

**EXISTENCE REQUIREMENT,  
WORLD-INDEXED PROPERTIES,  
AND CONTINGENT APRIORI\***

***REQUISTO DE EXISTÊNCIA,  
PROPRIEDADES INDEXADAS PELO  
MUNDO E CONTINENGENTE A PRIORI***

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**RESUMO** *Este artigo é dedicado ao argumento contra o Requisito de Existência fornecido por Takashi Yagisawa. Argumentamos que o cerne do argumento de Yagisawa – a Forte Iterabilidade – não pode ser inferido pela ideia de contingente a priori (Kripke) e é incompatível com a ideia de @-transformação (Plantinga). Assim, essas ideias, contrariamente a Yagisawa, não podem servir de base metodológica da Forte Iterabilidade. Também argumentamos que a Forte Iterabilidade é incompatível com o Princípio Constitutivo. Finalmente, mostramos que o conceito de propriedades indexadas pelo mundo (o argumento de Yagisawa se fia na ideia de propriedades indexadas pelo mundo) é inconsistente e, mesmo que o defensor da Forte Iterabilidade possa resistir a esta objeção, a Forte Iterabilidade deve ser abandonada.*

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**Palavras-chave:** *Requisito de existência. Propriedades indexadas pelo mundo. Contingente a priori. Necessidade. @-transformação.*

**ABSTRACT** *The article is dedicated to the argument against the Existence Requirement provided by Takashi Yagisawa. We argue that the core of Yagisawa's argument – the Strong Iterability – cannot be inferred from the idea of contingent a priori (Kripke), and is incompatible with the idea of @-transform (Plantinga). Thus, these ideas, contrary to Yagisawa, cannot serve as a methodological basis of the Strong Iterability. We also argue that the Strong Iterability is incompatible with the Constituent Principle. Finally, we show that the concept of world-indexed properties (the argument of Yagisawa relies on the idea of world-indexed properties) is inconsistent, and even if the defender of Strong Iterability can resist this objection, the Strong Iterability must be given up.*

**Keywords:** *Existence requirement. World-indexed properties. Contingent a priori. Necessity, @-transform.*

## 1 Introduction

Consider the following sentence:

(E) For every object  $x$ , for every possible world  $w$ , for any property  $F$ ,  $x$  can have  $F$  at  $w$  only if  $x$  exists at  $w$

The sentence (E) is known in metaphysics as the *Existence Requirement*. In accordance to the *Existence Requirement*, the *existence* of a thing is a necessary condition for this thing to be ‘something’ – if  $x$  does not exist in the possible world  $w$ ,  $x$  is nothing in  $w$ .<sup>1</sup> However, Yagisawa argues that (E) is vulnerable (Yagisawa, 2005). First of all, (E) faces a problem depicted by D. Kaplan in ‘*Demonstratives*’. Let us replace  $Fx$  in (E) with  $\sim Ex$  ( $x$  does not exist); as a result, we get the following (false) instance of (E):

(EF) For every  $x$ , for every possible world  $w$ ,  $x$  does not exist at  $w$  only if  $x$  exists at  $w$

1 I use the expressions *at w* and *in w* as having the same meaning.

However, by Yagisawa's account, the argument of Kaplan is not sufficient to establish the falsity of (E), because this argument "suffers from the controversial nature of non-existence: either 'does not exist' is not a predicate hence not a legitimate substituent for 'F', or negative existential statements are ill understood to provide a secure basis for a strong argument" (Yagisawa, 2005, pp. 39-40). (EF) shows that (E) is *possibly* false, but it is not clear if a good argument against (E) can be based on negative existential statements. Hence, Yagisawa does not take a stand on Kaplan's argument. Rather, Yagisawa wants to find a less controversial premise for a good argument against (E) - he intends to show (independently from Kaplan) that the existence of  $x$  is not a necessary condition for  $x$  to be 'something' in some possible world.

The key argument of Yagisawa is as follows. Gore lost the presidential election in the year 2000. Hence, at @ (at the actual world), Gore lost, so at  $w$ , Gore has a world-indexed property of the form *at  $w$ , lost at @*. Given these conditions, the following statement is an instance of (E):

(E') For every possible world  $w$ , Gore lost at @ at  $w$  if Gore exists at  $w$

Following Yagisawa, the world-indexed iteration is *redundant* (that is, the sentence *for the possible world  $w_1$  and the possible world  $w_2$ , at  $w_2$  Gore lost at  $w_1$*  is equivalent to *Gore lost at  $w_1^2$* ; hence, following (*Redundancy*), (RE) follows from (E'):

(RE) For every possible world  $w$ , Gore lost at @ if Gore exists at  $w$

But, as Yagisawa noted, (RE) is false since there are possible worlds at which Gore does not exist. However, at every possible world  $w$ , at  $w$  Gore has a property *lost-at-@*, and so it is not necessary for Gore to exist at  $w$  in order to be a bearer of the property *lost-at-@* at  $w$ .

2 Following orthodoxy (Plantinga, 1970, pp. 490-492), the common view on world-indexed sentences is as follows. Let  $\mathcal{L}$  be our modal language allowing the world-indexed sentences.  $\mathcal{L}$  includes:

$\phi, \psi \dots$  sentence letters  
 $\&, \vee, \rightarrow, \equiv, \sim$  logical symbols  
 $w, w'$  possible world terms

Say that the sentence  $\psi$  is world-indexed if it is prefixed by the operator  $[w] - [w'] \psi$  means that  $\psi$  is the case at  $w$ . If  $\psi$  is prefixed by  $[w]$ , we have another sentence -  $\psi$  is the case at  $w$ . Now, this sentence can also be prefixed by another operator  $[w']$ , and we will have a sentence of the form  $w'w\psi$ , such that  $w\psi \equiv w'w\psi$ . That is, a possible world  $w'$  says something about at  $w - w'$  is 'an image of what is going on at  $w$ . It reflects or mirrors  $w$ . The world  $w'$  says how  $w$  is related for every sentence  $\psi$ ' (Miroiu, 1999, p. 314). Given that  $w\psi \equiv w'w\psi$ , the world-indexed iteration is redundant - 'if  $\psi$  is the case at  $w$ , then from the point of view of any other world  $w'$  it is an unalterable fact: that  $\psi$  is the case at  $w$  is bound to be the case at every world  $w'$ ' (Miroiu, 2005, p. 211).

Thus, if (RE) is false, then the *Existence Requirement* fails. Hence, if Yagisawa's argument (hereafter YA) is successful, it allows us to reject the *Existence Requirement*.

## 2 Some objections to (YA)

McCarthy and Phillips put forward the following argument against Yagisawa. Let us consider the schema  $(\forall x) \Box (Fx \rightarrow (\exists y)(x = y))$  and let *Gore lost at @* be a substituent of  $Fx$  - according to (YA), if Gore lost at @, then Gore has this property, 'lost at @', in every possible world. Hence (given that for every possible world  $w$ , at  $w$  Gore lost-at-@), it is necessarily the case that at  $w$ ,  $(\exists y)(\text{Gore} = y)$  (according to the schema). But Yagisawa also argues that there are possible worlds in which Gore does not exist, and so there are possible worlds in which Gore has the property *lost at @* and does not exist. Thus, (YA) entails that there is  $w$  (in which Gore does not exist) such that

at  $w$ , Gore lost at @  $\rightarrow$  at  $w$ ,  $\sim (\exists y)(\text{Gore} = y)$

Thus, if we follow (YA), we obtain two alternative consequences of the schema (McCarthy and Phillips, 2006, p. 42):

- (a) at  $w$ ,  $(\exists y)(\text{Gore} = y)$
- (b) at  $w$ ,  $\sim (\exists y)(\text{Gore} = y)$

So, if (a) and (b) both follow from (YA), then (YA) is unable to provide a good argument against (E). (YA) then is false, because it generates an inconsistency.

Another strong argument against (YA) can be found in (Stephanou, 2007, pp. 244-245). Schematically, this argument is as follows. Consider (Y):

(Y) For every possible world  $w$ , necessarily, if at @, Gore lost, then in  $w$ , something is identical to Gore

Assume that Gore lost at @. Hence, Gore lost at @ at every possible world. From (*Redundancy*) we have that it is necessarily the case, if Gore lost at @ at  $w$ , then Gore lost at @, and so we conclude that it is necessarily the case that if Gore lost at @ at  $w$ , then it is necessarily the case that Gore lost at @. So, we have from (Y) and the inference that Gore *necessarily* lost at @, that at @,  $\Box(\exists y)(\text{Gore} = y)$ . But this inference is unacceptable because Gore is

not a necessary being. The problem, as Stephanou thinks, is that a property of Gore *lost at @* does not entail  $(\exists y)(\text{Gore} = y)$  since  $(\text{at } @, \text{Gore lost})$  is not a substituent of F in  $(\forall x)(Fx \rightarrow Ex)$ .

It is true that  $(\text{at } @, \text{Gore lost})$ . Nevertheless, it is impossible to derive the conclusion ***if, necessarily, at @, Gore lost, then there is some x such that at @, x is Gore***, because it is necessarily true that Gore lost at @, but Gore does not exist at @ necessarily. Thus, if *at @, lost* is a predicate, then ***necessarily, x lost at @*** entails ***necessarily, there is an x such that at @, x lost***. But if this inference is true, Gore exists necessarily. However, it is not the case that Gore is a necessary being.

Finally, consider the defense of (E) presented by Caplan in (Caplan, 2007). Caplan argues that (YA) relies upon the principle of *Strong Iterability*:

(SI) For any object  $x$ , any property F, and any possible worlds  $w$  and  $v$ ,  $x$  has F in  $w$  if and only if  $x$  has F-in- $w$  in  $v$ .

The falsity of (E), as Yagisawa believes, follows directly from (SI). This can be easily seen from the following argument. Gore has F (lost in @), so Gore in  $w$  lost-in-@. Let  $w$  be the world in which Gore does not exist. It follows that Gore in  $w$  has F and does not exist. Therefore, the one who accepts that Gore has F-in-@ in every possible world must also accept (SI) to avoid (RE). In other words, we must accept the truth of the following sentence

(F) For any object  $x$ , any property F, and any possible world  $w$ , if  $x$  has F in @, then  $x$  has the property *having F in @* in  $w^3$ , and therefore  $x$  has the property *F in @ in  $w$*  (Caplan, 2007, p. 338)

However, not everyone who accepts that  $x$  has the property *having F-in-@* in  $w$  also accepts the idea that  $x$  can instantiate the property *having F-in-@* in all possible worlds (including those worlds in which  $x$  is nonexistent). Therefore, the one who accepts (F) is not necessarily inclined to accept (SI). It would be reasonable to think that an object cannot instantiate properties in the world in

3  $x$  has the property *having F in @ in  $w$*  means that  $x$ , in  $w$ , has the world-indexed-property F-in-@. Given that F is a contingent property of  $x$ ,  $x$  possibly does not have F in  $w$ . But if  $x$  has F in @, then  $x$ , in  $w$ , necessarily have F-in-@ (all world-indexed properties are necessary) or, in the language of Caplan,  $x$  (in  $w$ ) has *having F-in-@* since it is possibly false that  $x$  (in  $w$ ) has F – that is, in  $w$ ,  $x$  has not F, but  $x$ , in  $w$ , has *having F (in @)*. Plantinga defines world-indexed properties in the same way

<sup>4</sup>Where P is a property and W is a world, an object  $x$  has the property *having P in W* in a world  $W^*$  if and only if  $x$  exists in  $W^*$  and W includes  $x$ 's *having P* (Plantinga, 1974, p. 63).

which it does not exist. Thus, we can reconsider (F) by introducing the principle of *Weak Iterability* (Caplan, 2007, p. 338):

(WI) For any object  $x$ , any property  $F$ , and any possible worlds  $w$  and  $v$ ,  $x$  has  $F$  in  $w$  and  $x$  exists in  $w$  if and only if  $x$  has  $F$ -in- $w$  in  $v$ .

Now we can reintroduce (F) as follows:

(F\*) For any object  $x$ , any property  $F$ , and any possible world  $w$ , if  $x$  has  $F$  in  $@$ , then, if  $x$  exists in  $w$ ,  $x$  has the property *having  $F$ -in- $@$*  in  $w$ , and thus  $x$  has a property  $F$ -in- $@$  in  $w$

Note that the difference between (SI) and (WI) (and, as a result, between (F) and (F\*)) is the difference between Yagisawa's and Plantinga's concepts of *Iterability principle*. So, we face a choice. (F\*), as Caplan remarked, follows from the *Strong Iterability*. But (F\*) also follows from the *Weak Iterability*. In such a situation, Caplan says, we must prefer a more moderate principle (that is, the *Weak Iterability*), and therefore we have no reasonable ground to reject (E). However, if we have no reasonable ground to reject (E), we have no reasonable ground to accept (YA).

### 3 World-indexed iteration and contingent apriori

In order to prove that the world-indexed iteration is redundant, Yagisawa uses Kripke's idea of the contingent apriori:

(M) The standard metre stick is one metre long<sup>4</sup>

It is true that, in our world, the metre is 100 centimetres (one metre). Of course, in another possible world the length of the metre could be different from the length of the metre in the actual world. But in every possible world the length of a metre in the actual world (the length of the actual metre) is 100 centimetres. Additionally, Yagisawa reinforces his argument by using Plantinga's notion of *@-transform*<sup>5</sup>. The idea of *@-transform* is this. Say that Socrates is snubnosed in the actual world. Given that the snubnosedness is a contingent property of Socrates, there is a possible world  $w$  in which Socrates

4 See (Kripke, 1980, pp. 54-60) for a detailed explanation.

5 See (Yagisawa, 2010, p. 59) and (Yagisawa, 2005, p. 40).

lacks this property. However, in  $w$ , Socrates is necessarily snubnosed-in- $@$ <sup>6</sup>. Plantinga explains the notion of world-indexed property as follows:

And now consider the world-indexed property *being-wise-in- $\alpha$* , a property Socrates has just in case  $\alpha$  includes *Socrates' being wise*. Wisdom, of course, is a contingent property of Socrates, but *being wise in  $\alpha$*  is essential to him. While there are possible worlds in which Socrates exists but lacks wisdom, there are none in which he exists and lacks *being wise in  $\alpha$* . For (presuming that what is possible or necessary does not vary from world to world) there are no possible worlds in which  $\alpha$  does not include *Socrates' being wise*; hence there are no possible worlds in which Socrates exists but lacks the property *being wise in  $\alpha$* . More generally, world-indexed properties are non-contingent: for any object  $x$  and world-indexed property  $P$ , either  $x$  has  $P$  essentially or  $x$  has the complement of  $P$  essentially (Plantinga, 1979, p. 141).

The world-indexed property of the form  $P$ -in- $@$  is the  $@$ -transform of  $P$ . Thus, a property of *being snubnosed in  $@$*  is the  $@$ -transform of property *being snubnosed*. Similarly, *being 100 cm. long in  $@$*  is the  $@$ -transform of the metre's property *being 100 cm. long*. Note that the metre has a world-indexed property of *being 100 cm. long in  $@$*  if and only if the actual metre (the metre of  $@$ ) is 100 cm. long. Thus, given the  $@$ -transform, we have that the metre is 100 cm. in  $@$  in  $w$ , if the metre is 100 cm. in  $@$ . Consider however the following sentence:

(S) Socrates is a teacher of Plato

Given that Socrates is actually a teacher of Plato, (S) is true in  $@$ . Now, by (Strong Iterability), we have that if someone, Socrates, is such that in  $@$ , he is a teacher of Plato, then in every possible world, Socrates is a teacher of Plato in  $@$ . Thus, being a teacher of Plato in  $@$  is an essential property of Socrates. The question is now as follows: is a property of being a teacher of Plato essential for Socrates of  $@$ , given that this property, by (Iterability), is necessary for Socrates in every possible world? If Socrates, necessarily, is a bearer of the property *being a teacher of Plato in  $@$* , we can identify Socrates by claiming that someone,  $X$ , is Socrates, if  $X$  has a property of *being a teacher of Plato*

6 Here is a temporal analogy. Suppose that Hegel was born in the year 1770 (at  $t_1$ ). It does not belong to the nature of Hegel that he was born at  $t_1$  – it is not the case that Hegel, necessarily, was born at  $t_1$  (Hegel could have been born, for example, in the year 1670). But given that Hegel was actually born at  $t_1$ , at  $t_2$  (in the year 2021) it is necessarily the case that Hegel was born at  $t_1$  – it is not within our power to change this fact about the past. There is no  $t_i$  (such that  $t_1 < t_i$ ) such that at  $t_i$ , the proposition *Hegel was born in the year 1770* could be false.

in @. *Being a teacher of Plato* in @ is the @-transform of *being a teacher of Plato actually*. Thus, we have the following truth:

(SS) It is necessarily the case, if someone is Socrates, he is an actual Socrates (that is, a teacher of Plato)

What is a reason to believe that (SS) is true, given that a property of *being a teacher of Plato* is indeed a contingent property of Socrates? The defender of (Iterability) would reply that it is a contingent fact that Socrates is a teacher of Plato in @, but a property of being a teacher of Plato-in-@ in  $w$  is necessary for Socrates, if Socrates is actually a teacher of Plato. Thus, (SS) is a necessary truth, if being a teacher of Plato is considered as a world-indexed property of Socrates. Also, Stephanou (2000, pp. 188-189) gives another reason to believe that (SS) is a necessary truth:<sup>7</sup>

Indeed, it seems that the proposition expressed in [SS] is a necessary truth. First, [SS] is part of the logic of how proper names interact with modal operators. The proposition it expresses ought therefore be recognized as a logical truth, and as such it will very likely be a necessary truth, too. Secondly, it seems clear that the proposition formulated in [SS] is bound to be true by the concepts it involves... If so, then the proposition formulated in [SS] is presumably a necessary truth.

But if [SS] is a necessary truth, would it mean that Socrates, who possibly lacks a property of being a teacher of Plato, is not Socrates? This claim is controversial. If this statement is true, we get the inference ‘if Socrates fails to be a teacher of Plato, then Socrates couldn’t have been a teacher of Plato’ (Stephanou, 2000, p. 188). But, of course, the defender of (YA) does not want to assert that this inference is true. What the defender of (YA) wants to say is that Socrates has a property being a teacher of Plato accidentally (and so Socrates could lack this property at @), but the property of being a teacher of Plato at @ at  $w$  is essential for him. Given this distinction, consider:

- (i) In the actual world, Gore lost
- (ii) Actually, Gore lost
- (iii) In the world  $w$ , Gore lost

In the cases like (iii), we consider some (contingent) state of affairs in some possible world. We say that *Gore lost the presidential elections* is true

<sup>7</sup> See Duzi, Jespersen, and Materna (2010, p. 379) for a discussion.



because Gore lost the presidential elections. Accept now the @-transform (in particular, the equivalence between *Gore lost at @* and *for every possible world  $w$ , at  $w$  Gore lost at @*). Thus, the language containing the world-indexed sentences (like (i)) will be modal; the meaning of (i) and (ii) (with respect to the @-transform of *Gore lost*) is that there is a world (that is, an actual world) such that in every world Gore lost in that world (Miroiu, 1999, p. 312). The problem (as we see it) is as follows: if *having lost at @* is a contingent property of Gore, how could the fact that Gore has this property at @ be combined with a modal statement that Gore has *having lost at @* at every possible world *essentially* (necessarily)? In other words, is the idea of world-indexed properties consistent? If it is not, then it is not the case that *X has F in @ implies necessarily, X has F-in-@ in W*, and it is not the case that *Socrates, actually, is a teacher of Plato implies necessarily, Socrates is a teacher of Plato in @ in W*.

Another problem arises from the metaphysical premises of (YA). According to (YA), Gore at  $w$  has a property having lost at @, *even if nonexistent*. But Plantinga, for instance, rejects the idea that an object could have had a world-indexed property at  $w$  without the exemplification of existence at  $w$  (Plantinga, 1974, p. 62). On the other hand, Mackie argues that the concept of world-indexed properties is self-contradictory and does not make sense (Mackie, 1982, pp. 55-63). We will see in section 4 that (YA) is incompatible with the ‘constituent principle’ (i.e., the principle that if a property of the object exists, then the object (as a bearer of this property) must be existent). This principle is closely related to *existentialism*<sup>8</sup> – a point of view that every singular proposition is dependent on its constituent, and so the proposition could not exist if the constituent of this proposition did not; that is, if the proposition ‘at  $w$ , Gore lost at @’ refers directly to Gore, this proposition makes sense only insofar as the constituent<sup>9</sup> of this proposition (Gore) is existent. Thus, if Gore

8 Plantinga rejects existentialism in (Plantinga, 1983). We will not go into the details of the relation between actualism and existentialism. Note, however, that the inferences *necessarily, p, if the proposition that p is true* and *necessarily, p is true if p*, as shown by Fine, are not always true (Fine, 2005, p. 149). Also Timothy Williamson in (Williamson, 2002, p. 234) discusses the following controversial example. Consider the proposition *I do not exist*. If *I do not exist* is true, I do not exist. But if I do not exist, *I do not exist* refers to nothing (because the world, in which this proposition is uttered, does not contain me). Thus, it is not the case that *I do not exist* is true if I do not exist. Williamson, of course, is far from claying that this example establishes the falsity of inferences / principles listed above. Moreover, he uses these principles as premises for the argument that everything is necessarily existent. However, Williamson’s necessitism is incompatible with Yagisawa’s argument, since Yagisawa argues that existence is not necessary. Therefore, if we do not accept that necessitism is true, this example at least poses a difficulty for contingentism.

9 Kripke rejects the Constituent principle in (Kripke, 2011) and (Kripke, 2013). Hausmann argues that Kripke’s conception of negative existential is wrong (Hausmann, 2019), and Stephanou argues compellingly for Existentialism without referring to the Constituent Principle (Stephanou, 2020).

did not exist at  $w$ , ‘at  $w$ , Gore lost at @’ would not exist too. From this point of view, Gore does not have a property ‘lost at @’ at  $w$ , if nonexistent at  $w$ . We will develop this argument in detail in section (4).

#### 4 Constituent principle and @-transform

We have from (SS) that if someone is Gore, he is Gore of the actual world. So, if Gore is Gore-at-@, and Gore-at-@ is existent Gore, then at @, Gore-of-@ exemplifies a property ‘lost at @’ and existence. Now, let  $w$  be any world at which Gore does not exist. It is clear that  $w$  obtains if ‘Gore does not exist’ is true at  $w$ . By Yagisawa’s argument, ‘Gore at  $w$ ’ implies ‘Gore at  $w$  is Gore-at-@’. We have from the Strong Iterability that ‘Gore at  $w$  is Gore-at-@’ obtains at  $w$  even if Gore does not exist at this world. But the world, following Plantinga, is the maximal state of affairs (that is, such a state of affairs that either includes or precludes every state of affairs). Given Plantinga’s definition of a possible world, the defender of (YA) could reject (RE) by using the following principle:

(RRE) For every possible world  $w$  and object  $x$ , necessarily, if  $x$  does not exist at  $w$ , then the nonexistence of  $x$  obtains at  $w$ .

(RRE) thus seems to be at least possibly true; if a possible world (considered as a maximal state of affairs) excludes the existence of  $x$ , it must then include the nonexistence of  $x$ . Thus, by (RRE) and the definition of  $w$ , Gore’s nonexistence obtains at  $w$ . But (RRE) is implausible. Let (Q) be such a state of affairs as *Gore’s nonexistence obtains (at  $w$ )*. By the definition of  $w$ , (Q) obtains if  $w$  obtains. But, by definition of (Q), if (Q) obtains, then at  $w$ ,  $\sim\exists x$  (Gore =  $x$ ). Thus, if  $w$  obtains, then (by the definition of  $w$ ) there is no Gore at  $w$ . But Gore is a constituent of  $w$  (because *Gore’s nonexistence* refers directly to Gore). Consider the following sentence:

(CP) For any possible world, for any  $x$ ,  $x$  is a constituent of  $w$  only if  $x$  obtains entails  $w$  obtains, and  $w$  does not obtain if  $x$  does not obtain.

From (CP) we have another instance of the *Constituent Principle*:

(CPG) For any possible world  $w$ , if Gore is a constituent of  $w$  and does not exist at  $w$ , then nothing at  $w$  could exemplify Gore’s nonexistence at  $w$ .

Given (CP) and (CPG),  $w$  has no common constituent (Gore) with (Q). (Q) therefore entails non-obtaining of  $w$ . However,  $w$  obtains. Gore in  $w$  is such that Gore in  $w$  lost at @. The difference is that, at  $w$ , Gore-at-@ possibly does not exist, but necessarily, Gore at  $w$  lost at @. @ is thus a world, at which it is necessarily true that Gore lost at @. If, necessarily, *Gore lost obtains* entails @ *obtains*, then @ obtains. Hence, @ does not contain (Q). For if (Q) is a part of @, then necessarily, @ would be a world at which @ *obtains* would entail *Gore lost does not obtain*. So, *Gore lost does not obtain* (by Constituent Principle), entails *there is no Gore*, and *there is no Gore* entails ( $\sim E@$ ) (@ does not exist) (given the principle that the world does not obtain if the constituent of this world does not obtain). However, if  $w$  obtains, then @ also obtains, because at  $w$ , Gore is Gore-at-@.

So if  $w$  obtains, then (by the Constituent principle and (RRE)) it is the case that ( $\sim \exists x (x = \text{Gore}) \ \& \ (@ \text{ obtains}) \ \& \ (@ \text{ does not obtain})$ ).<sup>10</sup> Thus, if Gore does not exist at  $w$ , then, at  $w$ , there is some  $X$  such that  $X$  is Gore and  $X$  exemplifies the nonexistence of Gore. It is clear, however, that it is impossible that  $w$  could entail (*@ obtains*) & (*@ does not obtain*), because contradictions are not true. In virtue of the fact that  $w$  does not contain Gore (by (Q)), it is necessarily true that Gore is Gore of @, but in  $w$  Gore is such that in  $w$  Gore lost in @, and hence has a common constituent with @ (i.e., Gore) (in  $w$ , Gore is nonexistent), so Gore in  $w$  could exemplify nonexistence in  $w$  only if Gore had existence in @ (because, by (GA), Gore is Gore of @). Thus, if Gore in  $w$  lost in @, and so have a property having lost in @ in  $w$ , then Gore is a constituent of  $w$ , and if (RRE) entails @ *does not obtain*, if *Gore does not exist*, contradicting the Constituent Principle, then (RRE) is false, because (by (SS)), if Gore is a constituent of @, then Gore is a constituent of  $w$ , so it is not the case that Gore could be nothing in  $w$  and have the property *being nonexistent in w* since it would follow that this property is exemplified *not by Gore*. So, if (RRE) were true, then Gore of  $w$  would be different from Gore of @, contradicting (SS).

The defender of (YA) could reply as follows. It is true that at  $w$  Gore could be different from Gore of the actual world, but the main idea is that Gore of @ necessarily shares with any possible Gore the property *having lost at @*. Moreover, if (YA) is sound, Gore can exemplify this property in the possible world, even if nonexistent. Consider:

10 Compare with the argument of Pollock in (Pollock, 1984, pp. 98-100).

(GaW) There is a possible world  $w$  such that (i) Gore at  $w$  lost at @; and (ii) Gore does not exist at  $w$ .

Gore at  $w$  lost at @, so, at  $w$ , Gore has a property *having lost at @*. Thus, (GAW) implies:

(PGaW) The property of Gore *having lost at @* exists at  $w$ .

Let A be the property of Gore *having lost at @*. Given the definition of A, we can conclude as follows:

(PA) If something has A, Gore has.

As a result, in every world in which A exists, A is exemplified by Gore (because it is impossible that something other than Gore could exemplify such a property). If something at  $w$  could have a property A at  $w$ , then it should be identical with Gore of @. Given (PA), the exemplification of A at  $w$  is possible if and only if, at  $w$ , there is something identical with Gore of @. But, as it follows from (RRE), nothing at  $w$  is identical with Gore of @. Consider the following consequences of (PA):

(PA1) If something is Gore, it has A

(PA2) If A, only Gore could exemplify A.

Suppose that Gore of  $w$  (by (YA)) does not exist at  $w$ . As a result, (PA1) entails the impossibility for Gore of  $w$  to obtain A, because nonexistent Gore of  $w$  could not be identical with Gore of @. (PA2) entails that if Gore of  $w$  could have had A, then A could have been obtained by something not identical with Gore. Hence, we reach a contradiction with (PA), and thus we must give up the idea that Gore of  $w$  could be a bearer of A.

According to the premise of (YA), Gore has a property *having lost at @* at  $w$ , even if Gore is *nonexistent* at  $w$ . There are two possible reading of the term *nonexistence* — either there is no such object as *Gore* at  $w$ , or Gore exemplifies the property of *nonexistence* at  $w$ . If there is no such object as *Gore* at  $w$ , nothing at  $w$  could satisfy the condition ‘at  $w$ , *Gore* lost at @’ because the meaning of the word *Gore* is empty at  $w$ . Thus, following this reading of the term *nonexistence*, (YA) is incompatible with the Constituent Principle. However,

if nonexistence is a property<sup>11</sup> of an object in the world in which it does not exist, (YA) is not compatible with the @-transform. Plantinga does not believe that nonexistence is a property. Thus, he doesn't believe that nonexistence can be exemplified. That's why (following Plantinga) the principle of *Strong Iterability* accepted by Yagisawa is false. In order to see why, consider

(S)  $x$  has F

We have from the @-transform that  $x$  has F-in-@, and the *Strong Iterability* gives us (S\*)  $x$  has F-in-@ in  $w$ , if  $x$  has F in @.

Let *nonexistence* be a substituent of F in (S\*). Then (S\*) yields

(S<sup>a-tr</sup>)  $x$  is nonexistent-in-@ in  $w$  if the actual  $x$  is nonexistent

It is true that some  $x$  could be nonexistent in the actual world, but it is hardly true that the *actual*  $x$  could be nonexistent. Consider the sentence ' $x$  is nonexistent in @'. ' $X$  is nonexistent in @' is true iff the actual world does not include  $x$ , and  $x$  is included in  $w$  — that is, if  $x$  could have existed in @ (Plantinga, 1976, p. 120). But this view is incompatible with Plantinga's view: "Although there could have been some things that don't *in fact* exist, there are no things that don't exist but could have" (Plantinga, 1976, p. 120).

We conclude that (S<sup>a-tr</sup>) contradicts the principle of @-transform — if  $x$  in the world  $w$  could be nonexistent and have *having F in @ in w*, then it is possible for  $x$  to be nonexistent and have (by *a-transform*) *F-in-@*. Thus, the *Strong Iterability* is incompatible with the @-transform.

## 5 Strong Iterability, contingent apriori, and world-indexed properties

The principle of (Strong Iterability), defended by Yagisawa, is as follows: *even if Gore does not exist in the possible world w*, Gore in  $w$  lost in @, since Gore lost in @. Of course, the property 'lost at @' is a contingent property of Gore at @. However, Gore lost in @, and so *having lost in @* is an essential property of Gore in every possible world. In every possible world, Gore has the property of *being Gore of the actual world*, and so Gore has this property

11 In fact, nonexistence (as Yagisawa understands it) is *not* a property. Nonexistence, by Yagisawa, is a relation between the object and the domain of the possible world. However, there is no problem for us. Denote nonexistence as N, and say that N( $x$ ) in  $W$  ( $x$  does not exist in  $W$ ). Given this fact, N( $x$ ) in  $W$  in  $V$  —  $x$  has the world-indexed property of *being nonexistent in W in V*. But then, N( $x$ ) in  $W$  in  $V$  is *not* a relation between  $X$  and the domain of  $V$  since 'N( $x$ ) in  $W$  in  $V$ ' says nothing about the (non)-existence of  $X$  in  $V$ .

necessarily. Hence, the validity of (YA) crucially depends on the question whether there is such property as having lost at @ at every possible world.

(TG) (YA) is true if and only if *having lost in @ (in every possible world)* is a world-indexed property of Gore/*being 100 centimetres long (in every possible world)* is a world-indexed property of the metre.

(TG) faces a serious problem. Suppose that Gore has *having F in @* essentially, although he has F in @ contingently. Gore has then *having F in @* in every possible world, including @. But in @, Gore has F contingently, so it is possible for Gore in @ not to have F in @. Given that Gore has *having F-in-@* in  $w$  only if Gore has F in @, Gore does not have *having F-in-@* in any possible world if F is unexemplified by Gore in @. So we have:

(F1) Gore has *having F-in-@* in  $w$  necessarily

(F2) Gore possibly does not have F in @

Now, we have from (F1) that Gore has the world-indexed property of the form *having F in @ in  $w$*  in every possible world, and so Gore has this property in @. Given the fact that every world-indexed property is necessary, we have from (F1) and (*Iterability*):

(F3) Gore has F in @ necessarily

So we have from (F2) and (F3):

(F4) Gore possibly does not have F in @, and in @, Gore necessarily has F

Thus, we have from (F4) and (*Iterability*):

(F5) It is possible for Gore not to have F in @ (if Gore has F in @), and it is impossible for Gore not to have F in @ (if Gore has F-in-@ in  $w$ )

So, (F5) follows from (F1) and (F2). (F2) is true. According to (F1), Gore has a world-indexed property of the form *having F in @ in  $w$* , and we have from the notion of world-indexed properties that Gore has *having F in @* in every possible world. Thus, we can conclude as follows:

(F6) If (F1) is true, (F5) is true

(F7) But (F5) is false

(F8) So (F1) is false,

and world-indexed properties are incompatible with a contingent truth about Gore of the form *Gore lost in @*. Again, *the metre is 100 centimetres in @* is a contingent truth about the metre. Thus, by the argument above, this truth about is not compatible with the statement that the metre is 100 centimetres in @ in every possible world.

Mackie advanced a similar argument against the concept of world-indexed properties.<sup>12</sup> Let us call this argument (together with the argument above) ARGUMENT 1. According to this argument, world-indexed properties are incompatible with contingent states of affairs: if Gore has the world-indexed property *having F-in-@ in every possible world*, this property, in @, is incompatible with F, if F is itself contingent. By (YA), if Gore has F in @, then Gore has *having F-in-@* in every possible world. If (YA) were true, it would lead to the paradoxical conclusion that possible worlds depend on each other. We can introduce Mackie's concept of world dependence (Mackie, 1982, p. 60) as follows:

(WD) If  $W$  and  $V$  are possible worlds, and A and B are contingent states of affairs,  $V$  depends on  $W$  if the actualization of A in  $W$  makes impossible the actualization of B in  $V$ .<sup>13</sup>

Suppose now that Gore, by (Iterability), has *having F-in-@* in  $w$  because Gore has F in @.<sup>14</sup> Thus, Gore in  $w$  has F in @. Given that *Gore has F* is a

12 Mackie addresses this objection to Plantinga's concept of world-indexed properties. He argues that world-indexed properties are incompatible with S5 modal logic, and so the *Victorious Modal Argument* (VMA), proposed by Plantinga, is not successful.

13 Compare with the definition of (WD) in (Sennett, 1991, p. 69).

14 Given that (YA) crucially depends on Yagisawa's concept of Iterability, (YA) could be successful only if the main premise of (YA) – that is, equivalence between *in @*, *Gore lost*, and *Gore lost in @ in all possible worlds* – is true. However, Chihara (1998), and Grim (1991, 1984) both offered the Cantorian arguments that there is no such set as *all states of affairs* (Chihara, 1998, pp. 125-127), and there is no set of *all truths* (Grim, 1991, pp. 91-94, also see pp. 51-53); thus, there could not be such set as *all possible worlds*, so one might say that if (YA) involves this construction (that is, a set of all possible worlds), (YA) fails. However, there is a crucial disanalogy between Grim's argument (and also Chihara's one) and (YA). Grim's argument (Grim, 1984, pp. 206-207) runs as follows. Suppose there were a set of all truths (say T). Consider now all subsets of T – that is, the elements of the power set LT. To each element of LT will correspond a truth, and so, for some particular truth T1, T1 will or will not belong to LT. Thus, if there is such a set as all truths, there must be a bijection (1-1

contingent state of affairs in @, it is possible for Gore not to have F (let J be a property of not having F; hence, Gore has J iff Gore does not have F). Thus

(PJ) If F is a contingent property of Gore in @, and it is possible for Gore not to have F in @ (or, equivalently, to have J in @), there is a possible world  $v$  such that Gore has J in  $v$ .

We have that Gore has F in @, and so we have from (Iterability) that Gore has F in @ in  $w$ . Let H be a Gore's world-indexed property of the form *has F in @ in every possible world*. Thus, if the possession of property F (in @) implies the possession of property H, then Gore has F necessarily, contradicting our assumption that F is a contingent property of Gore (if H is a necessary property of Gore, and it follows from *Iterability* that Gore has F only if Gore has H, then in every world in which Gore has H, Gore has F. But Gore has

correspondence) between T and LT. But according to Cantor's power set theorem, the power set of any set is larger than the power of the original set. Thus, there is no 1-1 correspondence between T and LT, and so there couldn't be such a set as *all truths*.

So, given that Grim's argument presupposes that to each element of LT there corresponds a truth, we can formulate this premise as follows:

(Truth) If there is a set of all truths T, there is a particular truth  $t$  such that  $t$  is about T.

And, due to the fact that  $t$  is a truth about T, we can assert that:

(TT) The possibility of  $t$  crucially depends on the possibility of T (that is,  $t$  exists only if T exists)

Now, we see that Grim's argument begins with the question of the possibility of the set of all truths. But what can be said about (YA)? Yagisawa argues as follows – if, in @, F, then for every possible world  $W$ , in  $W$ , F-in-@. According to the concept of world-indexed properties, properties of the form F-in-@ in  $W$  are *necessary*, and thus obtain in every possible world. So, the disanalogy between (YA) and Grim's argument is that it is not the case that (YA) should necessarily be formulated in terms of sets (that is, *all truths*). The crucial premise of (YA) is that Yagisawa takes the world-indexed sentences like **if, in @, F, then for every possible world  $W$ , in  $W$ , F-in-@** as a sort of obvious logical truth (Yagisawa, 2005, p. 40). So, by analogy with Cantorian argument (in particular, with (TT)), we can argue:

(CY) For any object X, for any property F, X can have F-in-@ in every possible world only if there is such set as all possible worlds

But, frankly speaking, Yagisawa's world-indexed sentences of the form X has F-in-@ in every possible world does not depend on the existence of the set of all possible worlds. To see it, consider another example (replace X has F-in-@ in every possible world if X has F in @ with another logical truth):

(PR) For every proposition P, P is either true or false.

(PR) seems to be true. (PR) says something about universally quantified proposition – a proposition about all propositions. Could we say that (PR) is not true because we never have a set of all propositions (by Cantorian argument)? But the formulation of (PR) does not require the existence of a set of all propositions. For suppose otherwise. (PR) is necessary, and thus is true in every possible world. Thus, by analogy with (CY), we can formulate the following counterpart of Yagisawa's argument:

(CPR) For every proposition P, P is either true or false in every possible world if and only if there is such set as *all possible worlds*.

(CPR) doesn't seem to be true. Thus, by (YA), and given the truth of (PR), X's property of *having F-in-@ in every possible world* does not depend on the existence of a set of all possible worlds. Here is a disanalogy with Grim's argument – by Grim's argument,  $t$ 's existence depends on T's existence. Hence, if world-indexed properties of the form **F-in-@ in every possible world if F in @** are universally quantified properties, these properties can and must be formulated without referring to a set of all possible worlds. *We can have* properties of this kind (see Plantinga and Grim, 1993, p. 278) even if the Cantorian argument is correct, and so there is no set of all worlds (truths, properties etc.).



H in every possible world. Thus, Gore has F in every possible world). So, if F is a contingent property of Gore, and Gore does not have H if Gore has F, then it is possible that Gore has F in  $w$ , and Gore has J in  $v$ . But suppose that F entails H. Gore, therefore, has H in  $w$ , and so it follows from the definition of world-indexed property that if Gore has H in one possible world, Gore has H in every possible world. Thus, Gore necessarily has H (and so Gore in  $w$ , by *Iterability*, has F necessarily), so it is impossible for Gore to have J in  $v$ . If so, the actualization of *Gore has F* in  $w$  is incompatible with the actualization of *Gore has J* in  $v$ , and so  $v$  depends on  $w$ . But, as Mackie remarked, the concept of world dependence is very implausible – it is impossible that the actualization of some *contingent* state of affairs in some possible world could prevent the actualization of another *contingent* state of affairs in another possible world. And now we have that the world-indexed properties entail the world dependence, so we must give up world-indexed properties; and if we must give up world-indexed properties, we must give up (YA).

Another argument against (YA) is very close to the argument of Gregory (Gregory, 2001, p. 227). Let us call this argument ARGUMENT 2. The difference between ARGUMENT 1 and ARGUMENT 2 is as follows. According to ARGUMENT 1, (YA) is false because it relies on the concept of world-indexed properties (WIP). The structure of this argument is

- 1) (YA) is true only if (WIP) is true
- 2) (WIP) is false
- 3) Hence, (YA) is false

The goal of ARGUMENT 2 is different. According to this argument, (YA) is false even if (WIP) is true. We can state the ARGUMENT 2 (with respect to our problem) as follows. The validity of (YA) depends on the validity of (SS) – that is, on the statement that it is necessarily the case that Gore lost at @ at every possible world. Let  $v$  be a possible world such that Gore, in  $v$ , is F in  $w$ , and let G be Gore of  $v$ . Then, Gore is F in  $w$  in  $v$ , and so in  $v$  G is such that in  $w$ , G exists (we have from (Iterability) that Gore is something in  $v$  (in  $v$ , Gore is F in  $w$ ), and Gore of  $v$  is G). Now, we have that in  $v$ , Gore is G in  $w$ , and thus Gore, by (Iterability), is something in  $w$ , and so we have that something is Gore of  $w$  in  $v$  only if Gore is G in  $w$  (but suppose that (SS) is true. Then, in  $w$ , nothing is Gore because Gore is F in  $w$ , and (by SS) nothing is G in  $v$ ). Now, in  $w$ , G is such that G exists only if G is F (because Gore of  $w$  is F). In  $w$ , G is G, and G is Gore in  $w$ . So, if G exists in  $w$ , and G is Gore, then Gore exists in  $w$ . Now, suppose that Gore of  $w$  (i.e. F) possibly does not exist. Then, there is a possible world  $v$  such that in  $v$ , Gore is G, and thus we have from Iterability that in  $v$ , G is F. But it is impossible for G to be identical with F

since F does not exist in  $w$ ,<sup>15</sup> so in  $v$ , Gore of  $w$  (F) is not G, contradicting our assumption that in  $v$ , G is F. However, according to (SS), necessarily, F (Gore of  $w$ ) is Gore in every possible world, and so in  $v$ , Gore of  $v$  (G) is F. Now, we have that in  $v$ , G is not identical to F, and thus Gregory concludes that (SS) is not true (not necessary).

This argument is of decisive theoretical significance. First, this argument shows that there is no direct inference from the idea of contingent apriori to sentences like (SS). Secondly (and most importantly), it demonstrates that (SS) and (M) are both incompatible with (SI) (since it is impossible for F to be identical with G in  $v$  if F does not exist in  $w$ ). But it also can be shown that (M) is compatible with *Weak Iterability*. Assume that F is G, and F does not exist. Then, similarly to the ARGUMENT 2, we argue: G could be identical with F, only if F is existent. F is not existent (assumption). Hence, F is not identical with G, if nonexistent. If so, then (SS) does not follow from Kripke's contingent apriori, (M), – it is not the case that if Gore is F in @, then Gore is F in @ in all possible worlds. If Gore is a bearer of the property *being F in @*, Gore, by the argument above, has F in @ only in those worlds in which Gore is existent. Thus, (SI) does not follow from (M).

Now, the defender of (YA) faces a dilemma. If the argument against world-indexed properties is sound, we must reject world-indexed properties. If so, (YA) fails. Suppose, however, that the defender of (YA) can resist this argument. If so, then it follows from the argument above that even if we accept the concept of world-indexed properties, (SI) fails (but (WI) survives). Thus, the proponent of (YA) must either accept or reject the concept of world-indexed properties. However, in both cases (SI) fails, and therefore (YA) also fails. Finally, if our arguments are correct, then we must prefer (WI) over (SI) – in other words, we tend to think that Plantinga's concept of Iterability is more reliable than the *Strong Iterability* proposed by Yagisawa.

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15 If X does not exist in  $w$ , X does not have properties in  $w$  (in particular, a property of *being identical with Y*). See Bergmann (1996).

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