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Scalar and non-scalar comparison across categories: The case of Turkish equatives

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Equative comparison constructions occur across categories – adjectival as well as nominal and verbal. In English, adjectival equatives are (mostly) scalar, while nominal and verbal ones are (mostly) non-scalar. At the same time, English scalar (adjectival) equatives make use of the standard marker *as*, while non-scalar (nominal/verbal) ones make use of *like* as a standard marker, cmp. (1a-c). In German as well as Polish, there is only one standard marker, which is used across categories, in scalar as well as non-scalar equatives (German *wie*, Polish *jak*), see (2a-c).

(1)	a. Anna is as tall as Berta.	(2)	a. Anna ist so groß wie Berta.	(adj. / scalar)
	b. Anna has a dress like Berta's.		b. Anna hat so ein Kleid wie Berta.	(nom. / non-scalar)
	c. Anna runs like Berta (does).		c. Anna rennt so wie Berta.	(verb. / non-scalar)

In Turkish, there are two standard markers, *kadar* and *gibi*, indicating scalar and non-scalar equatives. *Kadar* is an originally Arabic word roughly equivalent to English *much*. The standard marker *gibi* can be translated as *similar* or *like*, as in *Ankara gibi bir şehir* ('a city like Ankara'). In contrast to English, both standard markers can be used across categories. Thus we find equatives based on adjectival as well as nominal and verbal parameters expressing scalar comparison when combined with *kadar*, (4a, 5a, 6a), and non-scalar comparison when combined with *gibi*, (4b, 5b, 6b).

(4)	a. Anna Berta kadar zeki. A. B. kadar intelligent.Cop3sg	`Anna is as intelligent as Berta.' (scalar, same degree of intelligence)
	b. Anna Berta gibi zeki. A. B. gibi intelligent.Cop3sg	`Anna is intelligent like Berta.' (non-scalar, similar in the way of being intelligent)
(5)	a. Anna'nın elbisesi Berta'nın-ki kadar. A.-Gen dress.Poss3sg B.-Gen-Rel kadar.Cop.3sg	`Anna's dress is as _____ as Berta's.' (scalar, e.g., same length or price)
	b. Anna'nın elbisesi Berta'nın-ki gibi. A.-Gen dress Poss3sg B.-Gen-Rel gibi.Cop.3sg	`Anna's dress is like Berta's.' (non-scalar, e.g., design & color & fabric)
(6)	a. Anna Berta kadar koşuyor. A. B. kadar run.3sg.Prog	`Anna runs as _____ as Berta.' (scalar, e.g. duration or frequency)
	b. Anna Berta gibi koşuyor. A. B. gibi run.3sg.Prog	`Anna runs like Berta.' (non-scalar, e.g. style and equipment)

The contrast between *kadar* equatives and *gibi* equatives gives rise to a number of intriguing observations concerning (i) the less expected (from the point of view of English) occurrence of *gibi* in adjectival equatives and (ii) the unexpected occurrence of *kadar* in nominal/verbal equatives (which is not to be confused with comparison of nominal degree, cf. Sassoon 2017).

Ad (i) a) *gibi* is compatible not only with gradable but also with non-gradable adjectives, which is not possible for *kadar* e.g. *Anna Berta gibi mezun*. 'Anna is graduated like Berta' (e.g. through a fake diploma certificate, etc.)

b) *gibi* allows for different comparison classes, e.g. in (4b), Anna might be a kid and Berta her mother, which is strongly dispreferred with *kadar*;

c) *gibi* blocks degree modifiers like *en az* ('at least'), which are o.k. with *kadar;*

(7) a. Anna en az Berta kadar zeki / *gibi zeki 'Anna is at least as intelligent as Berta.'

d) *kadar,* but not *gibi,* may be combined with measure phrases: *1,90m kadar uzun / *1,90m gibi uzun.* However, with *kadar* the sentence has only a comparative reading:

(7) (Who is taller, Anna or Berta?)
Anna 2cm kadar uzun.

`Anna is approximately 2 cm taller (than Berta)'.

c) and d) indicate that Turkish has degree-variables, see Beck et al. (2010).

Ad (ii) e) *kadar* in nominal and verbal equatives selects exactly one dimension, which has to be metric. For example, (5b) can neither be understood as *Anna's skirt is as long and expensive as Berta's* nor as *Anna's skirt is as stylish as Berta's*;

f) licit dimensions in nominal/verbal *kadar* equatives are severely restricted by the particular noun/verb; for example, the dimension of age is licensed for kids but not for houses; similarly, scalar comparison of dresses is restricted to length and price, see (4a). These restrictions are subject of an experimental study, see below.

g) licit dimensions in *gibi* equatives seems to be subject to general restrictions to appearance or manner (see Umbach & Stolterfoht in prep).

f) licit dimensions in nominal/verbal *kadar* equatives cannot be evaluative, even though adjectival *kadar* equatives with evaluative adjectives are acceptable – (5a) cannot be understood as Anna's skirt is as beautiful as Berta's, even though (8) is perfect:

(8) Anna'nın elbisesi Berta'nın-ki kadar güzel.
A.-Gen dress.Poss3sg B.-Gen-Rel kadar beautiful.Cop.3sg
Anna's dress is as beautiful as Berta's.

There are at the moment two types of analyses available for the semantics of equative comparison, which take opposite perspectives. Degree-semantic analyses (e.g., Bierwisch 1987, Kennedy 1999) are tailored for scalar adjectival equatives as in (1a) and fail to handle non-scalar cases. Kind-based (Anderson & Morzycki 2015) and similarity-based accounts (Umbach & Gust 2014) take non-scalar equatives as basic and include scalar equatives, though in different ways. The two perspectives are commonly considered as competing theories. In view of the Turkish data, however, this idea can no longer be maintained. We have to acknowledge that – within the same language – two different strategies of performing equative comparison are manifest, while the choice between strategies depends upon the standard marker.

An appropriate semantic analysis of equatives has to handle non-scalar and scalar cases in parallel without, however, reducing one to the other. The latter requirement rules out the kind-based account where scalar comparison is interpreted by the help of "degree-kinds". The similarity-based account, on the other hand, which is a generalization of degree semantics from one-dimensional scales to multi-dimensional spaces, is suited for scalar as well as non-scalar comparison because one-dimensional scales are still available. In this account, measure functions map individuals to points in multi-dimensional spaces which are spanned by dimensions of arbitrary scale level (metrical, interval, ordinal, nominal). Single metric dimensions are just the simplest case of a multidimensional space. Similarity is implemented by indistinguishability of points, which is an equivalence relation and may vary in granularity. The interpretation of equatives is straightforward: Non-scalar equatives are interpreted by similarity in multi-dimensional spaces, while scalar equatives are interpreted by a weak linear order in a single metric dimension (in the standard degree-semantics fashion).

One non-trivial question is how to select relevant dimensions. In the case of scalar comparison with gradable adjectives, the dimension is overtly expressed by the meaning of the adjective – in *Anna is as tall as Berta* the relevant dimension is height. This is the paradigm case in degree semantics, and it led to the idea that adjectives should be straightforwardly interpreted as scalar measure functions mapping entities to degrees of the relevant dimension (see Kennedy 1999).

However, beyond scalar adjectival comparison dimensions are only implicit. For example, in *Anna has a dress like Berta's* relevant dimensions are constrained by the noun ruling out, e.g., speed – you cannot compare dresses with respect to speed – but it could be design, color, fabric, size etc. depending on what is prominent in the context. In Turkish, the question of dimension selection is even more challenging: On the one hand, even scalar dimensions may be implicit – as observed for *kadar* when combined with *elbise* 'dress' and *koş* 'run' in (5a), (6a). On the other hand, even adjectival equatives may be non-scalar and involve dimensions to be inferred from the context – as in *gibi* combined with *zeki* 'intelligent' in (4b), thereby blocking the interpretation of gradable adjectives as scalar measure functions.

We therefore assume that adjectives, like nouns and verbs, simply denote properties, i.e. (disregarding intentionality) are of type <e,t> or <ev, t>. In addition, we assume that the lexical meaning of adjectives, nouns and verbs provides a range of possible dimensions, with respect to which entities in their denotation can be compared. Dimensions relevant in an actual comparison are selected from the range of possible dimensions by the context. We encode selection of dimensions by context-dependent partial functions ds (for scalar comparison) and dns (for non-scalar comparison) that take adjectival/nominal/verbal predicates as their arguments and provide a single metric dimension (ds) or a set of dimensions of arbitrary scale level (dns). This is close to the idea of an underspecified measure function *MEAS* in Solt (2015), with the choice of scale contextually determined.

> Let *DIM* denote the set of dimensions where $DIM_M \subset DIM$ is a subset of metrical dimensions. Let *o* stand for predicates of individuals or events, i.e. <e,t> or <ev,t>. Then *ds* is a function from <e,t> or <ev,t> to DIM_M and *dns* is a function from <e,t> or <ev,t> to $\wp(DIM)$.
>
> For f in DIM_M and F in $\wp(DIM)$, μ_f and μ_F denote measure functions: μ_f takes individuals/events to points in f (i.e. degrees), and μ_F takes individuals/events to points in the space spanned by the dimensions in F.

We assume a phrasal syntax following Hofstetter (2009) and propose a semantics for Turkish equatives such that

- *kadar* denotes a relation ***AS*** corresponding to a weak linear order $\geq_f$ in a single metric dimension f
  [[kadar]] = $\lambda o\ \lambda y\ \lambda x.\ \mathrm{AS}(x, y, ds(o))$ where $\mathrm{AS}(x, y, ds(o))$ iff $\mu_{ds(o)}(x) \geq_{ds(o)} \mu_{ds(o)}(y)$
- *gibi* denotes a relation ***SIM*** corresponding to indistinguishability $\approx_F$ in a multidimensional space F
  [[gibi]] = $\lambda o\ \lambda y\ \lambda x.\ \mathrm{SIM}(x, y, dns(o))$ where $\mathrm{SIM}(x, y, dns(o))$ iff $\mu_{dns(o)}(x) \approx_{dns(o)} \mu_{dns(o)}(y)$

Stepping back, the semantics of Turkish equatives seems to suggest that the question of whether comparison is scalar or non-scalar might not directly be encoded in the lexical meaning of the adjective, noun or verb expressing the parameter of comparison. It might, rather, be an issue of which dimensions are offered by the lexical meaning of an item, and which of these are selected in an actual comparison. From this point of view, the case of scalar adjectival equatives is just the simplest one – *tall* inevitably goes with height. Beyond, dimensions are only implicit and are determined by lexical meaning plus context. Restrictions on the choice of implicit non-scalar dimensions in German, as in (2b,c), have been studied experimentally by Umbach & Stolterfoht (in prep.). The results relate to findings in lexical semantics (see Pustejovsky et al. 2013) and concept formation (e.g. Prasada & Dilingham 2006) and will presumably carry over to Turkish. The choice of implicit scalar dimensions, as in (5a)/(6a), is the topic of an ongoing experimental study.

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