Meaning of 'now' and other temporal location adverbs

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Abstract. This paper provides an analysis of the temporal location adverb *now*. The core data comes from free indirect discourse, where *now* often co-occurs with the past tense and has an affinity for stative sentences. Building on Kamp & Reyle's (1993) analysis, I propose that *now* is a perspective setting anaphor: it requires an eventuality described by an aspectual phrase to hold throughout a salient event that serves as a the 'current perspective.' The proposed meaning is compatible with both the past and present tenses and it has the same semantic type and uses the same ingredients as other temporal location adverbs.

Keywords: adverbs, aspect, tense, narrative progression, free indirect discourse, anaphora, indexicals

1 Introduction

There is a particular use of *now* where it co-occurs with the past tense. This usage is often found in *free indirect discourse* (FID) viz. (1), where it is possible to understand the described eventualities as happening from the point of view of a particular character, rather than the speaker or narrator ([1]). This, however, is not a necessary condition for *now* to co-occur with the past tense. For example, the state of being unpleasant to look at in (2) *must be* interpreted from the point of view of the speaker.

> He came to me and told me he had been dressing in my clothes whenever I wasn't home for quite a few years, and *now he was ready to take the next step* and with the help of his doctor (that I didn't even know about) he wanted to start the process of becoming female ([2]).   **(1)**

> Anna went to her plastic surgeon. She had won the beauty contest 30 years ago. *Now the old bag was a sight for sore eyes!* (Sam Cumming, p.c.)   **(2)**

Now exhibits two key properties in discourses such as (1) and (2). The first is that *now* is used as an anaphor. This is especially clear when one compares (2) to its counterpart without *now*. In such a case, the state of being unpleasant to look at would be understood to hold when Anna won the beauty contest. This would render the discourse infelicitous. With *now*, however, the discourse is felicitous because the described state is understood to hold throughout the event of going to the plastic surgeon. This event is chosen as an antecedent because *now* is an event seeking anaphor and the perfect clause in (2) makes the consequence of the winning event salient (rather than the winning event itself; see [3]). Further evidence comes from

(3), which is infelicitous with *now* because the series of stative sentences don't provide an antecedent of the right type.

> Samsa's room, a regular human bedroom, only rather too small, lay quiet between the four familiar walls. Above the table on which a collection of cloth samples was unpacked and spread out hung a picture. It showed a lady, with a fur cap on and a fur stole, sitting upright and holding out to the spectator a huge fur muff. Samsa {*was now/was} intrigued by this lady (modified from [4]). **(3)**

The other property of *now* is exemplified by discourses such as (4) and (5). Here we see that *now* is incompatible with eventive sentences ([5], pp. 595-596).[1] In this way, *now* differs from all other temporal location adverbs (cf. [8]), including the seemingly similar anaphor *at that point* in (6).

> He came to me and told me he had been dressing in my clothes whenever I wasn't home for quite a few years, and now he {was ready to take/was taking/had taken/*took} the next step... **(4)**

> Yesterday, Anna went to her plastic surgeon. She had won the beauty contest 30 years ago. Now she {wanted to replace/*replaced} her nose and upper lip with those of a donor. **(5)**

> The first of Weiss' explicitly autobiographical novels, *Leavetaking*, describes his childhood and youth until 1940. {At that point/*now} he essentially claimed his independence and set out to become an artist ([9]). **(6)**

Based on similar observations, Kamp and Reyle propose that *now* refers to a *temporal perspective point*—i.e. the speech time or a previously mentioned discourse event ([5]). The innovation of their analysis is that *now* is not treated as an indexical expression (cf. [10]), but as perspective setting anaphor whose value is constrained by tense. A problem with their analysis, however, is that they posit three past tenses even though the morphology indicates otherwise: (i) a past tense that only combines with stative sentences, (ii) a past tense that only combines with eventive sentences and (iii) a past tense that is required only in the presence of *now* ([5], pp. 601).

An alternative hypothesis is to say that the semantics of FID explains the seemingly quirky behavior of *now*. For example, according to one influential analysis, FID is an operator that 'shifts' the coordinates of an indexical expression ([11], [12]). On this view, we could say that in a discourse like (2), a FID operator shifts the speech time coordinate to a past time, namely the time of Anna going to the plastic surgeon. In turn, we can maintain that *now* is an indexical expression; it refers to the (shifted) speech time.

While this analysis of FID may be correct[2], shifting coordinates of *now* does not explain *now*'s reluctance to co-occur with eventive sentences viz. (4)-(6). Moreover,

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1 Note that there is a reading of (4) and (5) in which the eventive predicates are acceptable. Such a reading, however, exemplifies a distinct *now*, which is not discussed in this paper; it is morphologically distinguished from the *now* considered here in languages like Russian (cf. *sejcas* vs. *teper* discussed in [6]) and Korean (cf. *cikum* and *icey* discussed in [7]).

2 A potential problem is that it violates Kaplan's prohibition: natural language operators do not shift indexical expressions ([13]). This prohibition explains why, e.g. we cannot say *Spinoza thought that I am God* to mean "Spinoza thought that he is God." According to another

it does not explain *now*'s anaphoric nature—i.e. that it 'chooses' a *particular* antecedent event to serve as the 'current perspective' viz. (2)-(3). These facts, I believe, warrant a semantic reanalysis of *now*.

In this paper, I build on Kamp and Reyle's proposal that *now* is a perspective setting anaphor whose value is constrained by tense and propose a meaning that is (i) compatible with both the past and present tenses and (ii) has the same semantic type and uses the same ingredients as other temporal location adverbs. In particular, I propose that all such adverbs have a temporal component and a discourse component. Depending on the nature of the adverb, one of these components typically plays a greater role in fixing the temporal location of an eventuality described by an aspectual phrase. In the case of *now*, however, both components play an instrumental role. They conspire to impose the following two requirements: (i) search for a topical event that serves as the "current perspective" and (ii) describe what took place throughout this topical event. These two requirements capture *now*'s anaphoric nature and—given aspectual constraints on narrative progression discussed in the next section—they lead to a contradiction with eventive, but not stative verb phrases. All in all, the proposed analysis makes the correct predictions about the discourses considered in this section without "postulating apparently spurious ambiguities" ([5], pp. 599).

2 Background assumptions

2.1 Event structure

Following [3], I assume that events have a tripartite structure, consisting of a *preparatory process* that leads up to an event's *culmination,* which in turn transitions into an event's *consequent state*. Accomplishment verb phrases (VPs) like *write a letter* are the most complex event types because they describe events consisting of I and II in Fig. 1; achievement VPs like *arrive* describe events consisting of II, while activity VPs like *run* describe events consisting of I.
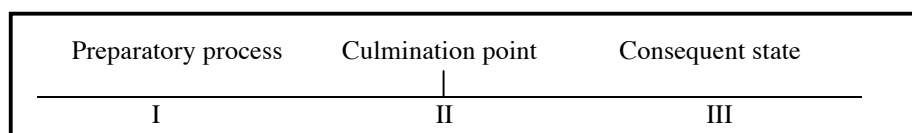
Preparatory process	Culmination point	Consequent state
I	II	III

Fig. 1. Moens and Steedman's tripartite event structure.

2.2 Narrative progression and aspect

It is generally held that temporal anaphora depends in part on the aspectual distinction between events and states (see [15], [16], [17], [18]). For example, consider the discourse below in (7), modeled after Partee's famous example in [17]. Here, the times of the described events (i.e. John's getting up, raising the blind and pulling the blind down) correlate with the order of appearance, i.e. a *narrative progression* is invoked. On the other hand, the state described in (7) (i.e. being light out) holds throughout the described events, i.e. a *narrative halt* is invoked.

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analysis, advanced in [14], FID is a special case of direct speech or quotation. However, to the best of knowledge, this view does not shed any new light on (2)-(6).

John got up at 8 and raised the blind. It was light out. He pulled the blind down.   (**7**)

Narrative discourses like (7) motivate a notion of a *reference time*—i.e. a placeholder for where the narrative has developed. According to one influential analysis proposed by Bonnie Webber in [19], a reference time is either the time described by temporal location adverbials or the duration of the consequent state of a previously mentioned discourse event (cf. Partee's "time right after"). Moreover, following [15]-[18], Webber proposed that aspect constrains the temporal location of an eventuality described by a verb phrase (VP) in the following way: Whereas events occur within a reference time, states hold throughout that time.

Such an analysis accounts for the inferred temporal ordering in (7) as follows. The event of John getting up is located within the time denoted by *at 8*, which serves as the reference time. Subsequently, the event of John raising the blind is located within the duration of the consequent state of John getting up, which serves as the new reference time. This correctly predicts that John raised the blind *after* he got up. With regard to the state described in (7), i.e. being light out, it holds throughout (rather than within) the reference time, namely the duration of the consequent state of John raising the blind. This correctly predicts that it was light out when John raised the blind. Moreover, the state of being light out does not serve as an antecedent for the next sentence, thus triggering the *narrative halt* effect.

In sum, Webber's analysis is elegant because (i) it makes use of an independently motivated event structure and (ii) it relates events to times specified by an adverbial in the same way it relates events to times provided by the discourse context, thereby preserving Reichenbach's unified notion of a *reference time* ([20]).

Despite its elegance, however, I argued in [21] and [22] that Webber's analysis cannot account for the Russian imperfective aspect, which relates distinct event parts to the reference time. Which event part is at play depends on how the reference time is specified. If it is specified by an adverbial expression, then the Russian imperfective locates an *event* relative to a reference time. However, if it is specified by the discourse context, then the Russian imperfective locates the *consequent state* of an event relative to a reference time. To account for these generalizations, I argued that it is necessary to split the notion of a *reference time* into two distinct parameters (cf. [5]; see also [23] for independent evidence). I proposed a *birelational analysis* in which aspectual meaning involves both temporal information and information about discourse connectivity. In particular, aspect requires two inputs relative to which a described eventuality is located—(i) a *time* that is specified by a temporal location adverbial (or some other grammatical expression) and (ii) a *state* that is specified by the discourse context. Events are required to hold throughout the two inputs, while states hold throughout them.

In what follows, I assume a birelational analysis of aspect without further comment. As shown in §4, this assumption allows us to give an adequate semantics for *now*. I end this section by providing birelational meanings of two English expressions: an eventive and a stative aspectual phrase in (8) and (9) respectively. In the next section, I provide details about how the inputs to these phrases are supplied.

AspP [Anna laugh] $\rightsquigarrow$ (**8**)
$$\lambda s \lambda t \exists e[\tau(e) \subseteq t \wedge \tau(e) \subseteq \tau(s) \wedge laugh(anna, e)]$$

AspP [Anna be.sick] $\rightsquigarrow$ (**9**)
$$\lambda s' \lambda t \exists s[t \subseteq \tau(s) \wedge \tau(s') \subseteq \tau(s) \wedge be.sick(anna, s)]$$

3 Meaning of temporal location adverbs

I assume the syntactic architecture in Fig. 2, where aspectual phrases combine with a tense operator and the resulting denotation combines with an adverbial.
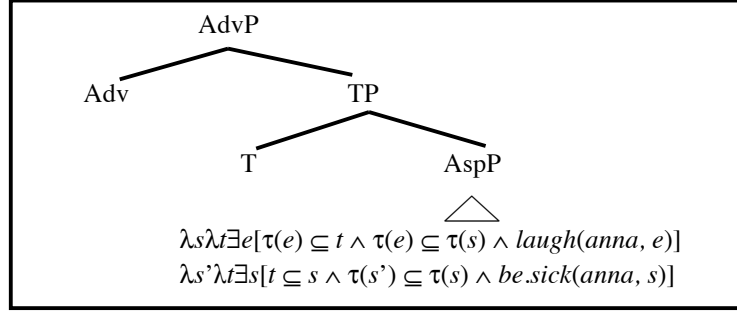

Fig. 2. Assumed syntactic architecture.

I treat tense operators as relations between the speech event e_0 and a time argument t. For example, the past tense operator PST in (10) requires that a time argument precede the run time of the speech event and the present tense operator PRS in (11) requires that the two be identified.

$$\text{T [PST]} \rightsquigarrow \tag{10}$$
$$\lambda Q \lambda s \lambda t[t < \tau(e_0) \wedge Q(s, t)]$$

$$\text{T [PRS]} \rightsquigarrow \tag{11}$$
$$\lambda Q \lambda s \lambda t[t = \tau(e_0) \wedge Q(s, t)]$$

With regard to temporal location adverbs like *yesterday, the day before, at 5,* and *February 15, 1981*, I propose that they combine with TP and have two functions. They supply a time input—which serves as the *location time* for a described eventuality (cf. [5])—and specify its duration as well as its relation to a *perspectival event*—i.e. the speech event or a previously mentioned discourse event (cf. Kamp and Reyle's notion of a *temporal perspective point* in [5]).[3] Moreover, they supply a state input, which does not play a significant role in locating the described eventuality.

As an example of the analysis, consider the denotations of *yesterday* and *the day before* in (12) and (13):

$$\text{Adv [yesterday]} \rightsquigarrow \tag{12}$$
$$\lambda Q \exists t \exists s[day(t) \wedge t <_{day} \tau(e_0) \wedge Q(s, t)]$$

$$\text{Adv [the day before}_n\text{]} \rightsquigarrow \tag{13}$$
$$\lambda Q \exists t \exists s[day(t) \wedge t <_{day} \tau(e_n) \wedge Q(s, t)]$$

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[3] On this analysis, the contribution of tense is superfluous in the presence of certain adverbs. Following [24], I take this to reflect a remarkable property of natural language that in the presence of an adverbial like *a week ago*, the past tense must still be expressed.

Both adverbs specify that the location time t is a 24-hour interval of time denoted by *day* that precedes the perspectival event by a day. Being an indexical, *yesterday* requires that the perspectival event be the speech event e_0. On the other hand, the anaphoric adverb *the week before* requires that the perspectival event be a previously mentioned discourse event e_n. This explains why *yesterday* can be used discourse initially, but *the day before* cannot (cf. Kamp and Reyle's discussion of *last Sunday* vs. *the preceding Sunday* in [5], pp. 622-625).

A question that arises is: Where does TP get its two inputs if there is no adverbial present? Following work by Carlota Smith ([25], [26]), I assume that semantically, there is always an adverb present (even if it not there syntactically). In particular, I assume that episodic sentences in the past tense that do not have an overt adverbial combine with a silent *then* (cf. Bäuerle's silent 'once' in [27]). Like other temporal location adverbs, *then* has two functions. As illustrated in (14), it supplies a time input, which does not play a significant role in locating the described eventuality (cf. [5], pp. 528-529). Moreover, it supplies a state input s_n that requires a salient state antecedent that I will refer to as the *topic state*.

$$\text{Adv } [<\text{then}_n>] \rightsquigarrow \qquad\qquad (\mathbf{14})$$
$$\lambda Q \exists t[Q(s_n, t)]$$

The meaning above explains why the sentences in (15) are infelicitous out-of-the-blue: there is no topic state provided by the discourse context.[4]

$$\begin{array}{c} \text{\#Avital came in.} \\ \text{\#Then Avital came in.} \end{array} \qquad\qquad (\mathbf{15})$$

Moreover, it explains the understood event ordering in the discourses below in (16): *then* (in its covert or overt manifestation) requires that the sitting down event be contained within the topic state. Assuming this state is the consequent state of the coming in event, it is correctly predicted that the sitting follows the coming in.

$$\begin{array}{c} \text{Yesterday, Avital came in. She sat down.} \\ \text{Yesterday, Avital came in. Then she sat down.} \end{array} \qquad (\mathbf{16})$$

In sum, temporal location adverbs supply both temporal information and information about discourse connectivity. In particular, they supply two inputs that are required by aspectual phrases—a *time* and a *state*. Adverbs like *yesterday* and *the day before* are similar insofar as the supplied *time* input plays a greater role in fixing the temporal location of the described eventuality; the two adverbs differ solely in whether the perspectival event is the speech event or a previously mentioned discourse event. On the other hand, the *state* input supplied by the adverb *then* (in its overt or covert manifestation) plays a greater role in fixing the temporal location of the described eventuality. This explains why we often see this adverb in narrative progression contexts, but never discourse initially. In the next section, I propose that both the *state* and *time* inputs supplied by *now* play a significant role in fixing the temporal location of the described eventuality.

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[4] (15) is infelicitous out-of-the-blue whether *then* occurs sentence-initially or sentence-final. See [28] and references therein for more discussion about the different uses of *then*.

4   Meaning of 'now'

In the introduction, we saw that *now* has two key properties: it is an anaphor that seeks a salient event antecedent and it has an affinity for stative sentences. The basic idea of my analysis is as follows. *Now* encodes the following directions: (i) search for a topical event that serves as the "current perspective" and (ii) describe what took place throughout this topical event. The latter direction is consistent with the aspectual requirements imposed on stative predicates, but not eventive ones, thereby explaining the contrast in (17). Moreover, the contrast in (18) is explained in the following way. Without *now*, the states of being old and sick are required to hold throughout the topic state, namely the consequent state of the winning event (cf. discussion of (16)). With *now*, however, the states of being old and sick are required to hold throughout a topical event that serves as the "current perspective." The topical event must be the event of going to the plastic surgeon assuming that the past perfective clause "had won the beauty contest" makes the consequent state of the winning event salient (and not the winning event itself).[5]

Yesterday, Anna went to her plastic surgeon. She had won the beauty contest 30 years ago. Now she {wanted to replace/*replaced} her nose and upper lip.	**(17)**

Yesterday, Anna went to her plastic surgeon. She had won the beauty contest 30 years ago. {Now she was old and sick/#she was old and sick}.	**(18)**

In order to make sense of this proposal within the theory outlined in the previous two sections, consider the meaning for *now* below, in (19):

$$\text{Adv } [\text{now}_n] \ \rightsquigarrow$$
$$\lambda Q \exists t \exists s [t = \tau(e_n) \wedge \text{CONS}(e_n) = s \wedge Q(s, t)] \qquad \textbf{(19)}$$

According to the formula above, *now* has the same semantic type and uses the same ingredients as other temporal location adverbs. In particular, it supplies a time input that is related to a salient event e_n that serves as the perspectival event. In this way, *now* is on a par with *the day before* viz. (13). It differs, however, in that it requires the supplied time input to be identified with (rather than precede) the run time of the perspectival event (viz. the condition $t = \tau(e_n)$). As will be shown below, this difference is what makes *now* compatible with both the present and the past tense.

Like all other location adverbs, *now* also supplies a state input. However, unlike other adverbs, it relates this state to the perspectival event. In particular, it requires the supplied state input to be a consequent state of the perspectival event (viz. the condition $\text{CONS}(e_m) = s$).

The relations $t = \tau(e_n)$ and $\text{CONS}(e_n) = s$ encoded by *now* entail that an eventuality described by AspP holds throughout the perspectival event as desired. Such is the case because—given the analysis sketched out in the previous section—t and s are the inputs relative to which an eventuality described by AspP is located. In particular, events described by AspP are required to hold within these inputs, while states are required to hold throughout them. This leads to contradiction with eventive sentences,

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[5]   This assumption is independently needed to explain why past perfect clauses often form a narrative progression in flashback discourses (cf. [5], pp. 593-611).

but not with stative sentences. That is, it follows from (19), (20) and (22) that the nose replacing event is contained within two non-overlapping eventualities—i.e. the perspectival event and its consequent state—thereby explaining the ungrammaticality of (17) with *replaced*. On the other hand, it follows from (19), (20) and (23) that a state of being sick held throughout the perspectival event, thereby explaining *now*'s affinity for stative sentences.

$$T \ [\text{PST}] \leadsto \qquad\qquad\qquad\qquad (20)$$
$$\lambda Q \lambda s \lambda t [t < \tau(e_0) \wedge Q(s, t)]$$

$$T \ [\text{PRS}] \leadsto \qquad\qquad\qquad\qquad (21)$$
$$\lambda Q \lambda s \lambda t [t = \tau(e_0) \wedge Q(s, t)]$$

$$\text{AspP [she replace her nose]} \leadsto \qquad\qquad (22)$$
$$\lambda s \lambda t \exists e [\tau(e) \subseteq t \wedge \tau(e) \subseteq \tau(s) \wedge replace.her.nose(she, e)]$$

$$\text{AspP [Anna be sick]} \leadsto \qquad\qquad\qquad (23)$$
$$\lambda s' \lambda t \exists s [t \subseteq \tau(s) \wedge \tau(s') \subseteq \tau(s) \wedge be.sick(anna, s)]$$

The proposed analysis not only accounts for *now* in contexts where it co-occurs with the past tense, but it also accounts for the so-called indexical use of *now* in examples like (24). Here we see *now* appearing discourse initially and co-occurring with the present tense; it makes reference to the time at which it is uttered.

$$\text{Anna is sick now.} \qquad\qquad\qquad (24)$$

This is just one way in which *now* is used in a discourse; its seeming indexical behavior in (24) comes from the present tense, which identifies the run time of the speech event with the time introduced by *now*, which in turn is identified with the perspectival event. For this reason it follows from (19), (21) and (23) that the state of being sick described in (24) holds throughout the speech event as desired.

5 Conclusion

I end this paper by mentioning two challenges for the proposed analysis. The first comes from Hans Kamp's example in (25), which entails that an earthquake is taking place at the speech event. What is interesting about (25) is that there is no present tense in the sentence and the aforementioned entailment disappears without *now*.

$$\text{I learned last week that there would now be an earthquake ([10], pp. 299).} \qquad (25)$$

Given the analysis proposed here, one could say that the perspectival event in (25) must be the speech event because it is compatible with the semantics of *would* and there is no other possible antecedent; the learning event described by the matrix clause is presumably ruled out because *would* requires the earthquake to follow this event. In other words, the idea is that *now* is compatible with a *present* or a *past* perspectival event and—if no grammatical elements (viz. the present tense) indicate otherwise—independent rules of anaphora resolution determine which one is chosen.

Another challenge for the proposed analysis concerns the behavior of other temporal location adverbs that appear to 'lose' their indexicality in FID analogous to *now*. For example, consider *tomorrow* in (26), where it does not refer to a day after the speech event (see [29] for examples involving other adverbs).

Tomorrow was Monday, Monday, the beginning of another school week! ([1])   (**26**)

Given the proposed analysis, there are two avenues to pursue: (i) like *now, tomorrow* is an anaphor or (ii) an FID operator is responsible for shifting *tomorrow*'s coordinates in (26). In its extreme, (i) leads to the perhaps undesirable claim that many (if not all) adverbial expressions that are typically thought to be indexical are really anaphoric. The less radical view in (ii), on the other hand, suggests that an FID operator is also at play when *now* occurs in FID. If that's right, then the effects of this operator are truth-conditionally undetectable given *now*'s semantics.

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