

- d. Hij danst *zo*. (Dutch)
 he dances thus
 'He dances like that.'

These expressions all occur as adnominal modifiers as well (in Slavic, in an inflected form). In this use, they are also anaphoric, but not to a manner:

- (2) a. *Taki* pies uciekł wczoraj w nocy. (Polish)
 such.MASC.SG.NOM dog.NOM ran.away yesterday in night
 'Such a dog ran away last night.'
- b. *Takuju* sobaku my videli. (Russian)
 such.MASC.SG.ACC dog.SG.ACC we saw
 'We saw such a dog.'
- c. Wir haben *so* einen Hund gesehen. (German)
 We have such a dog seen
 'We saw such a dog.'
- d. Ik zou *zo* 'n hond willen hebben (Dutch)
 I would such a dog want have.INF
 'I would like to have such a dog.'

The relation between the adverbial modifiers in (1) and the adnominal modifiers in (2) is quite close. But the sentences in (2), unlike those in (1), receive interpretations that seem to involve anaphora to a kind (Carlson 1977) rather than to a manner, as we will argue below. A correspondence of this sort exists even in English, though only in a vestigial form, in the relation between the cognates *so*¹ and *such*:

- (3) a. ?He danced (like) *so*.
 b. Such a dog ran away last night.

The analytical aim here will be to develop an approach to the semantics of adverbial expressions such as those in (1), guided by the intuition that their analysis should parallel that of their adnominal counterparts.

This problem is articulated in a bit more detail in section 2. In section 3, previous approaches to the analysis of English *such* are examined, and an analysis in terms of anaphora to kinds is adopted and extended to adnominal modifiers like those in (2). In section 4, a parallel analysis is developed for their adverbial relatives by introducing an analogue of kinds into the domain of events. In section 5, some broader implications of this approach are explored. Section 6 concludes.

2. A Closer Look at the Data

2.1. The Adnominal Use

In their adnominal incarnation, these modifiers closely parallel English *such*. In English, if a particular kind of dog had been under discussion (say, the poodle) a natural way to refer to a particular dog of that kind (a particular poodle) would be with *such a dog*. The DPs in (2) can be used in this way as well. Thus in Polish, for example, one might refer to a particular dog of the contextually salient kind with *taki pies* ('such dog').

The parallel also extends to an alternative way of indicating the kind involved. In English, *such* has a use in which the kind is not provided by context, but rather indicated overtly with an *as* phrase:

- (4) a. Such a dog *as this* ran away last night.
b. Such books *as these* were once read.

Analogues of English *as* phrases can be used for this purpose in other languages as well.²

- (5) Taki pies *jak ten* uciekł wczoraj w nocy. (Polish)
such.MASC.SG.NOM dog.NOM as this ran.away yesterday in night
'Such a dog as this ran away last night.'
- (6) So ein Hund *wie dieser* hat mal meinen Bruder gebissen. (German)
such a dog as this.SG.NOM has once my brother bitten.
'Such a dog like that once bite my brother.'

So, apart from expected and relatively superficial differences – like agreement between the modifier and the noun – these modifiers correspond very directly in their adnominal use to English *such*.

2.2. The Adverbial Use

In their adverbial use, these modifiers have no direct analogue in English, though they are comparable to expressions like *thus*, *that way*, *like that*, or the use of *so* in (3). Essentially, the state of affairs seems to be that though English has limited itself to using *such* adnominally, German and Polish have imposed no analogous restriction.

Even so, the connection between adnominal and adverbial uses of these expressions is intimate. The semantic task adverbial uses of these modifiers perform with respect to manner is precisely analogous to the semantic task their adnominal uses perform with respect to kinds. Thus, if a particular manner of dancing (say, dancing passionately) had been under discussion, a natural way to characterize a particular instance of dancing that way (a particular passionate

dancing) would be with *tańczył tak* ('dance.INF so') in Polish or with *so tanzen* ('so dance.INF ') in German.

Just as the adnominal incarnations of these modifiers support an alternative, overt means of expressing the kind involved as in (5-6), so too their adverbial incarnations support a precisely parallel means of expressing the manner involved:

- (7) Jan tańczył tak jak Maria. (Polish)
 John danced.3.SG.MASC.PAST thus as Mary
 'John danced this way/the way Mary did.'
- (8) Jan hat so wie Maria getanzt. (German)
 John has thus as Mary danced
 'John danced this way/the way Mary did.'

It is not, then, just the modifiers themselves that are identical (modulo, in Slavic, inflection) across their uses, but also the phrasal complements they take.

In Polish, the correspondence between adnominal and adverbial uses is also reflected in the *wh*-word counterparts of *tak/taki*:

- (9) a. *Jaki* pies uciekł wczoraj w nocy?
 what.MASC.SG.NOM dog.NOM ran.away yesterday in night
 'What kind of dog ran away last night?'
- b. *Jak* tańczył Jan?
 how danced John
 'How did John dance?'

The inflected adnominal form *taki* can be questioned with a corresponding inflected adnominal *wh*-word *jaki*; likewise, the uninflected adverbial form *tak* can be questioned with a corresponding uninflected adverbial *wh*-word *jak*. The semantics seems correspondingly parallel. Just as *tak* is anaphoric to a manner, *jak* questions a manner; and just as *taki* is anaphoric to a kind, *jaki* apparently questions a kind.³

2.3. The Facts So Far

The correspondence between adnominal and adverbial uses of these modifiers, then, is very close. These uses are semantically parallel, syntactically parallel (modulo inflectional morphology), support parallel *as*-phrase-like structures, and, in Polish, have parallel *wh*-words.

To our knowledge, these systematic parallels have not been previously discussed from a generative perspective. Nor is there to our knowledge an existing analysis in formal semantics that links manner modification and

reference to kinds in the way these facts seem to require. The analytical challenge these facts present, then, is to establish such a link.

3. Nominal Uses and Anaphora to Kinds

To establish the link between adnominal and adverbial uses of these modifiers, it seems natural to begin by examining the semantics of *such* in English.

3.1. *Kinds and the Semantics of Such in English*

Carlson (1977) analyzed English *such* as a kind anaphor.⁴ More specifically, *such* means ‘of kind *k*’, where *k* is some contextually salient kind. For example, *one such dog* means ‘one dog of that kind.’

The principal reason for thinking this is so (and that *such* is not, for example, simply a proform for an adjective, as Siegel 1994 suggests), is that expressions that cannot denote kinds do not make good antecedents for *such*:

- (10) a. People *in the next room*... ??*such* people (are obnoxious)(Carlson 1977)
b. Elephants *that are standing there*... ??*such* elephants
c. Men *that Jan fired this morning*... ??*such* men

Bare plurals like those in (10) cannot easily denote kinds, as their incompatibility with predicates that require a kind demonstrates:

- (11) a. ??People *in the next room* are widespread.
b. ??Elephants *that are standing there* may soon become extinct.
c. ??Men *that Jan fired this morning* are common.

Carlson suggests that these bare plurals do not denote kinds because they “refer to a finite set of things . . . that must exist at a certain time in a given world.” However – as Carlson points out – to the extent that such a bare plural can correspond to a kind, it may antecede *such*. For example, to the extent that *alligators in the New York sewer system* can be construed as a kind of alligator, it is acceptable as an antecedent of *such*:

- (12) Alligators *in the New York sewer system*... *such* alligators survive by eating rodents and organic debris. (Carlson 1977)

3.2. *Nominal Uses as Properties of Kind Realizations*

Such, then, can be interpreted as a property of individuals that realize a contextually supplied kind. Like a pronoun, it bears a referential index – but one that corresponds to a kind.⁵

(13) $[[\text{such}_i]] = \lambda x . x \text{ realizes } k_i$

This semantics for *such* can be directly extended to Polish *taki* and German *so*:

(14) a. $[[\text{taki}_i]] = \lambda x . x \text{ realizes } k_i$
b. $[[\text{so}_i]] = \lambda x . x \text{ realizes } k_i$

Taki pies, for example, is interpreted as in (15):

(15) a. $[[\text{taki}_i]] = \lambda x . x \text{ realizes } k_i$
b. $[[\text{pies}]] = \lambda x . x \text{ is a dog}$
c. $[[\text{taki}_i \text{ pies}]] = \lambda x . x \text{ realizes } k_i \wedge x \text{ is a dog}$

The denotation of *taki_i* – a property of individuals that realize the contextually salient kind – intersects with the denotation of *dog* – a property of individuals that are dogs – to yield a property of individuals that that realize *k_i* and that are dogs. German *so ein Hund* ‘such a dog’ can be interpreted likewise.

3.3. As-Phrase-Like Structures

Taki and *so* may occur with optional complements (comparable to English *as*-phrases), as (5-6) showed. To account for this, *taki* and *so* can be taken to have an optional argument. The complement can be taken to denote a property of kinds (like English *as* phrases; Carlson 1977, Landman 2002). For example, *as Missy* denotes the property of kinds that Missy realizes:

(16) $[[\text{jak Missy}]] = \lambda k . \text{Missy realizes } k$

The semantic contribution of the *as*-phrase is to restrict the antecedent kind: the kind anteceding *taki* in *such a dog as Missy* must be a kind that Missy realizes. More precisely:

(17) $[[\text{taki}_i]] = \lambda f_{\langle k,t \rangle} \lambda x . x \text{ realizes } k_i \wedge f(k_i)$

In effect, *taki pies jak Missy* (‘such dog as Missy’) denotes a property of individuals that realize some contextually salient kind that Missy realizes.⁶

(18) $[[\text{taki}_i \text{ pies jak Missy}]] = \lambda x . x \text{ realizes } k_i \wedge \text{Missy realizes } k_i \wedge \text{dog}(x)$

4. The Adverbial Uses

The Carlson (1977) analysis of English *such*, which the previous section

demonstrated can be extended to adnominal uses of Polish *taki* and German *so*, can be extended even further to adverbial uses of these expressions by making some additional assumptions about the ontology of events.

4.1. Event-Kinds

The principal analytical challenge to confront in extending the kind-anaphora account of the adnominal uses to the adverbial ones is that this requires establishing a link between kinds and manner modification. This link, however, emerges quite naturally when one takes the denotations proposed above for the adnominal uses as a guide.

The first step to doing this is to exploit the parallelism between individuals and events (Davidson 1967, others). Just as adnominal *taki* and *so* denote properties of individuals, adverbial *tak* and *so* might be taken to denote properties of events. This way, both uses of expressions will have in common that they are property-denoting, and that they are interpreted by predicate conjunction.

At this point, though, one immediately encounters an intriguing complication. Pursuing the analogy further, if the adnominal uses denote properties of individuals that realize a particular contextually-supplied kind, it seems natural to suppose that the adverbial uses might likewise denote properties of *events* that realize a particular contextually-supplied kind. But here, we are on less familiar territory – we have encountered a funny kind of kind. It is not usual to regard kinds as having event realizations.

What the facts here seem to demand, then, is an analogue of kinds in the domain of events. This seems natural enough, but it is not a familiar notion. (One notable antecedent, though, is Hinrichs 1985, who implements kinds in the domain of events for largely conceptual reasons.) To put the pieces of the puzzle together, one might assume an ontology with both kinds, like Carlson's, and events. The domain of kinds and the domain of events, however, will have a non-empty intersection – the domain of event-kinds.

A bit more formally, the entity domain D_e will be partitioned into two sorts: D_o , the domain of objects (non-event individuals), and D_s , the domain of eventualities (events and states). The entity domain D_e will also be partitioned along another dimension into another two sorts: D_r , the domain of non-kinds (or realizations), and D_k , the domain of kinds.⁷ Thus:

$$(19) \quad \begin{aligned} D_e &= D_o \cup D_s \\ D_e &= D_r \cup D_k \end{aligned}$$

The purpose of imposing this structure on the domain is only to be able to introduce event-kinds – members of both D_s and D_k .

4.2. Adverbial Uses as Properties of Event-Kind Realizations

The adverbial modifiers can now be interpreted in a way that closely parallels the nominal ones. Like the adnominal uses, the adverbial uses can be interpreted as properties of realizations of a contextually supplied kind:

- (20) $\llbracket \mathbf{tak}_i \rrbracket = \lambda e . e \text{ realizes } k_i$
 $\llbracket \mathbf{so}_i \rrbracket = \lambda e . e \text{ realizes } k_i$

The only semantic difference, then, will be sortal. That is, unlike the adnominal uses, the adverbial uses denote properties of events and are anaphoric to event-kinds. This can be made explicit as a presupposition:

- (21) Adnominal uses:
 $\llbracket \mathbf{taki}_i \rrbracket = \lambda x: x \in D_o \cap D_r \wedge k_i \in D_o \cap D_k . x \text{ realizes } k_i$
 $\llbracket \mathbf{so}_i \rrbracket = \lambda x: x \in D_o \cap D_r \wedge k_i \in D_o \cap D_k . x \text{ realizes } k_i$

- (22) Adverbial uses:
 $\llbracket \mathbf{tak}_i \rrbracket = \lambda e: e \in D_s \cap D_r \wedge k_i \in D_s \cap D_k . e \text{ realizes } k_i$
 $\llbracket \mathbf{so}_i \rrbracket = \lambda e: e \in D_s \cap D_r \wedge k_i \in D_s \cap D_k . e \text{ realizes } k_i$

Thus, adverbial *tak*, for example, will be defined only with respect to event realizations and only if it is anaphoric to an event-kind. (We will henceforth suppress this presupposition for brevity.)

*Tańczył tak*_{*i*} ('danced thus'), then, will receive an interpretation as in (23):

- (23) $\llbracket \mathbf{tańczył} \rrbracket = \lambda e . e \text{ is a dancing}$
 $\llbracket \mathbf{tak}_i \rrbracket = \lambda e . e \text{ realizes } k_i$
 $\llbracket \mathbf{tańczył tak}_i \rrbracket = \lambda e . e \text{ is a dancing} \wedge e \text{ realizes } k_i$

Tak can thus be interpreted as a run-of-the-mill modifier, conjoining with *tańczył*, yielding a property of events as a VP denotation.⁸

4.3. Event-Kinds As a Way of Representing Manner

In the previous section, the analogy between the adnominal and adverbial uses was pursued almost mechanistically – to sustain it, kinds in the event domain were necessary, so they were introduced. But does this do justice to the semantics of the adverbial uses?

It seems to. To convince oneself of this, it is necessary to reflect on what an event-kind is. This is, of course, not entirely obvious, any more than it is obvious how to understand the role of kinds in the grammar more generally. But it does seem relatively clear that if, for example, there can be a kind which is realized by particular clumsy people, there may also be a kind which is realized

by particular clumsy dancings. In this way, an event-kind can model a manner. This will be explored in a bit more detail below. But as it stands, this does suggest that event-kinds may in fact suffice to reflect that adverbial uses of these expressions are, pre-theoretically, anaphoric to a manner.

5. Broader Implications: Event-Kinds and Manner Anaphora

Within the nominal domain, the main argument for treating *such* as anaphoric to a kind was that it could not be anteceded by an expression that denotes a set of individuals that occur at a particular time and place – an expression that does not correspond to a kind.

Tak and *so* seem to be subject to a similar constraint – temporal and locative adverbials cannot generally antecede them:

- (24) a. *Maria hat am Dienstag getanzt und Jan hat (German)
 Mary has on Tuesday danced and John has
 auch so getanzt.
 also thus danced
 ‘Mary danced on Tuesday, and John danced like that too.’
- b. *Maria tańczyła we wtorek i Jan też tak tańczył. (Polish)
 Mary danced on Tuesday and John also thus danced
 ‘Mary danced on Tuesday, and John danced like that too.’
- (25) a. *Maria hat in Minnesota gegessen und Jan hat (German)
 Mary has in Minnesota eaten and John has
 auch so gegessen.
 also thus eaten
 ‘Mary ate in Minnesota, and John ate like that too.’
- b. *Maria jadła w Minnesocie i Jan też tak jadł. (Polish)
 Mary ate in Minnesota and John also thus ate
 ‘Mary ate in Minnesota, and John ate like that too.’

Temporal and locative adverbials in general restrict a set of events to having taken place at a particular time or place in a given world, and as a consequence do not make for a very good event-kind.

As with the nominal cases, what constitutes a possible event-kind is subject to some variability. Repeating (12):

- (26) Alligators *in the New York sewer system*... *such* alligators survive by eating rodents and organic debris. (Carlson 1977)

This can be construed as involving a particular kind of alligator. Similarly, certain locatives can be construed as involving an event-kind, and thereby can antecede *tak* and *so*:

- (27) Maria śpi w śpiworze i Jan też tak śpi. (Polish)
 Mary sleeps in sleeping-bag and John also thus sleeps
 ‘Mary sleeps in a sleeping bag, and John sleeps like that too.’
- (28) Maria schläft in einem Schlafsack und Jan schläft auch so. (German)
 Maria sleeps in a sleeping-bag and Jan sleeps also thus
 ‘Maria sleeps in a sleeping bag, and Jan sleeps like that too.’

Even locatives containing proper names may reflect this point – if Minnesota in (25) were a restaurant and eating there a sufficiently well-established kind of eating, (25b) would be good. Thus event-kinds seem to be subject to the same constraints as kinds generally. These independent characteristics of kinds seem to suffice to distinguish manner modifiers from temporal and locative modifiers.

6. Outlook

6.1. Uses in the Adjectival Domain

The analysis here is rooted in the correspondence between the adnominal and adverbial uses of modifiers such as Polish *tak* and German *so*. It is worth noting, though, that these modifiers also have uses in the adjectival domain:

- (29) a. Jestem tak wysoki (jak Piotr) (Polish)
 I-am so tall as Peter
 ‘I am this tall/as tall as Peter.’
- b. Ich bin so groß (wie Peter) (German)
 I am so tall as Peter
 ‘I am this tall/as tall as Peter.’

As modifiers of AP, these expressions are degree anaphors – they rely on a contextually-supplied degree. If the core semantics of this class of modifiers more generally involves kind anaphora, there ought to be some way in which this apparent degree-anaphora can be modeled in terms of anaphora to kinds. One way to implement this idea might be to introduce into the ontology, in

addition to degrees, degree-kinds. But this seems a suspect notion. What might a kind of degree be? What would the difference be between a degree-kind and a degree-realization? Another approach, perhaps more interesting, would be to focus not on the degree argument, but rather on the eventuality argument plausibly also present in the adjectival domain. Just as adverbial uses of these modifiers involve event-kinds, the adjectival uses could involve state-kinds. This would be quite natural – if there are event-kinds, one might expect there to be state-kinds too. This would require, of course, that an ordering on to be imposed (these) state-kinds, just as there is on degrees. This approach presents the tantalizing question of whether state-kinds might actually suffice on their own to represent degree.

Whatever the right approach to this may ultimately be – a matter we will leave for future research – we take this as an indication that it may in fact be fruitful to take kind anaphora as the core semantics of these expressions, and to treat the adjectival use as a probe into the relation between kinds and degrees.

6.2. Conclusion

The principal analytical proposal here has been that German *so* and Polish *tak/taki* are uniformly kind-anaphoric in both their adnominal and adverbial uses, and that their semantic relation is expected on a view in which anaphora to a manner is anaphora to an event-kind.

Given this approach, these modifiers constitute novel evidence for introducing event-kinds into the ontology. This approach also provides the beginnings of an answer to the question of how to represent the notion of ‘manner’ in the grammar. The facts considered here – coupled with the observation that there is no reason why the domain of eventualities and the domain of kinds must be disjoint – lead to a way of modeling manner in terms of an independently motivated notion, kinds. The principal semantic distinction between manner modification and temporal or locative modification then follows from known characteristics of kinds. In this way, this approach to these modifiers puts in a new light our natural intuitions about what manner is.

Notes

Thanks to Ania Łubowicz, Jan Anderssen, Maria Gouskova, and Brandt van der Gaast for judgments and help with the data, and to Angelika Kratzer, Lisa Matthewson, Barbara Partee, Chris Potts, Chris Barker, and Philip Miller.

¹ This adverbial use of English *so* is likely related to ‘identifier *so*’ (Bolinger 1972, others). Identifier *so*, though, seems to be subject to a number of idiosyncratic restrictions (see Kehler and Ward 1999 for a detailed examination) not shared by adverbial uses of the modifiers at issue here.

² We will limit our examples from this point primarily to German and Polish for convenience.

³ It would of course require more argumentation than can be provided here to establish

convincingly that *jaki* in fact questions a kind. This claim, however, has been made on completely independent grounds even for English *what* (Heim 1987).

⁴ Discussions of *such* include Bolinger (1972), Bresnan (1975), Siegel (1994), and Wood (2002).

⁵ Carlson's semantics for *such* has it introduce a presupposition that we have not included here that the kind be a subkind of the kind that corresponds to the nominal *such* modifies. For instance, *one such dog* denotes a property of individuals that realize k_i , where k_i is presupposed to be a subkind of dog.

⁶ We assume that *such* and its argument *as*-clause form a constituent at LF, in the same way that, for example, *more* and its *than*-clause complement might.

⁷ We do not distinguish stages of individuals here, as Carlson does.

⁸ This representation 'severs' the external argument (Kratzer 1996). This is not crucial.

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