Liftetime effects in X-marked conditionals

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1 Introduction

Conditional sentences enable speakers to express reasoning about hypothetical situations. In doing so, speakers may suspend or modify what is known or presumed about the actual world–functions that are typically signalled by grammatical marking. Languages employ different strategies for this purpose, ranging from designated markers (e.g. Hungarian) to modal verbal morphology (e.g. Romance languages) and repurposed temporal and/or aspectual morphology (e.g., English, Hindi). In order to discuss this variation in terms that are not burdened by historical or theory-internal implications, von Fintel & Iatridou (2023) propose the term *(e)X(tra)-marked* for conditionals containing grammatical marking which indicates the suspension or modification of background assumptions, and *O(rdinary)-marked* for those that do not. English examples are given in (1) for the O-marked case, and in (2) and (3) for X-marked cases.[1]

(1) If John *runs* the Boston Marathon next spring, he *will* win. *O-marked [O]*

(2) If John *ran* the Boston Marathon next spring, he *would win*.
Simple Past X-marked [SPX]

(3) If John *had run* the Boston Marathon next spring, he *would have won*.
Past Perfect X-marked [PPX]

Both X-marked forms contain instances of *fake past* (Iatridou 2000), as temporal past and past perfect morphology (`ran` and `had run`) can be used to consider a hypothetical event in the future (`next spring`). While it is widely agreed that this extra morphology serves to signal the "suspension of presuppositions" (Stalnaker 1975) and thereby widens the domain of worlds under consideration (to include antecedent worlds), the details remain disputed. Specifically, it is unclear what role is being played by the repurposed temporal or aspectual morphology, and accounts differ as to whether and to what extent the core meaning plays a role (*Past-as-Past* vs. *Past-as-Modal approaches*, see von Fintel & Iatridou 2023; Kaufmann 2023 for overviews). This interacts with a related question concerning the difference between different types of X-marking in languages like English, as evidenced by SPX and PPX in (2) and (3), respectively. There is no reason to expect *a priori* that the same analysis applies to both X-marking forms in English.

[1] These terms are inspired by languages like English, where there is a morphological divide between (1) on the one hand and (2)/(3) on the other. However, another cross-linguistically attested strategy is to distinguish morphologically between the analogs of (1)/(2) on the one hand and (3) on the other (see our discussion of Japanese below). With this caveat in mind, we adopt von Fintel & Iatridou's terminology as a helpful discussion starter.

The term "lifetime effects" refers to a cluster of infelicity patterns in the distribution of the English Present Perfect. For instance, the infelicity (out of the blue) of (4a) is taken to be related to the fact that Einstein is no longer alive, as evidenced by the contrast with the (as of now) perfectly felicitous (4b).

(4) a. # Einstein has visited Princeton.
b. Kamala Harris has visited Princeton.

The contrast was first noticed by Chomsky (1970) and subsequently developed into a hotly debated topic in semantics. There are a number of open issues relating to which participant's life time is crucial, what role is played by information structure (topicalization, Question under Discussion), and whether lifetime effects can be explained in terms of other properties of the English Present Perfect (present relevance, repeatability).[2]

The present paper will not contribute to these debates around the English Present Perfect. We borrow the term "Lifetime effects" not because of its associated theoretical assumptions, but because it is a suitable descriptive term for the patterns we discuss below. Specifically, we show that the choice between different X-marking strategies is influenced by assumptions about normal lifetimes of the participants in the relevant hypothetical events. For now, we remain agnostic as to whether the phenomena are related, or even amenable to the same approach. With this caveat, we now turn to X-marked conditionals. We first give a brief outline of the relevant theoretical background, then we turn to lifetime effects and their significance.

2 SPX and PPX marking: the received wisdom and a puzzle

The semantic difference between English SPX- and PPX-marking is still not fully understood. Considerable headway has been made since around the turn of the millenium, and agreeement has begun to congeal around some basic tenets. But much of this is tentative and subject to refinement or even revision in light of additional investigations within and across languages.

2.1 X-marking and remoteness

One point on which refinement seems called for concerns the idea that the PPX form is preferred in contexts in which the antecedent is "more counterfactual" or farfetched. This is motivated in part by Iatridou's (2000) observation that the SP form is used for *Future Less Vivid (FLV)* cases—that is, those for which the antecedent is unlikely but not altogether impossible. For instance, if our athletic friend John, who tends to win whatever sports events he participates in, has expressed a clear intention to skip the Boston marathon next spring, then (2) is the best choice to convey our conviction that he is forgoing a fairly sure win. In contrast, (3) appears to suggest an unsurmountable obstacle; Ippolito (2013, p. 41) provides a scenario where John unexpectedly died last summer while training for the Boston marathon.

[2]For background and discussion, see Smith (1997), Musan (1997, 2002), Portner (2003); Meyer-Viol & Jones (2011), a. o.

Relatedly, Ippolito (2013) observes that the implication of the antecedent's falsehood is not cancellable in PPX-marked conditionals, but can be canceled in at least some SPX-marked ones, arguing that the fomer comes about as an *antipresupposition* (Section 3.4.4).[3] In our running example (pun intended), this is shown by the fact that in a context in which the antecedent is explictly given some chance of being true, the SPX conditional can be used but the PPX conditional cannot:

(5) *[There is only a slight chance that John will run the BM next spring. That's too bad because. . .]*

a. If he ran, he would win.

b. # If he had run, he would have won.

Ippolito (2013) accounts for these observations in the context of her overall proposal as follows. For both SPX and PPX conditionals, she gives a *Past-as-Past* account in a branching-time framework: X-marked conditionals are evaluated, at utterance time t, relative to a modal domain that is determined by the accessibility relation at an *earlier* time $t' < t$. This backshift widens the modal base by including worlds that were accessible at t' but have become inaccessible by t. In our example, X-marking shifts the time of evaluation to a past point at which John has not yet made up his mind on whether to participate, thus expanding the modal domain to include worlds in which John runs the Boston marathon in the following spring. This much is shared, under Ippolito's analysis, by both SPX and PPX conditionals.

As for the difference between the two types of X-marking, Ippolito argues that it crucially involves the presuppositions of the antecedent. She adopts a version of Musan's (1997) expansive notion of presupposition, according to which predicates like `run the Boston marathon` presuppose that their subjects are alive. In this case, since the predicate is eventive and evaluated with regard to a future time, what needs to hold at evaluation time is that John's running the marathon is *possible*. And this, Ippolito argues, requires that John is alive at evaluation time.

All the antecedents in (1) through (3) share this presupposition; however, they differ in the time at which it must be satisfied.[4] The SPX variant (2) (as well as the O-marked (1)) require that John be alive at utterance time. PPX marking differs in that it induces a shift into the past for the purposes of evaluating the antecedent's presuppositions. This shift to a past presupposition time happens in addition to the aforementioned shift to a past modal accessibility time (and the two times need not coincide). Crucially, this renders the sentence felicitous in case John passed away last year while training for next year's marathon (Ippolito's scenario): the presupposition that he is alive is not satisfied at the utterance time, but it is satisfied at a past time before his passing, which we can use to access alternative histories at which it is still an option for him to run the marathon. In this case, his being

[3] This claim may seem at odds with the fact that *Anderson Conditionals* (1951), typically used to offer an explanation for the current state of affairs, are not strongly counterfactual. We follow Ippolito (2008) in assuming that they are SPX conditionals with Perfect morphology in their constituents.

[4] Ippolito offers a slightly different account for cases in which a specific antecedent-type event that happened in the past is counterfactually supposed to happen in the future. In such cases the impossibility presupposition can be satisfied—and the PPX form required—due to the non-replicability of the event, even if the subject is alive. These examples are not relevant to our current discussion.

dead constitutes the obstacle that renders the antecedent remote enough (in fact, counterfactual) to merit the use of PPX.

Ippolito's account constitutes significant progress and gets many things right, but it is not without problems. One such problems, which affects all Past-as-Past accounts of SPX conditionals, concerns antecedents which never had any chance of being true, such as the *countermathematical* in (6).

(6) a. If nine were even, it would be divisible by two.
b. # If nine had been even, it would have been divisible by two.

Here the SPX form is preferred, but the antecedent is at present just as impossible as it has always been. Nor is it clear what presuppositions of the antecedent should be at play and satisfied at utterance time. This pattern is rather stable cross-linguistically (Mizuno & Kaufmann 2018, i.a.).

Another issue affects any account which, like Ippolito's and that of von Fintel & Iatridou (2023), assumes that the choice between SPX and PPX is driven solely by the antecedent. In Section 3, we briefly discuss data from Kaufmann (2023) which show that the judgments in the Boston marathon example can be changed by manipulating the consequent or the context while holding the antecedent constant.

In the following, we present a novel contrast that proves problematic not only for Ippolito's proposal, but for any account that treats PPX marking as reserved for more far-fetched antecedents than what SPX marking can be used for.

2.2 The puzzle

By the reasoning outlined above, we would assume that the preference for PPX marking over SPX marking carries over to the following pair. Pheidippides (530-490 BC) was the Greek courier who ran "the original marathon", that is, the 40km distance from Marathon to Athens (to announce the Athenian victory over the Persians on the battlefield at Marathon, but also to warn the unfortified city of a potential attack by the Persian forces who had retreated by sea).

(7) a. If Pheidippides ran the BM next spring, he would win. *[SPX]*
b. # If Pheidippides had run the BM next spring, he would have won. *[PPX]*

Famously (according to the legend), upon delivery of the message, Pheidippides collapsed from exhaustion and died; but even if we didn't know this, we would assume that he had since passed away (from old age, if not for any other reason).

The infelicity of (7b) can find an explanation under Ippolito's approach: its antecedent presupposes that Pheidippides is alive next spring. But we cannot find a past time at which this was a live possibility: unlike John, who died only last year, Pheidippides has been dead for over 2,500 years. Any conceivable way of putting him into next year's Boston Marathon involves drastic changes to physical and/or bilogical laws of nature (extreme longevity, resurrection, time travel or the like). Elaborate backstories along these lines can indeed render (7b) marginally acceptable; but the contrast with the perfectly felicitous (3) remains. For these reasons, we call the infelicity of (7b) a *lifetime effect*: the antecedents of PPX-marked conditionals are limited to hypothetical events that respect reasonable life

times of their subjects. In this, they are surprisingly like O-marked conditionals, except that PPX-conditionals access alternative histories branching from the past.

But the very success of Ippolito's presuppositional account in predicting the lifetime effect in (7b) proves problematic in the face of the felicity of (7a). According to her, the difference between SPX and PPX lies solely in the time at which the antecedent's presuppositions are evaluated. If the lifetime effect in (7b) derives from a presupposition that fails to hold at all possible developments from a past point of evaluation, it is a mystery why that same presupposition should hold at utterance time. If Pheidippides's running in next years Boston Marathon was not a possible at any point in the past, then it surely is not a live possibility now.

In the following, we account for the contrasts in terms of independently motivated assumptions about different ways of making room to integrate the antecedent proposition with facts known or presumed true. Lifetime effects will fall out as entailments of the antecedent: running a marathon entails being alive; making worlds accessible at which an individual runs a marathon next spring means making worlds accessible at which that individual is alive next spring.

3 What X marks

The view that PPX marking is preferred for conditionals with more far-fetched antecedents was already shown to be on shaky ground by observations on countermathematicals and other prior work (Schulz 2017; Kaufmann 2023). Lifetime effects constitute yet another nail in its coffin. The alternative view that we would like to promote is based on two core observations.

Firstly, SPX marking is general and underspecified, whereas PPX marking is specialized and restricted in its occurrence. SPX marking is the generic form for the expression of all kinds of irrealis conditionals, spanning the spectrum from the merely unlikely (Future-Less-Vivid) to the causally or even logically impossible (countermathematicals). Secondly, PPX marking requires the existence of a causally coherent course of events which departs from the actual history and leads to the truth of the antecedent. This explains not only the observation (which would otherwise be utterly puzzling) that SPX marking can be used at both extremes of the unlikelihood spectrum, but also the the felicity patterns of minimal pairs contrasting SPX and PPX: the SPX form is at most dispreferred, but never really out, whereas in some cases the PPX form simply cannot be used. For instance, (2) is not impossible, just dispreferred, if John is dead; but the PPX variant of the countermathematical in (6b) strongly suggests a past time at which the number nine "became" even; and the Pheidippides PPX in (7b) is simply nonsensical.

We adopt some ideas from Kaufmann (2023) in making sense of these observations. Specifically, we advocate a *Past-as-Modal* approach to SPX marking and a *Past-as-Past* approach to PPX marking, with the extra twist that PPX-marking expresses a combination of the same (modal) SPX-marking in the scope of a (temporal) backshift. Semantically, SPX marking signals a *causal intervention* on the actual state of affairs, undoing some facts for the sake of consistency with the antecedent. PPX marking also signals such an intervention, and in addition that this intervention takes place in the past (from the perspective of the utterance time).

It is generally agreed that an adjustment takes place when the antecedent is inconsistent with the established facts, and that the adjustment is signaled by X-marking (Stalnaker 1968, 1975, i.a.). In calling it a *causal intervention*, we endorse a certain perspective on the choice between facts to give up and facts to hold on to (Pearl 2000; Kaufmann 2001a, 2001b, 2001c, 2005a, 2009, 2013; Schulz 2007, 2011, i.a.) The claim that the function of marking this intervention is specifically tied to SPX-marking is not as universally held, possibly because it is not unequivocally forced on us by the English data. But we see it supported in cross-linguistic data from languages like Japanese, which has no analog of English SPX marking (hence English SPX-marked and O-marked conditionals have the same Japenese translation equivalents) and which expresses PPX conditionals with a single Past morpheme. We discuss the relevant Japanese data below.

In approaching our data from the perspective just outlined, it is important to keep in mind that the precise nature of the intervention is not determined by the content of the antecedent. The intervention *enables* the antecedent by undoing obstacles to its truth; but in any causal structure of even just modest complexity, there will be multiple ways of doing that Dehghani *et al.* (2012). For instance, if John died last spring while preparing for next year's marathon, we might envision ways of preventing his death—say, by changing the course of the accident, illness, or crime that actually killed him. All those are interventions in the past. Or we could imagine him being miraculously resurrected between now and next spring. That is an intervention in the non-past. The choice is not determined by the antecedent, but it can be influenced by the content of the conditional or contextual factors. This is how Kaufmann (2023) explains the felicity of the SPX conditional in (8).

(8) *[John died last spring.]*
   a. If John ran the BM next spring, that would be a miracle.
   b. # If John had run the BM next spring, that would have been a miracle.

As we said, we assume that both SPX and PPX conditionals signal a causal intervention; the latter signal in addition that that intervention targets past facts. We further assume that like the English Past tense, the extra Past layer in PPX conditionals requires that there be a contextually salient past time for the intervention to target. If no such past time is available, the PPX form cannot be used (hence the preference for SPX in countermathematicals). Thus of the two, PPX is the *marked* form both morphologically and semantically.

3.1 Towards a formal account

A detailed and fully explicit compositional semantic account would go beyond the scope of the allotted space, but in this subsection we aim to give enough of an idea of what it would look like. Some ingredients are worked out elsewhere; we especially rely on Kaufmann (2005a, 2005b, 2013, 2023) and Kaufmann *et al.* (2006).

3.1.1 Filter-funnel model

The structure of the model relative to which sentences receive their truth values is based on Thomason's (1984) notion of a "T×W"-frame, which in turn was an adaptation of Kamp's (1979) analysis of historical necessity. Figure 1 illustrates.

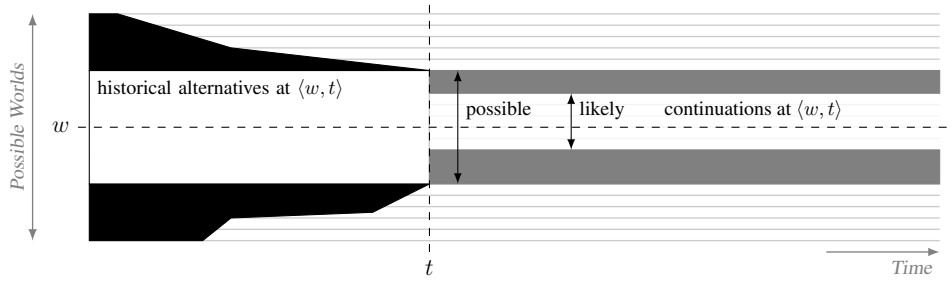

Figure 1: T×W frame

Sentences are interpreted at Montagovian *indices*, that is, world-time pairs. Each index $\langle w, t\rangle$ determines an equivalence class of *historical alternatives* $\langle w', t\rangle$, co-temporal indices at alternative worlds, subject to the condition that for any two times $t < t'$, the alternatives at $\langle w, t'\rangle$ are a subset of those at t, thus some alternatives at t may be lost by t' (courses of events that could have come to pass but didn't), but not *vice versa*. A constraint on admissible valuations of the language stipulates that at the truth values of all atomic formulas be constant across all historical alternatives at a given time. In Figure 1, the white rectangle to the left of t comprises indices which, at their respective times, are indistinguishable (by the language) from their co-temporal indices at w. This accounts for the intuition that at each time there is but one past. No such constraint governs the interpretation at later times: the alternatives at $\langle w, t\rangle$ may have different future continuations. Among those continuations (shown in the rectangle to the right of t), a stereotypical ordering source identifies some as more likely than others, indicated by the shading. We assume that the domain of modal quantification for O-marked conditionals is restricted to the likely continuations (the white area), while the others (the gray areas) figure in the interpretation of Future-Less-Vivid SPX conditionals.

3.1.2 Simple clauses

We assume with Kaufmann (2005b) that simple tensed clauses contain a modal operator quantifying over the set of historical alternatives. In Figure 2 at $\langle w, t\rangle$ this is indicated by the thick vertical line. For `John runs` to be true, all indices on this line must precede (due to the Nonpast tense) an index $\langle w', t'\rangle$ at which the sentence radical `John run` is true (i.e., a running event of John happens at time t' in world w'); for `John will run`, that requirement is restricted to just the stereotypical future developments.

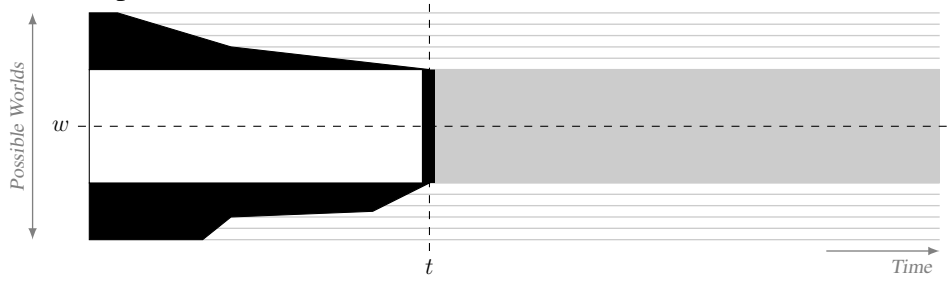

Figure 2: Interpretation of simple clauses

(9) a. `John runs` is true at $\langle w, t\rangle$ iff for all historical alternatives $\langle w', t\rangle$, there is some $t' \geq t$ s.t. `John run` is true at $\langle w', t'\rangle$.

b. `John will run` is true at $\langle w, t\rangle$ iff for all stereotypical alternatives $\langle w', t\rangle$, there is some $t' \geq t$ s.t. `John run` is true at $\langle w', t'\rangle$.

3.1.3 Conditionals: forward extension and restriction

The addition of an antecedent has two effects on the modal domain of the operator in the consequent. The first is a *forward extension* of the modal domain, in effect spreading the vertical line from Figure 2 into the shaded rectangle in Figure 3. The second is a *restriction* of this set of indices to those at which the antecedent is true. Thus importantly, the antecedent may be interpreted from a future perspective. See Kaufmann (2005b) for arguments for this view.

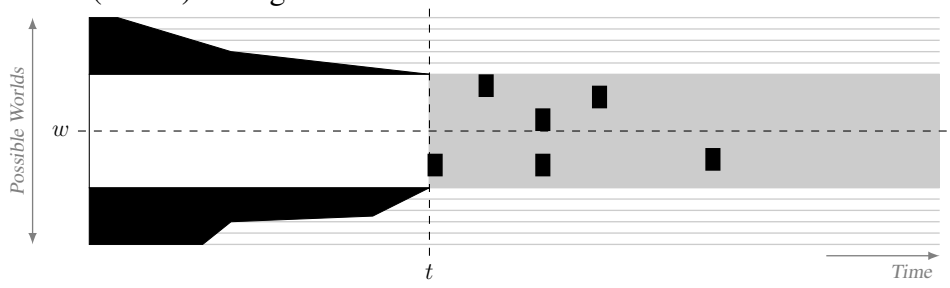

Figure 3: Forward extension

(10) `If John runs, he will win` is true at $\langle w, t\rangle$ iff for all stereotypical $\langle w', t'\rangle$ s.t. $\langle w', t\rangle$ is an alternative and $t < t'$ and at which `John runs` is true, there is some $t'' \geq t'$ s.t. `John win` is true at $\langle w', t''\rangle$.

3.1.4 X-marking: intervention

Kaufmann (2013) implements the notion of causal intervention in a Kratzer-style semantics, but without the temporal dimension inherent in a T×W-model. The inclusion of the temporal dimension is needed, but reserved for another occasion. Here we give an informal indication, focusing on the resulting widening of the modal accessibility relation (with both SPX and PPX) and backshift (with PPX). Note that the forward expansion and restriction that we attribute to all conditionals are also at work under X-marking.

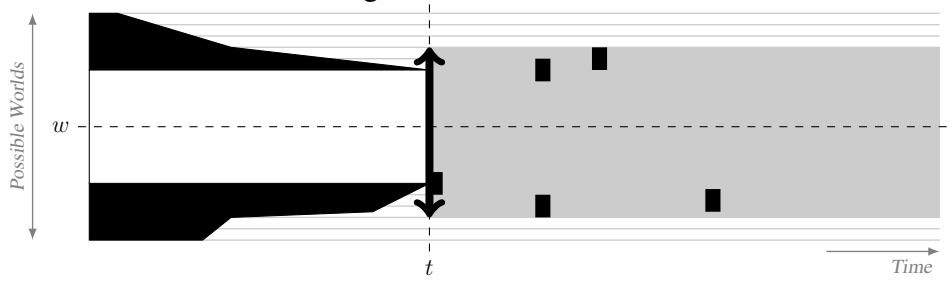

Figure 4: SPX: intervention in the non-past

SPX marking indicates a widening of the modal domain from the speech time onwards, making unlikely or impossible nonpast indices accessible; see Figure 4.

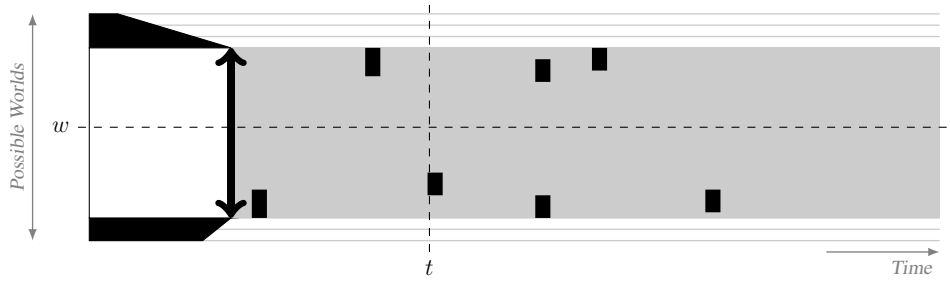

Figure 5: PPX: intervention in the past

PPX marking indicates a backshift in addition to the intervention; see Figure 5. This results in the inclusion of past indices in the modal domain. This explains why Japanese tenseless antecedents without aspectual morphology can refer to past times in PPX conditionals but not in SPX or indicative ones (see below).

4 Crosslinguistic data: Japanese

The literature on the English SPX/PPX distinction revolves almost exclusively around examples with present or future reference. This is because in those cases the two markings are distinguished morphologically, whereas with past reference they coincide. Thus while (11) is ill-formed, (12) is ambiguous between the two readings indicated (see also Ippolito 2008).

(11) # If Pheidippides ran the BM last year, he would have won.

(12) If Pheidippides had run the BM last year, he would have won.
   a. If it were the case that he ran ...
   b. If it had been the case that he runs ...

It is for this reason that English conditionals with past reference do not furnish clear minimal pairs for the investigation of the SPX/PPX contrast. However, the difference does show up in other languages. We discuss the case of Japenese.

Japanese has a number of conditional markers, most of which do double duty in other domains, for instance as markers of temporal relations. We focus here on `-(r)eba`, a common connective which is largely devoid of temporal import. We rely on Mizuno & Kaufmann (2018); Mizuno (2023) for key aspects of the analysis.

One relevant aspect of Japanese `-(r)eba` conditionals is that the antecedent cannot contain a tense morpheme, presumably for purely morphosyntactic reasons. Another relevant property of Japanese conditionals as a whole is that there is no marking for (what corresponds to English) SPX conditionals. Both of these properties are on display in the future-oriented conditional (13). First, in the verbal form in the antecedent, `de-reba`, the conditional connective `-(r)eba` combines directly with the verbal stem `de-`. Certain kinds of morphology can intervene between the two (such as negation, passive, perfective), but tense cannot. This lack of tense does not prevent the antecedent from referring to the future; on our account this falls out immediately from the forward shift induced by the conditional construction, as dis-

cussed for English in the last section. Crucially, as the English glosses indicate, the sentence is ambiguous between an O-marked and an SPX-marked reading.[5]

(13) [P-ga rainen BM-ni *de-reba* *kat-u*] daroo.
P-NOM next year BM-LOC participate-COND win-NONPAST MODAL
a. 'If Pheidippides runs the BM next year, he will win.' *[O]*
b. 'If Pheidippides ran the BM next year, he would win.' *[SPX]*

In contrast, the Japanese analog of the English PPX carries the Past morpheme `-ta`, which is expressed on the consequent, although we assume that the backshift operator that it denotes takes scope over the entire conditional, similarly Ippolito's proposal about English PPX marking. This is shown in (14). The sentence is grammatically well-formed, but infelicitous for the same reason that English (7b) is.

(14) # [P-ga rainen BM-ni *de-reba* *kat-]-ta* daroo.
P-NOM next year BM-LOC participate-COND win PAST MODAL
'If Pheidippides had run the BM next year, he would have won.' *[PPX]*

The main advantage of the Japanese data for our current discussion is that the SPX/PPX distinction that we have just observed with future reference also shows up in conditionals about the past. In this connection, the lack of tense in the antecedent proves to be particuarly useful.

First, consider (15), the past-reference counterpart of (13). It, too, is ambiguous between an O-marked and an SPX-marked reading. Furthermore, while the evaluation time of the antecedent can be shifted into the future, it cannot be shifted into the past. This is similar to English, where sentences like `*If P runs the BM last year...` is ill-formed. To be sure, Japanese indicative or SPX conditionals can refer refer to the past. But whereas English antecedents can carry Past tense to achieve this, in Japanese under `-(r)eba`, an aspectual morpheme must be used, such as `-tei-` on its perfective reading (for background on Japanese tense and aspect, including `-tei-`, see Kaufmann 2020). With this form, plus Past tense in the consequent, reference to the past is possible.

(15) [P-ga kyonen BM-ni *de-**tei**-reba* *kat-ta*] daroo.
P-NOM last year BM-LOC partic.-PERF-COND win-PAST MODAL
a. 'If P ran the BM last year, he won.' *[O]*
b. 'If P had run the BM last year, he would have won.' *[SPX]*

Importantly, Japanese (15) is not ambiguous between an SPX reading and a PPX reading, unlike its English counterpart. Japanese PPX conditionals about the past do not require the aspectual marker `-tei-`, but can be expressed just like (14), with a tenseless antecedent and `-ta` marking the PPX backshift. Thus (16) is again not ill-formed but merely infelicitous, like its future-oriented counterpart (14).

(16) # [P-ga kyonen BM-ni *de-reba* *kat-]-ta* daroo.
P-NOM last year BM-LOC participate-COND win PAST MODAL
'If P had run the BM last year, he would have won.' *[PPX]*

[5]The former, of course, would only be felicitous with reference to a living subject.

Thus in Japanese the lifetime effect, which in English we could only observe with future reference (due to the lack of a formal distinction between SPX and PPX with past reference), is also detected with past reference.

5 Conclusions

Natural language conditionals employ different strategies to mark the remoteness of eventualities under consideration from what is known or presumed to be true (X-marking). In this paper, we have shown how assumptions about the natural life span of event participants can impact the choice between different X-marking strategies. Contrary to the received wisdom that strategies reflect degrees of remoteness, we argue that these effects support a qualitative difference in how non-actual circumstances are brought into consideration. One strategy, exemplified by English Past Perfect conditionals and Japanese Past marking in the consequent, involves going back in time and considering alternative courses of events. Another strategy (fake Simple Past in English, no remoteness marking in Japanese) involves the consideration of possibly counterfactual alternatives to the current state of affairs and their future developments. Backshift X-marking preserves standard assumptions about natural laws, thus the hypothetical events under consideration must obey basic assumptions about individuals' life spans. Non-backshift X-marking can more freely access both coherent alternatives that are merely unlikely, and also completely outlandish states of affairs, including long deceased historical figures participating in modern-day sports events.

6 Acknowledgments

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