Cross-world reference[1]

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Abstract. One way for semanticists to analyze truth in fiction is by relativizing propositions to fictional worlds. However, some sentences in natural language refer to individuals, events, or states from multiple worlds. These include *referential cross-world sentences*, where the name of an actor from the real world appears to replace the name of the fictional character they play (*downward*), or vice versa (*upward*). The conventional analysis claims that in these cases, the name of the actor refers to the fictional individual, or vice versa. I present several empirical asymmetries between upward and downward cross-world reference that make this analysis problematic. Instead, I propose a covert operator FICT, which takes a predicate *P*, and returns a predicate that roughly means 'plays a character of whom *P* is true in a fictional world.' FICT can be applied to sentential predicates to form downward referential cross-world sentences, or within DPs to form upward referential cross-world sentences. In addition, this accounts for apparent differences between English and languages like Italian and Russian in how gender is handled in referential cross-world sentences, as well as for some previously studied facts about dream reports, which I analyze as a type of referential cross-world sentence. Finally, I explore how this analysis might be expanded to include account for facts about the treatment of fictional times and events.

Keywords: semantics, cross-world, possible worlds, fiction, gender.

1. Introduction

1.1. Truth in real life and truth in fiction

A common use case for natural language is to make truthful statements about the real world.

(1) Mark Hamill was interviewed on CBS.

A less common use case involves making truthful statements about fictional worlds. These may involve references to individuals who do not exist in real life.

(2) Luke Skywalker is a Jedi.

Anyone with a passing familiarity with Star Wars will understand (2) to be "true" (and its negation to be "false"), despite the fact that Luke Skywalker is not a person who actually exists and the defining properties of a Jedi include abilities that violate real physical laws. In the framework of Lewis (1978), this is possible because we can evaluate the truths of different sentences relative to different worlds. (1) is true in the real world, which I will call w^*, and (2) is true in the world of Star Wars, which I will call w_{SW}. Each cannot be straightforwardly evaluated in the other world due to presupposition failure, since w^* does not contain the person called Luke Skywalker and w_{SW} does not contain Mark Hamill or CBS.

To account for this in our semantics, one might relativize interpretation to worlds, as is stan-

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dard in work done in the tradition of Montague Grammar. For reasons that will become clear, here I will instead add worlds as a term for our predicates, following many others (Gallin, 1975; Barwise and Perry, 1981; Cresswell, 1990; Percus, 2000; Keshet, 2010). Thus we interpret (1) as something like INTERVIEWED-ON-CBS(MARK)(w^*), and (2) as something like JEDI(ℓ)(w_{SW}).

The truth of a proposition in the real world can be determined by using sensory organs to observe actual individuals and gain firsthand information about the individuals involved. The truth of a predicate in a fictional world cannot be determined this way, because the individuals that populate a fictional world do not exist in physical reality. Instead, we generally use the canonical text that defines the fictional world w (which may be a book, but could also be a film, video game, song, etc.). If p is a proposition of type $\langle s,t\rangle$, then $p(w)$ is true if it is written or otherwise observable in the text (excepting statements by unreliable narrators, etc.). Furthermore, we can say that $p(w)$ is true if it is entailed by the set of true statements that are known directly from the text. Lewis (1978) goes one step further, and argues that $p(w)$ is true if p is true of all of the possible worlds consistent with the text that are maximally close to the real world. Thus, even though the anatomy of Luke's brain is never discussed in the Star Wars canon, we can assert with a reasonable degree of confidence that (3) is true of w_{SW}.

(3) Luke Skywalker has a cerebellum.

The cerebellum is necessary for motor control in the real world, and Luke clearly has motor control, so a world where he has this ability due to the presence of a cerebellum is more similar to w^* than a world where his cerebellum is absent. There are possible worlds in which, e.g., Jedi lack cerebella and instead control their muscles with the Force, but since those worlds are not maximally similar to w^*, they can be discounted. However, this approach still leaves some propositions undecidable in fictional worlds.

(4) Tom Bombadil has blood type B positive.

Tom's blood type is never discussed in the Lord of the Rings canon. It could be B positive, but a world in which it is B positive is not any more or less similar to w^* than one in which it is O negative. Thus (4) cannot be said to be true or false of w_{LotR} (the world of Lord of the Rings).

Thus we have a framework for evaluating statements in various fictional worlds, as well as the real one. From real and fictional worlds, we can construct possible worlds of the kind normally invoked for modals and conditionals, as one would expect. However, there exists a class of sentences for which interpretation in a single world fails to make sense.

1.2. Referential cross-world sentences

Some sentences require information from multiple worlds to interpret. These are called "cross-world sentences" (Fodor, 1979; Kocurek, 2016).

(5) a. Bilbo in *The Lord of the Rings* is taller than Thumbelina in *Thumbelina*.
b. If I were you, I wouldn't bet on that horse. (Kocurek, 2016: :700)

There is a specific kind of cross-world sentence, discussed by Cook (2017), where a reference to an individual from one world *appears to* stand in for a reference to a related individual from another world. I call these "referential cross-world sentences." Consider (6):

(6) **Mark Hamill** is a Jedi.

On its literal reading, this is false in w^* because Mark Hamill cannot actually move objects with his mind. It is undecidable in w_{SW} because Star Wars contains no character named Mark Hamill. However, there is an available reading along the lines of "Mark Hamill plays a character who is a Jedi," which is true in w^*. I refer to this as a *downward* referential cross-world sentence, and the *downward cross-world element* (the DP referencing the actor that seems to stand in for a reference to the character in such sentences) will be in bold.

We might also consider (7):

(7) Tracy Smith interviewed Luke Skywalker on CBS Sunday Morning.

This is undecidable in w^* because Luke Skywalker does not exist in real life, and undecidable of w_{SW}, because neither Tracy Smith nor CBS Sunday Morning exist there. However, it has an available reading along the lines of "Tracy Smith interviewed [the one who played a character named Luke Skywalker] on CBS Sunday morning," which is true in w^*.[2] I refer to this as an *upward* referential cross-world sentence, and the *upward cross-world element* (the DP referencing the character that seems to stand in for a reference to the actor in such sentences) will be underlined.

The ability to participate in cross-world sentences is not a unique property of names. They also work with other R-expressions or pronouns that refer to the particular actor or character.

(8) Have you met Mark Hamill? **He**'s a Jedi.
(9) Tracy Smith interviewed a Jedi.

To fully appreciate this phenomenon, it is useful to expand our discussion to game worlds. Tabletop role-playing games (RPGs) are a rich source of this kind of data. Typically, these games involve a group of players, who each control[3] a character in a fictional world. Another person, called the dungeon master (DM)[4] controls all non-player characters (NPCs) and everything else in the world. Cross-world sentences with RPG worlds identify a player with the character they play. While replacing a movie character's name with a reference to their actor (or vice-versa) is marginal in formal settings, replacing an RPG character's name with a pronoun that references the player is fully acceptable, and is standard practice for RPG players.

(10) a. **I**'m a gnome wizard.
b. The mind flayer casts Charm Person on **you**.

Other kinds of cross-world sentences are sometimes prescriptively discouraged by hardcore players, but are intuitively acceptable, and are certainly no more marginal than (6) or (7). In the following examples, Emily is a real person who plays a character named Xplodinator, a gnome wizard.

[2]The interview, notably titled "Mark Hamill on *being* Luke Skywalker" (not *playing*), can be found at youtube.com/watch?v=IdRc0fBhebM

[3]It is a useful fact (that I will exploit later) that the verb "play" is used in English both for the relationship between an actor and their character, and for the relationship between a game-player and their character. English is not the only language in which this is the case. It is also possible for a single player to control multiple characters, or for a single character to be controlled by different players at different times.

[4]Prescriptive norms state that "dungeon master" should only be used if the RPG is Dungeons & Dragons, and otherwise this person is a "game master," but "DM" is commonly accepted for other games in practice.

(11) a. **Emily** is a gnome wizard.
b. **Emily** casts Fireball.
c. The mind flayer casts Charm Person on **Emily**.

(12) a. Xplodinator is running late, so we'll have to wait to start the game.
(With the interpretation that Emily is running late in real life.)
b. The wizard brought doritos.
(With the interpretation that Emily brought doritos.)

In the small amount of existing literature on referential cross-world sentences and the related phenomenon of dream reports, it is assumed that in downward cross-world sentences, a name like *Emily* actually does reference an individual like Xplodinator, and in upward cases, *Xplodinator* actually references Emily (Percus, 2000; Percus and Sauerland, 2003; Cook, 2017). I call this the *direct referential analysis*, and I will argue that this is not the case. Rather, the surface phenomenon of cross-world reference is actually the result of an operator that affects predicates, not individuals. Before I explain my analysis, I will present some asymmetries between upward and downward referential cross-world sentences that demonstrate that the simple reference explanation is unsatisfactory.

1.3. Asymmetries in cross-world sentences

The two types of cross-world sentence do not behave identically. There are at least three ways in which this is the case, which are described here.

1.3.1. Anaphor binding and φ-features

A cross-world element in an English downward cross-world sentence can only bind a third-person anaphor matching the features of the explicit referent (e.g. the actor), not their character. In an upward cross-world sentence, it can bind either one.

(13) *Context: Emily is a woman and her character Xplodinator is a man.*
a. **Emily** casts Mage Armor on { **herself** / *himself / #Xplodinator }.
b. Xplodinator went to get { himself / herself / ?#Emily } some Doritos.

Under the direct referential analysis, we would expect *Emily* in (13a) to be able to bind *himself*, and unable to bind *herself*, because that *Emily* would refer to Xplodinator, a man. Similarly, we would expect Xplodinator in (13b) to be able to bind *herself*, but not *himself*. That analysis is wrong on both counts.

A first- or second-person pronoun acting as a downward cross-world element can also bind a matching first- or second-person anaphor (and indeed that is the only kind of anaphor it can bind).

(14) Emily: **I** cast Insight on { **myself** / *himself / #Xplodinator }.

An upward cross-world sentence generally cannot have a first- or second-person pronoun as the surface form of a cross-world element, as that would require the speaker or addressee to be a fictional character. The actual intended apparent referent of an upward cross-world element can be first- or second-person, but it is difficult to find contexts where this is felicitous, except in the plural. In that situation, it can bind a first- or second-person anaphor respectively, but

third-person is still an option, as in (15a). This contrasts with cases where the antecedent refers to a real group that contains the speaker, where a third-person anaphor is odd at best (15b).

(15) *Context: A break during the filming of a Jedi Council scene in the Star Wars prequels.*
   a. Samuel L. Jackson: The Jedi are going to get { themselves / ourselves } some lunch.
   b. Samuel L. Jackson: The actors are going to get { ?themselves / ourselves } some lunch.

Thus, upward cross-world sentences seem to be more permissive with anaphors (and pronouns generally), whereas in downward sentences, they must match the explicit referent.

The same restrictions also apply to other pronouns used in a cross-world context.

(16) a. You remember Emily? { **She**'s / #He's } a wizard.
   b. You know Xplodinator? { He / She } likes Spicy Sweet Chili Doritos.

This shows that at least downward cross-world elements have the φ-features we would expect from their surface forms. This is reflected not just in the forms of those elements (when they are pronouns), but also in what kind of anaphors they can bind. This is awkward for the direct referential analysis. If the subject of the second sentence of (16a) really refers to Xplodinator, a male character, it is very odd that it is not only allowed to be *she* but also prohibited from being *he*.

1.3.2. Coordination

If a single actor has played multiple characters, a predicate that is true of one of the characters can be coordinated with one that is true of the other in a cross-world sentence where the explicit subject is the actor. However, if a single character has been played by multiple actors, predicates that are true of different actors cannot be coordinated with the character's name as the subject.

(17) *Context: Harrison Ford played the title character in the Indiana Jones movies, and also Han Solo in Star Wars.*
   a. **Harrison Ford** has [raided a temple] and [flown in a spaceship].
   Context: Obi-wan Kenobi has been played by both Alec Guinness, who was knighted by Elizabeth II, and Ewan McGregor, who is an avid motorcyclist.
   b. # Obi-wan Kenobi has been Knighted by Elizabeth II and is an avid motorcyclist.

Under the direct referential analysis, a sentence like (17a) would involve the name *Harrison Ford* referring to multiple individuals at once. Names, generally speaking, cannot do this, at least not without overt determiners. Indeed, we cannot construct similar examples with only real individuals.

(18) Mark loves you and hates me.
   a. ✓ 'Mark Hamill loves you and Mark Hamill hates me.'
   b. # 'Mark Hamill loves you and Mark Zuckerberg hates me.'

In (18), we see that while a name like *Mark* can have multiple possible referents, each copy of a name can only refer to one of them. In that way, a DP containing a name as its only overt content is much like a definite DP (and as I will argue in 2.3.1, it literally is a definite DP).

1.3.3. Nested world-crossing

It seems to be possible to nest upward cross-world reference inside downward cross-world reference, so that we can use a character's name to refer to a different character played by the same actor.

(19) a. In this movie, **Indiana Jones** flies around in a spaceship called the Millenium Falcon.
b. That dude, **Ron Swanson**, **he** was the President of the United States.[5]

They cannot be nested the other way, i.e. we cannot use one actor's name to refer to another actor who played the same character.

(20) a. # **Alec Guinness** is an avid motorcyclist.
b. # **Ewan McGregor** was Knighted by Elizabeth II.

Under the direct referential analysis, there is no clear reason why (20) should be impossible when (19) is fine, though this depends on the specific restrictions place on cross-world reference.

2. Proposal

2.1. Assumptions

Following Gallin (1975), among many others, I assume that predicates like intransitive verbs, nouns, and most adjectives bear the type $\langle e, \langle s, t \rangle \rangle$. Thus, $\textsc{dance}(x)(w)$ means "The individual x dances in world w."

I label the real world w^* and assume the existence of other, fictional worlds, which are generated by works of fiction. Following Lewis (1978), a proposition p is true in a fictional world w if p is explicitly stated or portrayed in the text that generates w or if, among the set of possible worlds that instantiate every explicit proposition in the text, p is true in all of those that are maximally close to w^*. This leaves many propositions undecidable in w.

Worlds are related by an accessibility relation $\textsc{acc}_{\text{fict}}$. I take $\textsc{acc}_{\text{fict}}(w_2)(w_1)$ ("w_2 is accessible as fiction from w_1") to be true if the text that defines w_2 exists in w_1 (in physical form, digital form, or in someone's memory). Thus any work of fiction that actually exists generates a fictional world that is accessible from w^*. However, since w^* is not defined by a work of fiction, it is not accessible from any other world.

I allow individuals to exist in multiple worlds, contra Lewis (1968).[6] An individual can have different properties in different worlds. This is most apparent in fictional worlds that are very close to the real world (so not Star Wars). In w_{WW}, the world of the TV show The West Wing, the US Constitution exists, and I claim that it should be represented by the same individual c that we use for the Constitution in w^*. However, if P is the property of declaring that presidential elections happen in years divisible by four, and Q is the property of declaring that presidential

[5]This sentence was spoken organically by Erin Humphreys, who did not know about this project, on March 16th, 2024. She was discussing the movie *Civil War*, in which Nick Offerman plays the President. Offerman is best-known for playing Ron Swanson on the TV show *Parks and Recreation*.

[6]This is only critical to the analysis in a very strict sense. My proposal can accommodate counterpart theory with minimal alterations.

elections should happen in years divisible by two but not four, then $P(c)(w^*)$ and $Q(c)(w_{WW})$ are true, whereas $Q(c)(w^*)$ and $P(c)(w_{WW})$ are false.

So does that mean that fictional characters also exist in the real world? In some sense, yes. They exist as abstract individuals that have the sorts of properties that fictional characters have, but not the properties that real people have. For example, if w_{IJ} is the world of the Indiana Jones movies and j is the character of Indiana Jones, then ARCHAEOLOGIST is true of j in w_{IJ} but not w^*, as it would be odd to respond "Indiana Jones" when asked to name an archaeologist. Meanwhile, PROTAGONIST is true of j in w^* but not w_{IJ}, as it would be odd for any character in an Indiana Jones movie to assert that Indiana Jones is a protagonist.

Another predicate that will often be used with fictional characters and w^* is PLAYS.

(21) $\textsc{plays} \equiv \lambda x.\lambda y.\lambda w.x$ is a character that y plays in w
$:: \langle e, \langle e, \langle s,t\rangle\rangle\rangle$

Here *plays* can mean either 'acts as in a film, TV show, theater production, etc.' or 'controls in a game.' Thus, if ADAM is Adam Driver and KYLO is Kylo Ren, then $\textsc{plays}(\textsc{kylo})(\textsc{adam})(w^*)$ is true. So is $\textsc{plays}(\textsc{xplodinator})(\textsc{emily})(w^*)$ in the RPG context described above. This is not intended to be an exhaustive list of ways PLAYS can be used; there may be others.

2.2. The FICT operator

In order to generate cross-world sentences, I propose an operator FICT that translates a predicate P into a predicate that means something along the lines of "plays a character that P."

(22) $[\![\text{FICT}]\!] = \lambda P.\lambda x.\lambda w : \textsc{acc}_{\text{fict}}(w')(w).\exists y[\textsc{plays}(y)(x)(w) \wedge P(y)(w')]$
$:: \langle\langle e, \langle s,t\rangle\rangle, \langle e, \langle s,t\rangle\rangle\rangle$

In prose, FICT takes a predicate P, an individual x (typically a real individual), and a world w (typically the real world or a close possible world), and returns true if x plays a character y at t in w such that P is true of y in a contextually salient world w' (typically a fictional world).

This operator turns out to be quite versatile. Its most obvious application is in downward cross-world sentences. If we take JEDI to be a predicate that takes a single individual (plus a world) and m to be a constant representing Mark Hamill, then:

(23) $[\![\text{Mark Hamill FICT is a Jedi}]\!] \equiv \text{FICT}(\textsc{jedi})(m)(w^*)$
$\equiv \exists y[\textsc{plays}(y)(m)(w^*) \wedge \textsc{jedi}(y)(w')]$

In prose, there exists a character played by Mark Hamill who is a Jedi in a relevant world w' (which here is clearly w_{SW}). This is clearly true and is what one means when one says (6).

We can also use FICT to analyze upward cross-world sentences. To do this, we need to put the operator in a different syntactic position. Rather than applying to a sentential predicate, it will apply to an NP. If we let r be a constant representing Tracy Smith, then:

(24) $[\![\text{Tracy Smith interviewed a FICT Jedi}]\!]$
$\equiv \exists y[\text{FICT}(\textsc{jedi})(y)(w^*) \wedge \textsc{interviewed}(y)(r)(w^*)]$
$\equiv \exists y[\exists x[\textsc{plays}(x)(y)(w^*) \wedge \textsc{jedi}(x)(w')] \wedge \textsc{interviewed}(y)(r)(w^*)]$

In prose, there exists an actor who played a character who was a Jedi (in the appropriate world), and Tracy Smith interviewed that actor. This is indeed what one means by (9).

2.3. Pronouns and names

Pronouns and proper names present a potential problem for my analysis of upward cross-world sentences in particular. Both are often taken to be directly referential to individuals (Kaplan, 1989; Soames, 2002). Thus, there is no DP-internal position where FICT can be inserted in between a determiner and a predicate of type $\langle e, \langle s, t \rangle \rangle$. This problem is solved differently for names than for pronouns.

2.3.1. Names could be nouns

There is reason to argue, contra the Millian view (Mill, 1843), that proper names are predicates (Frege, 1892; Elbourne, 2005; Fara, 2015a, b; Agolli, 2023). In this view, called *predicativism*, a name like "Emily" has the meaning "is named Emily." Slightly more formally, in my analysis, a name must also take time and world arguments, so we get:

(25) $[\![\text{Emily}]\!] = \lambda x.\lambda w.x$ is named Emily in w

Names are usually selected by a silent THE, which has the same meaning as regular *the*.[7]

Evidence for predicativism includes the ability of names to sometimes be selected by explicit determiners, as well as to take adjectival adjuncts.

(26) a. There are four Jasons in my class.
b. This Jim is a morphologist.
c. There was a tall Charlotte at the grocery store.

Adopting predicativism[8] allows us to find space within the DP in which to insert FICT.

(27) $[\![\text{[THE [FICT Luke Skywalker]]}]\!] = \iota x.[\![\text{FICT}]\!](\textsc{Luke})(x)(w^*)$
$= \iota x.\exists y[\textsc{plays}(y)(x)(w^*) \wedge \textsc{Luke}(y)(w')]$
$\approx \iota x.x$ plays a character named "Luke Skywalker" $= m$

Thus, upward cross-world sentences actually do what downward ones only appear to do; that is, they replace a reference to someone from one world with a reference to someone from another. In (27), we see that the DP we get from the name *Luke Skywalker* actually does evaluate to the same individual that we would call *Mark Hamill* in non-cross-world contexts.

[7] Agolli (2023) takes a more complicated view of definiteness as it relates to proper names, but those details are not relevant to this discussion.

[8] Strictly, one might say we only need to adopt predicativism for names of fictional characters. I adopt it for names of real people as well, both because using separate theories for different names would be unnecessarily cumbersome, and because we can get cross-world sentences where the "fictional" character is a real person:

(1) Context: John saw Daniel Day-Lewis, who played Abraham Lincoln in the movie Lincoln.
John saw Abraham Lincoln at the celebrity party.

In principle we could instead say that the real Abraham Lincoln and the fictional one are different individuals, but that is undesirable for reasons discussed in a previous footnote.

2.3.2. Pronouns are not nouns

Pronouns, like names, are often supposed (Kaplan, 1989) to be directly referential. Unlike proper names, it is quite difficult to analyze them as predicates. One reason for this is that pronouns seem to be more limited in their ability to be selected by overt determiners.

(28) a. The tall {Dennis/*he} wants some water.
b. I saw a {Bob/*you} over there.
c. Four {Ericas/*hers} are writing as quickly as they can.

There are some contexts where a pronoun with a determiner is okay. For whatever reason, these constructions seem to require an adjunct (either an adjective or a relative clause), and they are most natural with first- and second-person singular pronouns. They're degraded with third-person animate singular pronouns, and *it* and plural pronouns are right out.

(29) a. I need to find the real me.
b. The you that I know wouldn't do that.
c. ? Arnold is being the worst him he can be.
d. * This is the finest it I've ever seen.
e. ?? Let's try to be like the us that won the intramural Spades championship.

However, there is reason to think the instances of *me* and *you* in (29) are not really pronouns. They clearly have some deictic properties, but syntactically, they lack some of what we associate pronouns with in English. They can't take nominative case or become reflexives. They also always trigger third-person verb agreement. They can be used genitively, but this is marked with the *-'s* ending used on nouns, not by changing the "pronoun" to its typical genitive form.

(30) a. * The real I never liked biology.
b. * I'm going to find the real myself.
c. The real me {is/*am} a musicologist.
d. This is the real {me's/*my} LaTeX template.

Thus, we will set these constructions aside for now and assume that predicativism will not save us this time.

The surface area of this problem is smaller than it might initially seem. As I stated in 1.3.1, the overt referent of a first- or second-person pronoun spoken by a real person cannot be a fictional character. Thus, we need only be concerned about third-person pronouns.

2.3.3. Pronouns as determiners with complements

An approach that might better suit our purposes is that used by Elbourne (2001). He examines 'E-type' pronouns (i.e. pronouns that have non-c-commanding antecedents). He claims that their meaning is equivalent to that of *the*, but each pronoun has an unpronounced NP complement, with the same description as the antecedent. Thus, the well-known donkey sentence is analyzed as:

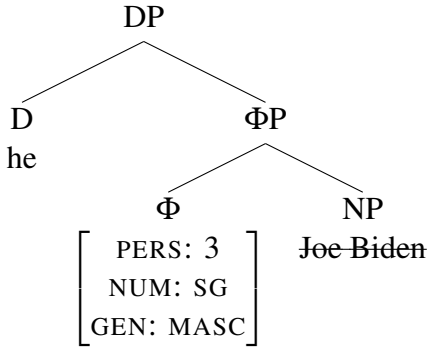
(31) Every farmer who owns a donkey beats [$_{DP}$ it ~~donkey~~].

This analysis works well with FICT, because FICT can slide right in between the pronoun and its complement. We might then analyze (13b) as:

(32) You know [$_{DP}$ THE FICT Xplodinator]? [$_{DP}$ {She/He} ~~FICT Xplodinator~~] likes Spicy Sweet Chili Doritos.

Elbourne claims that the pronoun gets its φ-features through agreement with the NP complement. However, this seems to be a poor fit for English, where there is no clear gender on noun heads. Therefore, following many others (Déchaine and Wiltschko, 2002; Bjorkman, 2017; Šereikaite and Zanuttini, 2024: , i.a.), I adopt an analysis whereby the pronoun acquires φ-features from a Φ head in between the NP and DP layers.[9] This is shown by (33), which is the tree for *he* when it references Joe Biden.

(33)



Following Sauerland (2008), I assume that the effect of a Φ head is to add a presupposition that the referent is compatible with the head's φ-features.[10] Setting aside person and number, then, a Φ head has type $\langle\langle e,\langle s,t\rangle\rangle,\langle e,\langle s,t\rangle\rangle\rangle$ and a denotation along the lines of (34).

(34) a. $[\![\Phi[\text{GEN: MASC}]]\!] = \lambda P.\lambda x.\lambda w : \text{MALE}(x)(w).P(x)(w)$
b. $[\![\Phi[\text{GEN: FEM}]]\!] = \lambda P.\lambda x.\lambda w : \text{FEMALE}(x)(w).P(x)(w)$

This has significant implications for upward cross-world sentences. Since Φ and FICT are both of type $\langle\langle e,\langle s,t\rangle\rangle,\langle e,\langle s,t\rangle\rangle\rangle$, in principle either of them can be higher than the other. This does not preclude the possibility of syntactic restrictions, but I claim that there is (at least in English) optionality in their ordering, and the choice of which to put higher affects the gender of the resulting pronoun.

If Φ adjoins below FICT, then Φ selects *Xplodinator*. There is only one individual x that satisfies $\text{XPLODINATOR}(x)(w)$ for any w we have discussed, and that individual is a man. Thus, using $\Phi[\text{GEN: FEM}]$ would cause the resulting predicate to have no individuals that can make the entailment true and satisfy the gender presupposition, whereas using $\Phi[\text{GEN: MASC}]$ will allow there to be exactly one such individual. Thus, if Φ is to be adjoined below FICT, it must bear [GEN: MASC]. Thus, the pronoun, upon agreeing, will gain a [GEN: MASC] feature, and be spelled out as *he*.

(35) You know [$_{DP}$ THE FICT Φ[GEN: MASC] Xplodinator]? [$_{DP}$ He ~~FICT Φ[GEN: MASC]~~

[9]Pronoun structure varies cross-linguistically and sometimes within languages. Veneeta Dayal (p.c.) notes that null pronouns in Hindi lack number features and may lack gender. Examining the behavior of these pronouns in referential cross-world sentences would be an interesting direction for further research.

[10]Sauerland assumes a slightly different structure, where the ΦP layer is higher than the DP layer, which means that his type and semantics for Φ are different. Nonetheless, the effect of adding a presupposition that the nominal satisfies the φ-features is the same.

~~Xplodinator~~] likes Spicy Sweet Chili Doritos.

On the other hand, if Φ is above FICT, then it selects FICT Xplodinator, which is a predicate that can be satisfied by exactly one individual: Emily, a woman. Thus, if we want to have any hope of the DP having a referent, Φ must bear [GEN: FEM]. As a result, the pronoun gets a [GEN: FEM] feature and is spelled out as *she*.

(36) You know [$_{DP}$ THE Φ[GEN: FEM] FICT Xplodinator]? [$_{DP}$ She ~~Φ[GEN: FEM] FICT Xplodinator~~] likes Spicy Sweet Chili Doritos.

This accounts for the ability to use either pronoun in upward cross-world sentences in English. This does not generalize to the downward case because downward cross-world arguments do not contain DP-internal FICT. Thus, the DP's φ-features must match its explicit referent, and its ability to bind anaphors is restricted accordingly.

2.4. Accounting for the remaining asymmetries

The FICT operator can be used in more ways than have been enumerated so far. It can be used within predicate conjuncts, potentially with different fictional worlds in each one.

(37) Mark Hamill has [FICT been a Jedi] and [FICT fought Batman].

This is true with each FICT using a different w' (the worlds of Star Wars and Batman: The Animated Series respectively). Coordination of two predicates in an upward cross-world sentence cannot be generated this way.

(38) # [THE FICT Obi-wan Kenobi] has been Knighted by Elizabeth II and is an avid motorcyclist.

Here, [THE FICT Obi-wan Kenobi] can only refer to one individual. That there are two people who satisfy the predicate ⟦FICT⟧(OBI-WANKENOBI) means that THE will fail its presupposition. Even if we allow context to constrain the domain of THE such that it picks either Alec Guiness or Ewan McGregor, either choice will yield a false result with one of the predicates. This accounts for the asymmetry between (37) and (38).

The analysis also predicts that there should be "half-downward" sentences, where a predicate referring to a real person is coordinated with or adjoined to one referring to their character. This is indeed possible, as shown by (39).

(39) A: Man, George Lucas is so prejudiced against people from Oakland. He never lets them have any good roles.
B: Bullshit! Mark Hamill is from Oakland and a [FICT Jedi].

We can also get "half-upward" sentences by using FICT inside the subject DP and one of the conjuncts, as in (40).

(40) [THE FICT Luke Skywalker] is from Oakland and a [FICT Jedi].

We can also use FICT both DP-internally and with the sentential predicate in the same sentence to generate the kind of sentence in (19), where a character's name stands in for a different character named after the same actor.

(41) *Context: Indiana Jones from the Indiana Jones movies and Han Solo from Star Wars are both played by Harrison Ford.*
A: What happened in the movie you watched last night?
B: **Han Solo** raided a temple and stole some stuff.

The intended interpretation of (41) is that the person who played Han Solo also played a character who raided a temple and stole some stuff. Its structure is shown by (42).

(42) [THE FICT Han Solo] [FICT raided a temple and stole some stuff].

This kind of sentence is permissible when, for example, the speaker intends to express that the character was played by Harrison Ford, but can't remember Harrison Ford's name.

Notably, the analysis does not generate the inverse, where an actor's name appears to stand in for another actor who played the same character. A construction like [THE FICT Alec Guinness] would refer to "the actor who plays Alec Guinness," which is either no one, since Alec Guinness is a real person, or some actor who played him in, e.g., a biopic. If we try to take the structure of (42) while trading out the fictional names and predicates for real ones, we get (43).

(43) # [THE FICT Alec Guinness] [FICT is an avid motorcyclist].

In prose, this means something like 'The actor who plays Alec Guinness plays a character who is an avid motorcyclist.' This might be true, if there is a biopic about Alec Guinness and the actor who plays him also played an avid motorcyclist (which could be Ewan McGregor) in some other film. However, its truth conditions have nothing to do with the fact that Alec Guinness and Ewan McGregor both played the same character. Indeed, the characters *played by* Alec Guinness don't figure into it at all.

3. Additional topics in cross-world reference

3.1. Gender mismatches in languages with grammatical gender

In languages where gender is marked on nouns, gender mismatch between the overt referent of an upward cross-world sentence and other items that reference or agree with the cross-world element is not as freely available. A comprehensive treatment of this would require a full typological study that is outside the scope of this work, but two case studies are presented here.

3.1.1. Italian

In Italian, a gender mismatch in a downward cross-world sentence is just as bad as in English.[11]

(44) Italian
Context: Emilia is an actress, playing a male character named Alessandro in a film. In the film, Alessandro gives a weird description of himself to a wizard.
a. Emilia ha dato una strana descrizione di se stess-a al mago.
E. has given a strange description of self same-FEM to.the wizard
'**Emilia** gave a strange description of **herself** to the wizard.

[11] This data comes from Raffaella Zanuttini, who is from northern Italy. Other speakers may form the simple past differently.

b. # Emilia ha dato una strana descrizione di se stess-o al mago.
E. has given a strange description of self same-MASC to.the wizard
'**Emilia** gave a strange description of himself to the wizard.

However, the optionality of gender pronouns in upward cross-world sentences shown in (13b) becomes more difficult to achieve, as shown by (45b).

(13b) Xplodinator went to get { himself / herself / ?#Emily } some Doritos.

(45) *Context: Emilia is an actress, playing a character who is a man named Alessandro. In real life, while not on camera or in costume Emilia is looking at herself in the mirror, and the speaker does not remember her real name.*

a. Alessandro sta guardando se stess-o allo specchio.
A. is looking self same.MASC at.the mirror
'Alessandro is looking at himself in the mirror.'

b. ?? Alessandro sta guardando se stess-a allo specchio.
A. is looking self same.FEM at.the mirror
'Alessandro is looking at herself in the mirror.'

A consultant described (45b) as being possible only with imaginary quotation marks around "Alessandro." Interestingly, the mismatched sentence seems to improve if, rather than a name, the subject is a noun with an *-e* ending. Such nouns can be masculine or feminine, with gender marked on the article.

(46) *Context: Emily's character Alessandro is a doctor. The speaker does not remember Emily's or her character's names, but remember the character's occupation.*

a. Il dottore sta guardando se stess-o allo specchio.
the.MASC doctor is looking self same.MASC at.the mirror
'The doctor is looking at himself in the mirror.'

b. ? Il dottore sta guardando se stess-a allo specchio.
the.MASC doctor is looking self same.FEM at.the mirror
'The doctor is looking at herself in the mirror.'

The feminine reflexive becomes completely acceptable if the noun also starts with a vowel, which causes syncretism between the masculine and feminine definite articles (they both contract to *l'-*).

(47) *Context: Emily's character Alessandro is a teacher. The speaker does not remember Emily's or her character's names, but remember the character's occupation.*

a. L'-insegnante sta guardando se stess-o allo specchio.
the-teacher is looking self same.MASC at.the mirror
'The teacher is looking at himself in the mirror.'

b. L'-insegnante sta guardando se stess-a allo specchio.
the-teacher is looking self same.FEM at.the mirror
'The teacher is looking at herself in the mirror.'

If the marginality of (46b) is the result of a feature conflict between the feminine *stessa* and the masculine referent of the subject causing the article to have difficulty finding an acceptable form, then (47b) may be an example of ameliorative syncretism (Soares, 2023), where such

a conflict is rendered irrelevant because both features would result in the same phonological form.

3.1.2. Russian

Russian past-tense verbs agree in gender with the subject. This gives us another method for testing the gender features of a cross-world argument. For downward cross-world sentences, the verb expones the features of the explicit argument.[12]

(48) *Russian*
Context: Emily, a woman, plays a male character named Infanto in an RPG. In the game, Infanto has just cast a spell.
a. Emily premenil-a zaklinanie
Emily.NOM used-FEM spell.ACC
'**Emily** cast a spell.'
b. # Emily premenil-Ø zaklinanie
Emily.NOM used-MASC spell.ACC
Intended: '**Emily** cast a spell.'

For upward cross-world sentences, we find a similar contrast to what is seen in Italian.

(49) *Context: Emily just went to get herself a snack.*
a. Infanto poshel-Ø zakusit'
Infanto.NOM went-MASC snack.INF
'Infanto went to get a snack.'
b. ? Infanto poshl-a zakusit'
Infanto.NOM went-FEM snack.INF
'Infanto went to get a snack.'

(49b) is only possible in a humorous context, implying that Emily is so in-character that she is still Infanto when she gets a snack. Thus, we find a similar pattern to what we found in Italian.

3.2. Dream reports as cross-world sentences

Some scholars have examined sentences that report on dreams (Percus and Sauerland, 2003; Anand, 2007), like (50).

(50) John: I dreamed that I married my grand-daughter. (Percus and Sauerland, 2003: :3)

Critically, one property of dreams is that John can have a dream from the point of view of someone else. In such a dream, there might even be an individual named *John*, who seems to be about the same as the real John. On the surface, it seems that the first-person pronouns uttered by John in the embedded clause could refer to either the point-of-view character or to the character whose properties are similar to the real John. However, if John had a dream from the point of view of his friend Bill, then the event which happened in John's dream that (50) describes could be any of (51a), (51b), or (51d), but not (51c).

(51) a. Bill married Bill's granddaughter.

[12] My Russian data comes from Tamara Vardomskaya.

b. Bill married John's granddaughter.
c. # John married Bill's granddaughter.
d. John married John's granddaughter.

Percus and Sauerland (2003) assume that the embedded first-person pronouns in (50) can actually refer to Bill, but they posit an empirical generalization that limits the possible configurations:

(52) The Oneiric Reference Constraint (ORC)
A sentence of the form
X dreamed that ...pronoun...
allows a reading in which the pronoun has *the dream-self* as its correlate only when the following condition is met: *some* pronoun whose correlate is *the dream-self* on the reading in question must not be asymmetrically c-commanded by any pronoun whose correlate is *X*. (Percus and Sauerland, 2003: :5)

Percus and Sauerland derive this from a movement constraint that depends on morphological features. It can be analyzed more parsimoniously with FICT. We can treat a dream as a world, and take John's relationship to Bill to be the same as an actor to a character. Then we can derive these readings as shown by (51′).

(51′) a. I dreamed that [1SG FICT λ_1 [t_1 married t_1's granddaughter]].
b. I dreamed that [I FICT married my granddaughter].
c. # I dreamed that [$_{TP}$ 1SG [FICT [λ_1 [I [married t_1's grand-daughter]]]]].
d. I dreamed that [I married my granddaughter].

Here, 1SG, or *I* (I take *my* to be the morphological result of combining 1SG with a possessive morpheme), always refers to John. John, the real person, and John, the dream character who looks like the real John, are treated as the same individual. John cannot use *I* to refer to Bill, just as Mark Hamill cannot use *I* to refer to Luke Skywalker, but FICT allows John to talk about the character he plays in the dream, which is Bill.

In the interpretation of (51a), the pronoun in *my* is bound by the embedded *I*, in the sense of Heim and Kratzer (1998). The ability of a first-person pronoun c-commanded by another first-person pronoun to take bound or unbound readings is unrelated to world-crossing. Consider the unembedded (and therefore quite illegal) example in (53).

(53) Joe: I married my granddaughter.
Dave: Me, too.
a. Dave married Joe's granddaughter.
b. Dave married Dave's granddaughter.

Here, Dave can interpret the lower pronoun in Joe's statement as either unbound or bound. If it is unbound, it refers to Joe, so Dave's response has the meaning in (53a). If it is bound, it must corefer with the higher pronoun, so Dave's response has the meaning in (53b). In (51a), the lower pronoun is similarly bound before FICT is applied. Thus, after applying FICT, we get a meaning along the lines of 'I played a character *x* such that *x* married *x*'s granddaughter.'

The reason for the unacceptability of (51c) is clear: in order to generate this reading, we had to move the 1SG out of the possessive, but that means it moved past the embedded subject *I*,

which also refers to John. This constitutes a strong crossover violation (Postal, 1971). None of the other readings requires such a violation in order to derive its semantics.

4. Conclusion

Early in this paper, I presented a set of asymmetries between downward and upward referential cross-world sentences, and claimed that these demonstrate that a direct referential analysis could not possibly account for them. Indeed, I have shown that the two types are structurally distinct. What is remarkable, though, is that we can generate these two structures using the same operator, but in different places. FICT has shown itself to be quite versatile in making both positive and negative predictions about available readings. Furthermore, it does not overgenerate. While FICT, especially when invoked multiple times, can generate a variety of different structures, we find that these structures are actually acceptable, and generally attested. We could, of course, come up with sufficiently large structures that are difficult to accept because of their complexity, but that is true of almost everything in semantics and syntax where recursion is possible.

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