

# When Time Won't Tell: Discourse Relations and Temporal Interpretation in Tagalog

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*This paper argues that temporal interpretation in Tagalog is driven not simply by aspectual information, but also makes use of top-down discourse information. It is demonstrated here how discourse relations play a role in constraining temporal interpretation, given that Tagalog does not grammatically encode tense, which results in temporal vagueness. Using Segmented Discourse Representation Theory (Asher & Lascarides, 2003), show how temporal information of events is derived from discourse, by determining what type of discourse relation holds across two propositions. A detailed application of how this machinery works is given, explaining how world knowledge affects the temporal interpretation process.*

## **INTRODUCTION: TAGALOG AND TENSELESSNESS**

Temporal reasoning is a very basic yet vital ability of humans, no matter what language we speak. As Mani and others (2005) point out, early humans somehow developed a way of reasoning in terms of events and their positions in the stream of time.

However, if one takes on that assumption, then one encounters the question as to why there is a considerable cross-linguistic variation in encoding temporal information. There are languages like English that

have a very complex way of encoding temporal information through the interplay of tense (whether an event occurs in the past, present, or future) and aspect (whether an event is completed, in PROGRESS, or about to begin).<sup>1</sup> In English, the two tense values of PAST and NON-PAST interact with the aspectual values of PROGRESSIVE and PERFECTIVE. These then produce the variety of tense-aspect values that are possible in English, as can be seen in (1).

- (1) a. The child sings. – *Simple Present*
- b. The child sang. – *Simple Past*
- c. The child is singing. – *Present Progressive*
- d. The child was singing. – *Past Progressive*
- e. The child has sung. – *Present Perfective*
- f. The child had sung. – *Past Perfective*

Admittedly, the examples above do not display all the possible tense aspect values in English, but they are sufficient in illustrating that there is a variety of different tense and aspect combinations in the language.

Tagalog, on the other hand, encodes aspect in its morphology but has no explicit encoding of tense. Thus, Tagalog is claimed to be a tenseless language (Schachter & Otanes, 1972; Haspelmath et al., 2005). The following examples illustrate this.<sup>2</sup>

- (2) K<um>anta     ang bata.  
       PERF-sing     SUBJ child  
       “The child (has/had) sung.”
- (3) K<um>a~kanta     ang bata.  
       PROG-sing     SUBJ child  
       “The child sings/is singing/was singing.”
- (4) Ka~kanta     ang bata.  
       PRSP-sing     SUBJ child  
       “The child will sing/be singing.”

The examples in (2) to (4) involve intransitive predicates whose argument is the agent of the clause.

- (5) Nag-luto      ang babae      ng kanin.  
 PERF-cook      SUBJ woman      NSUB rice  
 "The woman (has/had) cooked rice."
- (6) Nag-lu~luto      ang babae      ng kanin.  
 PROG-cook      SUBJ woman      NSUB rice  
 "The woman cooks/is cooking/was cooking rice."
- (7) Mag-lu~luto      ang babae      ng kanin.  
 PRSP-cook      SUBJ woman      NSUB rice  
 "The woman will cook/be cooking rice."

The examples in (5) to (7) involve transitive predicates with agentive voice; the *ang*-marked argument is the agent of the clause.

- (8) P<in>atay      ng lalaki      ang kambing.  
 PERF-kill      NSUB man      SUBJ goat  
 "The man (has/had) killed the goat."
- (9) P<in>a~patay      ng lalaki      ang kambing.  
 PROG-kill      NSUB man      SUBJ goat  
 "The man is/was killing the goat."
- (10) Pa~patay-in      ng lalaki      ang kambing.  
 PRSP-kill      NSUB man      SUBJ goat  
 "The man will kill/be killing the goat."

Examples (8) to (10) illustrate transitive predicates with undergoer voice; the agent of the clause is not marked by *ang*.<sup>3</sup>

- (11) Na-hulog      ang prutas      mula sa      puno.  
 PERF-fall      SUBJ fruit      from      DAT tree  
 "The fruit fell/had fallen from the tree."
- (12) Na-hu~hulog      ang prutas      mula sa      puno.  
 PROG-fall      SUBJ fruit      from      DAT tree  
 "The fruit is/was falling/falls from the tree."
- (13) Ma-hu~hulog      ang prutas      mula sa      puno.  
 PRSP-fall      SUBJ fruit      from      DAT tree  
 "The fruit will fall/be falling from the tree."

Finally, (11) to (13) illustrate intransitive predicates in which the argument of the clause is the undergoer of the predicate. There are

several forms for the following aspectual values: PERFECTIVE, PROGRESSIVE, and PROSPECTIVE. The form that is used in a specific sentence depends on the voice of the predicate. As illustrated in (2) to (7), if the predicate takes an actor as a SUBJECT, then the system involves either an inflection based on the infix *-um-* or the prefix *mag-*.<sup>4</sup>

If on the other hand, the predicate takes on an UNDERGOER as a SUBJECT, and at the same time is a transitive sentence, then the system involving a *-in-* infix as illustrated in (8) to (10) is used. Finally, the system involving the *ma-* prefix that is illustrated by (11) to (13) is solely used in sentences that are intransitive and take on an UNDERGOER subject.

As observed in the glosses, a certain sentence in Tagalog with a given aspectual value can have multiple interpretations. These multiple interpretations arise due to the fact that there is no way to encode the relationship between **Utterance Time** ( $T_U$ ) and **Event Time** ( $T_E$ ) which is essentially the information that is contributed by tense in language (Reichenbach, 1947; Klein, 1994).

And since there are a number of possible interpretations for a given sentence with regard to tense, this presents a problem for temporal interpretation. The following section will expand on this issue.

### THE PROBLEM: VAGUENESS IN TEMPORAL INTERPRETATION

As pointed out in the preceding section, Tagalog sentences that have the same aspectual marking can have multiple interpretations with regard to its temporal interpretation. Consider the following examples.

- (14) a. S<um>igaw si Maria. ?<um>iyak ang sanggol.  
 PERF-scream SUBJ Mary PERF-cry SUBJ baby
- b. Na-dapa si Juan. T<in>ulak siya ni Pedro.  
 PERF-trip SUBJ John PERF-push SUBJ NSUB Peter

- c. K<um>anta si Juan. S<um>ayaw si Maria.  
 PERF-sing SUBJ John PERF-dance SUBJ Mary

(14) shows three pairs that each involve two clauses, both marked as PERFECTIVE. However, the three do not have the same temporal interpretations, as shown in (15).

- (15) a. Mary screamed. (Therefore) the baby cried.  
 b. John tripped, (because) Peter pushed him.  
 c. John sang, Mary danced, (among other things...)

The above examples show that there are multiple ways of assigning temporal order. This is due to the fact that Tagalog has no additional grammatical category of tense. Tagalog can only mark whether an event has been completed, is in PROGRESS, or whether it is about to be initiated. Grammatical constructions that require the interplay of tense and aspect such as the plUPERFECT are not possible in Tagalog due to the absence of a tense category. Thus, one problem with tenseless languages such as Tagalog is that temporal ordering can be ambiguous and so there are multiple ways of interpreting a sentence with respect to its context. With regard to ordering the two events in (14), it is not clear just by evaluating the aspectual marking of the predicates whether the first event happened before the second event; the second event happened before the first event; or both events happened simultaneously or with no particular order.

Another problem that Tagalog presents is shown in the following examples.

- (16) a. Ma-tu~tulog ang nanay. Pero s<um>igaw ang sanggol.  
 PRSP-sleep SUBJ mother but PERF-scream SUBJ baby  
 "The mother was about to go to sleep. But the baby screamed."  
 b. Ma-tu~tulog ang nanay. Patay-in mo ang ilaw.  
 PRSP-sleep SUBJ mother turn.off-IMP 2.NSUB SUBJ light  
 "The mother will go to sleep. Turn off the light."

If we look at (16a), the first clause is marked in the PROSPECTIVE aspect. The second clause on the other hand is marked in the PERFECTIVE aspect.

This presents a problem for analyses that center around the concept of “default interpretation of aspect” (Bohnenmeyer & Swift, 2001). Analyses that posit a default interpretation for aspect usually point out that as a default PERFECTIVE is interpreted as PAST, IMPERFECTIVE AS PRESENT, and so on. If we would apply the default interpretations to the above examples, the first clause should be interpreted as a clause in the FUTURE tense, while the second clause should be interpreted as a clause in the PAST tense. However, as is shown in the gloss, the first clause is not interpreted to be an event in the future, instead, it is a past event. On the other hand, (16b) features the same first clause, but due to the fact that the second clause does not provide any motive to override the default future interpretation of the PROSPECTIVE-marked first clause, it is given a future tense reading. The discourse in (16) implies that the temporal interpretation of the first clause is not done clause-independently, rather, that context plays a large part in the interpretation. It seems that the correct temporal interpretation of the first clause is only attained once the relationship between the events of the first and second clauses is determined. In (16a), the context for the first clause overrides a default, and instead the first clause is given a past prospective temporal interpretation: a future interpretation of the first clause is infelicitous if one considers the second clause as its context. On the other hand, in (16b), a future interpretation of the first clause is not infelicitous.

### **EXPLAINING TEMPORAL INTERPRETATION**

There are quite a number of theories that attempt to explain temporal interpretation. One of these theories is *Discourse Representation Theory*, as formulated by Kamp and Reyle (1993). Discourse Representation Theory (henceforth DRT) is a theory of dynamic semantics which interprets clauses not just on their individual compositional meaning, but also in relation to their context. This theory makes use of Discourse Representation Structures (henceforth DRs) to analyze the sentential meaning with regard to its context.

However, a closer look of the theory still raises questions as to the nature of the tenseless sentences in Tagalog. Figure 1 is a DRS of the discourse in (16).

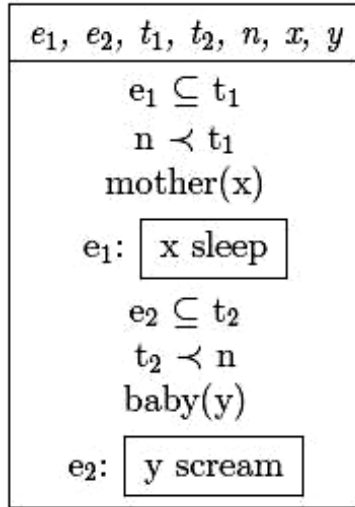


Figure 1: DRS for Example 16

As the DRS in Figure 1 shows, DRT makes a wrong prediction with regard to the positioning of events in the stream of time. Due to the fact that DRT relies on tense information to locate an event on the time line and to process the relation of the event with **Utterance Time** (notated as *n*, for *now*), it simply cannot handle sentences without tense encoding. And if we apply the default interpretation of aspect (in this case, since the first sentence is marked as *PROSPECTIVE*, it will be interpreted as *FUTURE* by default), thus getting " $n \prec t_1$ ", this still gives the wrong analysis. The correct interpretation for the discourse is reflected in the gloss, in which there are two events, both situated in the past. The first event is a sleeping event, which is given a *PROSPECTIVE* aspect, but that event is not realized due to the second event, which has a *PERFECTIVE* aspect. And it is also not the case that the first event is still true after Utterance Time, as evidenced by the following discourse.<sup>5</sup>

- (17) Ma-tu~tulog ang nanay. Pero s<um>igaw ang sanggol,  
 PRSP-sleep SUBJ mother but PERF-scream SUBJ baby  
 kaya na-wala ang antok niya  
 so PERF-lose SUBJ drowsiness 3.SG.GEN  
 "The mother was about to go to sleep. But the baby screamed, so  
 she lost her drowsiness."

Thus, this example implies that more is involved than default interpretation of aspectual values. Context seems to play a larger role in the tense interpretation of Tagalog sentences.

With regard to temporal interpretation in tenseless languages, Davison (2002) argues that there is an underspecified past tense in the PERFECTIVE aspect by means of generative syntactic arguments. She argues that the PERFECTIVE aspect is interpreted as past tense due to unselective binding, in which the antecedent can be a speech act, a time adverbial, or a tense in the preceding context.

One defect of this approach is that it assumes that the tense of any tenseless clause is dependent on some form of linguistic information that comes before it, be it a speech act, a temporal adverbial, or a preceding tensed clause. This account cannot explain the phenomenon exhibited by (16), since as explained above, the tense interpretation of the first clause depends on the clause following it, not on a clause before it. And there is neither a temporal adverbial nor a tensed clause present in the vicinity.

Explaining the temporal problem without resorting to syntactic mechanisms have also been posited, and several scholars have tried to come up with solutions to the temporal problem by resorting to other methodologies, especially those that involve other semantic mechanisms. A well-known work on aspectual interpretation is presented in Smith (1991), which outlines a two-component theory of aspectual interpretation, which describes the interaction between *Aktionsarten* and (viewpoint) aspect. And in Smith (2006), she gives three general pragmatic principles in determining how events are temporally



located in language: the Deictic Principle; the Bounded Event Constraint; and the Simplicity Principle of Interpretation. She argues that these are realized in languages in different ways, depending on the available information that the language provides. She provides examples in English (which is a tensed language), Navajo (which is a mixed tensed and tenseless language), and Mandarin Chinese (which is a tenseless language), and how these principles interact with the temporal information that is available in the language's grammar. The main idea behind this is that the less grammatical information the language has with respect to temporal information, the greater the role of these pragmatic principles play in temporal interpretation.

Other scholars include Hobbs and others (1993), who have posited abductive inference to explain certain bridging phenomena, and these mechanisms potentially can be extended to temporal interpretation. Lascarides and Asher (1993) also decided to invoke discourse relations in the interpretation of discourse. A decade later, Kehler (2002) also incorporated coherence relations in the issue of temporal interpretation, and he argued that temporal interpretation is simply a side-effect of the discourse relations that hold across sentences. Finally, Asher and Lascarides (2003) presented a theory of discourse interpretation that resolves temporal interpretation in a similar vein, by treating it simply as an epiphenomenon of discourse interpretation. This theory, called *Segmented Discourse Representation Theory*, will be the basis of the analysis that will be presented in this paper.

## **SEGMENTED DISCOURSE REPRESENTATION THEORY**

As an extension to DRT, *Segmented Discourse Representation Theory* (henceforth SDRT) has been formulated. This theory is an attempt to model the semantic-pragmatic interface by giving an interpretation to a speech act based not only on its semantic content but also on pragmatic contextual content (Asher and Lascarides, 2003).

One important feature of this theory is that pragmatic information plays a significant part in semantic interpretation. There are plenty of instances of this interaction, but the one that is relevant to this topic is the fact that discourse relations have an effect on the semantics of the sentence. More precisely, it entails that the rhetorical relations that stand between sentences (i.e., *Elaboration*, *Explanation*, *Narration*, *Background*, *Parallel*, and *Contrast*) will have an effect on the temporal interpretation of the events that are described by the sentences. The next section will elaborate on how SDRT is capable of handling the temporal interpretation of tenseless sentences in Tagalog.<sup>6</sup>

### APPLYING SDRT TO TAGALOG: PART I

As the Tagalog discourse in (14) and (16) show, context seems to play a big role in temporal interpretation in Tagalog. Related examples are given below.

- (18) K<um>idlat.            Na-gulat            ang bata.  
 PERF-lightning.strike    PERF-be.afraid        SUBJ child  
 "Lightning struck. The child was frightened."
- (19) H<um>angin.        B<um>ukas ang bintana.  
 PERF-wind.blow        PERF-open            SUBJ window  
 "The wind blew. The window opened."
- (20) H<um>angin.        T<um>unog ang relo.  
 PERF-wind.blow        PERF-sound            SUBJ clock  
 "The wind blew. The clock rang."

The three discourse sets above illustrate the need for pragmatic information to determine temporal relations. (18) to (20) all consist of two sentences. In each example, both verbs are given the PERFECTIVE aspect, consisting of two events, both of which can be classified as ACHIEVEMENTS with respect to its *Aktionsart* (Vendler, 1957). The only difference is the semantic content of the sentences.

If the only thing that is different is the semantic content, then we would expect the temporal interpretation of all of these discourses to be the same. However, that is not the case. Speakers' world knowledge

about events and causal relations influence the assignment of discourse relations, which then influence temporal interpretation. With (18), world knowledge tells us that children typically become frightened due to a lightning strike, so there is a strong tendency for it to be interpreted in an iconic fashion,  $E_1 < E_2$ . The child is frightened as a result of the strike of lightning. (19) on the other hand can be interpreted in two ways, either  $E_1 < E_2$  or  $E_2 < E_1$ , due to the fact that world knowledge allows us to imagine at least two scenarios that involve these two events. One interpretation is that it is an iconic description of events, in the sense that the window opening is the result of the wind blowing. Another interpretation is that the opening of the window is the cause or reason for the blowing of the wind, which elicits a non-iconic temporal interpretation.<sup>7</sup> And finally, (20) is most easily interpreted as  $E_1 \sim E_2$ , where the order of the events are not specified in relation to each other, and for all we know, it may as well be a simultaneous occurrence, as speakers presumably do not have a strong association between an event involving wind blowing and an event involving clock ringing.<sup>8</sup>

If we do not consider pragmatic information such as rhetorical discourse relations, then it would be a hard task explaining the differences in temporal interpretation between these three discourse sets. However, if we consider the type of rhetorical discourse relation that exists between the sentence pairs, then there would be a way to explain the difference in interpretation.

### **When Temporal Order Matches Presentational Order**

Take Example 18. The most natural interpretation for this discourse is the one in which temporal order matches presentational order. In other words, the event of lightning striking comes before the event of the child being frightened. We can say that between these two sentences, a discourse relation of *Narration* holds. And in this case, there is an overlap of the *poststate* of  $e_{\pi_1}$  with the *prestate*  $e_{\pi_2}$  of. In SDRT, *Narration* has the following effect to temporal interpretation (Asher & Lascarides, 2003):

(21) Spatiotemporal Consequence of Narration:

$$\varphi_{Narration(\alpha, \beta)} \Rightarrow overlap(prestate(e_\alpha), Adv\beta(poststate(e_\beta)))$$

In other words, if there is a discourse relation of Narration between two sentences, the second event ( $e_{\pi_2}$ ) begins when the first event ( $e_{\pi_1}$ ) ends. And with that, the temporal relationship between the two events will then be resolved.

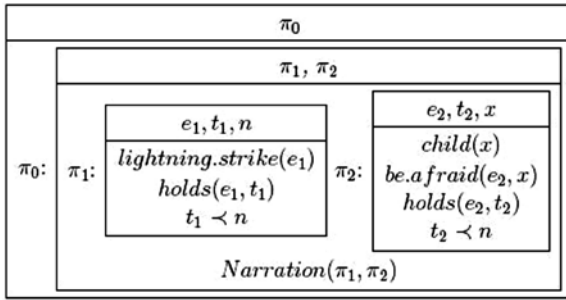


Figure 2: SDRS for Example 18

The segmented discourse representation structure (henceforth SDRS) for Example 18 is shown in Figure 2.

Note that unlike in standard DRT, there is no explicit ordering of the two events. Instead, temporal ordering is resolved through the type of rhetorical discourse relation that holds between the two sentences. The only temporal information that is provided by the sentences is the PERFECTIVE aspect that is defaultly interpreted as occurring before utterance time ( $t_1 < n, t_2 < n$ ). In the case of *Narration*, temporal order matches presentational order.

(18) can also be explained by invoking a different discourse relation, and that is *Result*. This discourse relation explicitly connects a cause to its effect as can be seen in the following axiom.

(22) Axiom on Result:

$$\varphi_{Result(\alpha, \beta)} \Rightarrow cause(e_\alpha, e_\beta)$$

The **Axiom on Result** makes it explicit that when two events are connected by this discourse relation, the first event is a cause of the second event. World knowledge then states that causes normally occur before effects, so the temporal interpretation that the event described by the first sentence occurs before the event described by the second sentence will then follow.

The two discourse relations discussed here, namely *Narration* and *Result* both involve a chronological and iconic interpretation of the temporal properties of the events that are involved. However, there are cases when temporal order does not match the order in which sentences appear. The next subsection covers these cases.

### When Temporal Order is Reversed

Not all discourses have their temporal order as iconic to the presentational order. Look at the discourse in (19). This discourse has two readings. It may be the case that the event of the wind blowing happens, which causes the door to open. This is the reading that matches the presentational order. This is a case of *Narration*, which was covered in the preceding subsection. However, it is also PERFECTLY possible that the order is reversed; the opening of the door can be the cause of the wind to blow, as evidenced in (23).

- (23) H<um>angin.      B<um>ukas ang    pinto, kaya  
 PERF-wind.blow    PERF-open    SUBJ    door    so
- d<um>aloy    ang hangin  
 PERF-flow    SUBJ    air
- “The wind blew. The door opened, so the air flowed.”

In cases like this, a different rhetorical discourse relation holds between the two sentences. Instead of a narrative sequence, we can see that the second sentence acts more as a cause to the event in the first sentence. In other words, there is a causal relation between  $e_{\pi_1}$  and  $e_{\pi_2}$ , in which  $e_{\pi_2}$  causes  $e_{\pi_1}$  to happen. In this case, we can say that a rhetorical discourse relation of *Explanation* holds between  $e_{\pi_1}$  and  $e_{\pi_2}$ . And we can

also expect that this discourse relation has a contribution to the temporal relation between sentences as well. Asher and Lascarides give the following temporal consequences whenever a discourse relation of *Explanation* holds.

(24) Temporal Consequence of Explanation:

- (a)  $\varphi_{\text{Explanation}(\alpha,\beta)} \Rightarrow (\neg e_\alpha < e_\beta)$
- (b)  $\varphi_{\text{Explanation}(\alpha,\beta)} \Rightarrow (\text{event}(e_\beta) \Rightarrow e_\beta < e_\alpha)$

Basically, what the maxim in (24) says is that whenever there is a discourse relation of *Explanation* that holds between two sentences, it cannot be the case that the first event  $e_{\pi_1}$  comes before  $e_{\pi_2}$ . Thus, the addition of the discourse relation of *Explanation* within the SDRS assures that the temporal interpretation of the two sentences will not be sequential, instead, in reverse order. The SDRS in Figure 3 illustrates *Explanation*.

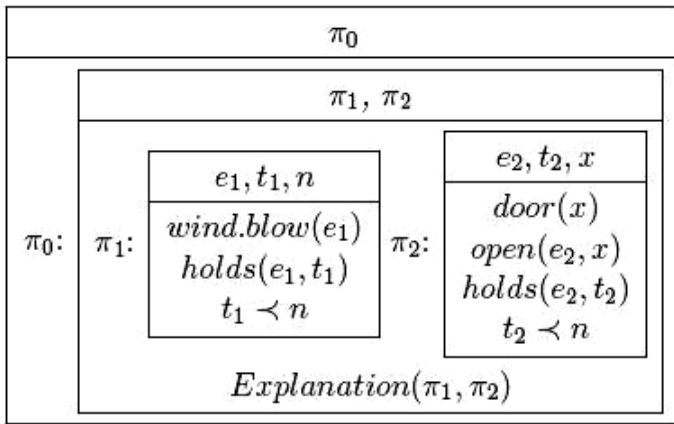


Figure 3: SDRS for Example 19 (as *Explanation*)

Of course, as pointed out earlier, the discourse in Example 19 has two readings. And aside from *Explanation*, which has reverse order, it can also have a sequential reading, which implies that instead of *Explanation*, a different discourse relation such as *Narration* holds, giving the temporal interpretation a sequential reading. Note that temporal ordering between the two events stems from the rhetorical discourse

relation that holds across events, and is not specified in the SDRS. The only temporal information that is specified in the SDRS is that both events hold true before *now*.

### When Temporal Order Does Not Matter

There are also cases in which the temporal order between the sentences does not need to be resolved. In these cases, the ordering of the events is not significant, and the listener will not interpret the discourse as consisting of two events, one event following the other or vice versa. This case is illustrated in (20), repeated below as (25).

- (25) H<um>angin.      T<um>unog ang      relo.  
 PERF-wind.blow      PERF-sound      SUBJ      clock  
 "The wind blew. The clock rang."

In this example, we still have the grammatical information consistent as with the previous examples. However, unlike (18), listeners have a hard time interpreting this as a sequence of events. Instead, it is more likely to be interpreted as two events that happened simultaneously.

At first, this may seem to be mysterious in the sense that it is not obvious why an event of wind blowing cannot be followed by an event of the clock ringing. Technically, there is no constraint that prevents this sequence from occurring in the real world: we can easily imagine this scenario as a plausible one. However, our world knowledge tells us that the ringing of clocks does not typically follow the blowing of the wind. Thus, *Narration* is a very implausible discourse relation given the unavailability of further context.<sup>9</sup>

A topic constraint also applies to *Narration*, as shown in (26).

- (26) Topic Constraint on Narration:

$$\varphi_{\text{Narration}(a,b)} \Rightarrow \neg \square (K_a \ K_b)''$$

Asher and Lascarides (2003) point out that if the discourse relation *Narration* holds between two sentences, then it must have common

content that is not vacuous. In case the content is vacuous, then the listener will tend to interpret it with a different discourse relation, and as a consequence to that, the temporal relations will also be interpreted differently.

It is also not the case that the discourse relation that stands in (25) is *Explanation*. This discourse fails the counterfactual test: *if the clock did not ring, the wind would not have blown* is a bizarre scenario. The discourse also does not make sense if one inserts an explicit temporal connective in between them, such as *because* or *therefore*. We can therefore conclude that the discourse relation of *Explanation* does not hold between the two sentences either.

So, if the discourse relation is neither *Narration* nor *Explanation*, then a different discourse relation is applied, and that is *Parallel*.<sup>10</sup>

With *Parallel*, there is no temporal consequence. Ordering is not forced to happen between sentences, and it is perfectly plausible for two events to occur at the same period of time. So with regard to our example above, it can perfectly be part of the following discourse.

- (27) (a) Ano-ng                    nang-yari    kahapon?  
           what-LNK                PERF-happen yesterday  
           “What happened yesterday?”
- (b) H<um>angin.            T<um>unog    ang    relo.  
           PERF-wind.blow        PERF-sound    SUBJ    clock  
           “The wind blew. The clock rang.”

Given the fact that Tagalog is a tenseless language, and that there is no grammatical encoding that would specify the relationship of  $T_U$  and  $T_E$ , then it may be appropriate to conclude that temporal interpretation depends solely on the type of discourse relations that hold between the sentences in the discourse. As evidenced by the above discussion, if there is a discourse relation of *Narration* that holds, then the temporal interpretation would be in sequential order. If there is a discourse relation of *Explanation* that holds, then the temporal



interpretation would be in reverse order. And if there is a discourse relation of *Parallel* that holds, then the temporal interpretation would not be interpreted as sequential nor reverse, but instead, as happening at the same period of time.

If it is the case that temporal interpretation depends on the rhetorical discourse relation between the discourse, then we may assume that in the case of *ACHIEVEMENTS*, temporal relations between Tagalog sentences are underspecified, and are only resolved when there is a discourse relation that can be interpreted between them. Whether this generalizes on other *Aktionsarten* is the aim of further research.

## APPLYING SDRT TO TAGALOG: PART II

The previous section dealt with sentences in which the aspectual marking is constant within the two sentences involved. However, there must also be a way to explain what happens in (16a), repeated below as (28).

- (28) Ma-tu~tulog ang nanay. Pero s<um>igaw ang sanggol.  
 PRSP-sleep SUBJ mother but PERF-scream SUBJ baby  
 "The mother was about to go to sleep. But the baby screamed."

In this example, the first sentence is marked as *PROSPECTIVE* while the second sentence is marked as *PERFECTIVE*. And as explained earlier, if we apply the default interpretation of aspect, then we would get the wrong interpretation. However, if we determine the type of rhetorical discourse relation that holds between the two sentences, then the temporal interpretation will be processed.

In SDRT, Lascarides and Asher (1993) discuss how common-sense entailment contributes to sentence interpretation, and ultimately, to temporal interpretation. One of the axioms that they posit is the Penguin Principle, given in (30).

(30) Penguin Principle

$$\Phi \rightarrow \psi, \Phi \gg \neg \chi, \psi \rightarrow \chi, \Phi \approx \neg \chi$$

E.g., Penguins are birds, penguins normally don't fly, birds normally fly, Tweety is a penguin  $\approx$  Tweety doesn't fly

This is a principle in which two defeasible laws are verified, and the conclusions of both laws conflict with each other. Therefore, the more specific law will be the one preferred. If we apply the Penguin Principle to our discourse, then we would get the following pattern of inference.

(31) Mothers are humans, mothers usually don't sleep in order to take care of their babies, humans usually sleep,  $\approx$  mothers forego sleep to take care of their babies

In other words, this is a way of modeling our common-sense knowledge that mothers usually take care of their babies whenever they cry, preventing mothers from sleeping. This is the result of default reasoning in the form of common-sense entailment à la Lascares and Asher (1993).

In addition to that, the discourse also satisfies the Topic Constraint as laid out in (26), making *Narration* a possible discourse relation. And if *Narration* holds, then the temporal relation should be interpreted as being in alignment with the presentational order. Instead of having an interpretation of the sleeping event in the future ( $n < e_{\pi 1}$ ), it would be a case of temporal inclusion, the  $e_{\pi 1}$  that is marked in the PROSPECTIVE aspect is interpreted as having a PAST tense, since it must be an event that comes BEFORE  $e_{\pi 2}$ .

Note that this result does not stem from the fact that since  $e_{\pi 2}$  is in the PERFECTIVE aspect, then it must be defaultly interpreted as in the past tense. Rather, the interpretation stems from the fact that there is a discourse relation of *Narration*, and also common sense and world knowledge tells us that given the context at hand, a sleeping event in the PROSPECTIVE that is interpreted in the past is more probable than a crying event in the PERFECTIVE that is interpreted in the future.

I am not saying that this is always the pattern that holds whenever there is a sentence in the PROSPECTIVE followed by a sentence in the PERFECTIVE. To illustrate, observe (32).

- (32) La~langoy si Maria sa gym. Pero nag-pa-kulot  
 PRSP-SWIM SUBJ Mary DAT gym but PRSP-CAUS-curl.hair  
 siya kaninang umaga  
 3.SG.SUBJ earlier morning  
 "Mary will swim/was about to swim in the gym. But she had her hair curled earlier this morning."

In this case, it is a little bit harder to apply the Penguin Principle. This is due to the fact that there is a weaker connection between swimming and having one's hair curled. World knowledge may not be sufficient to process the two events, and for some listeners, the Topic Constraint may or may not hold, depending on their knowledge base. Finally, the presence of *but* which signals a contrast relation may also indicate that default temporal interpretations for the previous clause may not apply. It has two interpretations, as shown in (33).

- (33) Two Interpretations of (32):  
 (a) Mary will swim in the gym, EVEN THOUGH she had her hair curled earlier this morning.  
 (b) Mary was about to swim in the gym, BUT DID NOT because she had her hair curled earlier this morning.

This then suggests that one's world knowledge base and common sense play a large role in interpreting discourse. Thus, with tenseless languages like Tagalog, discourse relations seem to trump grammatical markings when it comes to temporal interpretation.

## THE ROLE OF WORLD KNOWLEDGE

It has been shown above that rhetorical discourse relations are the deciding factor in interpreting temporal information. In this section, it will be shown that world knowledge affects to a certain degree the variability of temporal interpretation in Tagalog.

- (34) Ta~tahol ang aso. T<um>akbo ang pusa.  
 PRSP-bark SUBJ dog PERF-run SUBJ cat  
 ( $E_2 < N < E_1$ ): The cat ran. (Therefore) the dog will bark.  
 ( $E_1 < E_2 < N$ ): The dog was about to bark. (Therefore) the cat ran.  
 ( $E_2 < E_1 < N$ ): The cat ran. (Therefore) the dog was about to bark.

- (35) I-la~lathala niya ang sikreto.  
 PRSP-publish 3.SG.NSUB SUBJ secret

P<in>atay siya ng Yakuza.  
 PERF-kill 3.SG.SUBJ NSUB Japanese mafia  
 ( $E_1 < E_2 < N$ ): He was about to publish the secret. (Therefore) the mafia killed him.

The examples in (34) and (35) both have identical aspect markings. However, the possible interpretations between the two sentences are different. In Example (34), the ordering between the two events can go either way: it may be the case that the two events are interpreted using their default tense interpretation that is derived from their aspect marking: the PROSPECTIVE-marked first sentence is interpreted as occurring in the future, and the PERFECTIVE-marked second sentence is interpreted as occurring in the past. This is illustrated by the first interpretation. It may also be the case that the barking event is interpreted as being situated before the running event, even if it is not realized, as illustrated by the second interpretation. Finally, world knowledge also tells us that the two events can be interpreted in a non-chronological order as well: the event of a cat running can be the cause for the barking dog, which is illustrated by the third interpretation.

On the other hand, in (35), there is only one possible ordering. It must be that the SUBJECT was about to publish the secret, and that was the reason why the mafia killed him. The interpretation that the mafia killed him before he will publish the secret is not possible, because our world knowledge tells us that once you are killed, you cannot publish anymore. This is evidence that world knowledge plays a part in interpreting the discourse in Tagalog. If our world knowledge base allows different interpretations, then different readings will be available

to the listener. However, if world knowledge restricts our interpretation in one way or another, then the amount of available temporal interpretations will also be restricted.

## CONCLUSION

We have seen in arguments given above that Tagalog, which is a tenseless language, resorts to pragmatic operations in resolving temporal interpretation. Given the fact that there are no tense markings and the only available grammatical markings on time relations is aspect, Tagalog uses discourse relations to interpret the temporal relations that hold between sentences.

We have seen two problems in Tagalog tenseless sentences. The first was that given two sentences with the same aspectual marking, the temporal ordering between the two sentences is ambiguous. Grammatical information does not tell the listener what order the events should be interpreted. And it has been shown in the discussion that rhetorical discourse relations are the input that are responsible for computing the temporal relations that hold within the discourse.

The second problem concerns the default interpretation of aspect. Default interpretation of the aspectual marking will lead to the wrong interpretation. And as the discussion shows, the listener's world knowledge base and common sense instead are the major factors in interpreting temporal information across sentences. This hypothesis is also supported by the evidence that world knowledge restricts the available temporal interpretation in a particular discourse.

Admittedly, the examples that are presented in this paper are not exhaustive, nor are all the possible rhetorical discourse relations. It is then the goal for further study to explore other rhetorical discourse relations and examine what implications they might have in computing temporal relations.

## Notes

1. There are two types of aspect that are often discussed in the literature, namely, lexical aspect and grammatical aspect. Lexical aspect refers to the different types of predicates depending on their temporal properties. Lexical aspect is also referred to as *Aktionsarten*, and will be referred to in that way in this paper. Grammatical aspect on the other hand refers to the internal temporal structure of a certain event, ie., whether an event is on-going, completed, or finished. In this paper, the term *aspect* will refer to grammatical aspect only.

2. Examples in this paper will generally follow the rules as set out in the Leipzig Glossing Rules. However, as the system of marking aspect in Tagalog is morphologically complex and normally consists of more than one morphological process, the word-for-word glosses will not have a one-to-one correspondence with the morpheme boundaries in the example sentences.

3. The PROGRESSIVE typically allows a generic present tense reading, as shown in (3), (6), and (12). However, this reading is not available in predicates with the undergoer voice, due to the fact that *ang-marked* arguments need to satisfy a definiteness constraint, which is incompatible with a generic present tense interpretation.

4. In the majority of predicates, these are not interchangeable; some predicates use the *-um-* infix system as in Examples 2 to 4, others use the *mag-* prefix system illustrated in Examples 5 to 7.

<sup>5</sup> It is true that every event described in the future tense can be canceled, even in a tensed language such as English. What is different however in the case of a tenseless language such as Tagalog is that an event described using the prospective aspect is obligatorily vague between a future and a past prospective interpretation. English on the other hand can disambiguate it by explicitly using a past prospective marking, as exemplified by the English gloss. This option is not available to Tagalog.

6. SDRT is not the only theory that uses coherence-driven approaches to explaining temporal interpretation. The theory posited by Kehler (2002) also makes use of coherence in temporal interpretation. He combines tense-based approaches with coherence-based approaches in his unified account of tense interpretation. However, since Tagalog has no tense, then it is moot to rely on tense-based theories to explain Tagalog temporal interpretation.

7. Two tests can be applied in order to assert that this is a discourse with non- iconic temporal interpretation. One can insert the temporal connective *because* and still elicit a felicitous discourse, but this test fails for Examples 18 and 20. One can also apply the counterfactual test as suggested by Mandel (2003). This is a reversible scenario given the truthfulness of the counterfactual *if the window did not open, the wind did not blow*. The counterfactual test does not elicit a felicitous scenario for Examples 18 and 20, however, suggesting that the scenarios illustrated by those discourse examples are not stated in a non- iconic fashion.

8. A reviewer pointed out the influence of order of mention as well. While order of mention is not explicitly considered in this article, it is presumed that order of mention can also influence the selection of discourse relations, as suggested by Dery (2009). In any case, discourse relations still need to be determined for every discourse pair in order to determine the temporal order of events, and it is a topic of future research to determine what ways world knowledge and order of mention interact in determining the appropriate discourse relation that holds between event descriptions.

9. I am not saying that *Narration* CANNOT hold between the two said events. As I said above, there can be a PERFECT scenario where these two events follow each other, and thus *Narration* holds. However, given the fact that this is the only linguistic information available, there is no other context available that would make *Narration* a possible discourse relation.

10. Needless to say, Explanation cannot hold since world knowledge tells us that the ringing of clocks does not typically cause the blowing of wind.

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