conceptual covers? In the original proposal, the indefinite introduces a set of individuals and existential force is recovered via disjunction in the truth-conditions. In an account incorporating covers, that set would be mediated by a cover. Instead of introducing a set of individuals, the indefinite would quantify existentially over a conceptual cover over the set. Consider again the scenario corresponding to $E_1$: the domain of individuals (D) consists of three people ($\{a, b, c\}$), there are

17 Readers are referred to Kratzer & Shimoyama 2002, etc. for details about composition.

three epistemically accessible worlds ($\text{Acc}_{w_@} = \{w_@, w_1, w_2\}$),[18] and we do not know who is actually infected ($\{x: x \text{ is infected in } w_@\} = \{a\}$, $\{x: x \text{ is infected in } w_1\} = \{b\}$, $\{x: x \text{ is infected in } w_2\} = \{c\}$). Suppose for the moment that we interpret the indefinite under a rigid cover ($c_5$). Following the reasoning spelled out in Kratzer & Shimoyama 2002, the truth-conditions and implicatures are as follows (with the members of $c_5$ standing in for individuals):

(42) a. Truth-conditions:

$[\![\text{Anyone might be infected}]\!]^{w_@, g, \{c_5\}} = 1$ iff

$$\exists w \in \text{Acc}_{w_@}.\begin{bmatrix} w_@ & \to & a \\ w_1 & \to & a \\ w_2 & \to & a \end{bmatrix}(w) \text{ is infected in } w$$
$$\vee \begin{bmatrix} w_@ & \to & b \\ w_1 & \to & b \\ w_2 & \to & b \end{bmatrix}(w) \text{ is infected in } w$$
$$\vee \begin{bmatrix} w_@ & \to & c \\ w_1 & \to & c \\ w_2 & \to & c \end{bmatrix}(w) \text{ is infected in } w$$

b. Implicatures

- $\exists w \in \text{Acc}_{w_@}.\begin{bmatrix} w_@ & \to & a \\ w_1 & \to & a \\ w_2 & \to & a \end{bmatrix}(w) \text{ is infected in } w$
- $\exists w \in \text{Acc}_{w_@}.\begin{bmatrix} w_@ & \to & b \\ w_1 & \to & b \\ w_2 & \to & b \end{bmatrix}(w) \text{ is infected in } w$
- $\exists w \in \text{Acc}_{w_@}.\begin{bmatrix} w_@ & \to & c \\ w_1 & \to & c \\ w_2 & \to & c \end{bmatrix}(w) \text{ is infected in } w$

In the scenario described, the truth-conditions are satisfied and the implicatures are true, reproducing Kratzer and Shimoyama's reasoning with a (trivial) implementation of covers. If there was someone in the domain that we knew was not infected (e.g. there was no $w \in \text{Acc}_{w_@}$ such that $c$ was infected in w), then the truth-conditions would be satisfied but the distributive implicatures would not be. In accordance with Kratzer and Shimoyama's reasoning, we would not expect *anyone* to be used in such a case.

18 There could of course be more epistemically accessible worlds, including worlds where no one is infected.

The discussion above illustrated the interpretation of *any* with respect to a specific cover. What happens in the general case in relation to CC? I will follow Aloni in the view that the truth of *any* depends on existential quantification over members of CC. Contrary to the proposal for universal *every*, indefinite *any* only requires that there be some verifying cover in CC. While the indefinite only places an existential condition on verifying covers, a universal quantification effect over individuals is obtained via implicatures as proposed by Kratzer and Shimoyama. The truth conditions for (39) are provided in (43a), with the corresponding implicatures in (43b):

(43) a. Truth-conditions:
$[\![\text{Anyone might be infected}]\!]^{w_@,g,CC} = 1$ iff
$\exists c \in CC$ s.t. for $x_1, \ldots, x_n \in c$: $\exists w \in Acc_{w_@}.\ x_1(w)$ is infected in w $\vee \ldots . \vee x_n(w)$ is infected in w

b. Implicatures:
- $\exists w \in Acc_{w_@}.\ x_1(w)$ is infected in w
- ....
- $\exists w \in Acc_{w_@}.\ x_n(w)$ is infected in w

Taking into account the anti-exhaustivity implicatures, a sentence like (39) will be true only if there exists a cover c in CC such that for every concept member of c, there is an epistemically accessible world where the relevant individual is infected. So, even though *any* quantifies existentially over members of CC and introduces a disjunctive claim over the domain, the pragmatic effect is that of a wide-scope universal quantifier. However, contrary to what we saw for *every*, *any* does not require that we take into account all ways of epistemically accessing the domain (i.e. we do not quantify over all covers). The *any* sentence will be true as long as there is some cover in CC leading to truth. The covers responsible for scope illusions are not forced upon us, and as a result a universal wide scope "effect" is easily available.

## 5 Conclusion

The scope puzzle noted by von Fintel & Iatridou (2003) has presented us with an opportunity to explore the impact of epistemic access to domains of quantification. Our guiding hypothesis has been that constraints on epistemic access to domains are relevant to our intuitions about quantifier scope in the environment of epistemic modals. The proposal I have made for *everyone* is, in a sense, doubly-universal: it quantifies over all individuals from all epistemic perspectives/ under all covers. The result is a scope illusion: *everyone* scoping over *might* will only be true in epistemic states that also verify *might* scoping over *everyone*, accounting for von Fintel and Iatridou's observations. The case of indefinite *anyone* is different. It only requires truth under some type of epistemic access, with universal quantification effects ('epistemic free choice') derived as implicatures. The result is that *anyone* gives rise to the effect of a universal scoping over *might* without generating scope illusions.

In the literature following von Fintel & Iatridou 2003, novel and challenging examples have been noted in which *everyone* does appear to scope over *might*. I have suggested that the key difference is that in those examples it is presupposed that a particular epistemic access to the domain of quantification has been established. In that case, universal quantification over covers will not actually require that all types of epistemic access be taken into account, eliminating the conditions that give rise to scope illusions.

Aloni's original proposal was presented as a response to Quine's observation that epistemic attitudes such as belief are sensitive to the way in which objects are *specified*. This paper aims to make the case that sensitivity to the way in which objects are specified lies at the heart of von Fintel and Iatridou's scope puzzle too. The result is a home for the scope puzzle under the broader umbrella of problems that arise from the interaction between epistemic access to individuals and epistemic operators.

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