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Beschreibung des Vorhabens / Project Description

The meaning of German *wie* in equative comparison

(follow-up of the project *Expressing similarity*, UM 100/1-1)

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1 State of the art and preliminary work[1]

Introduction

The topic of this proposal is the meaning of **German *wie*** in **equative comparison** including **scalar** as well as **non-scalar** cases, cf. (1). The semantics of equatives has up to now been studied nearly exclusively from the perspective of the comparative, excluding non-scalar equatives from the analysis. Moreover, the semantics of equatives has been studied nearly exclusively from the perspective of English, which does not suggest a uniform analysis of scalar and non-scalar cases due to their different forms. In German, both scalar and non-scalar equatives are based on *wie*-clauses thus calling for a **uniform analysis**.

(1) a. Anna ist so groß wie Berta. 'Anna is as tall as Berta.'
b. Anna hat so eine Tasse wie Berta. 'Anna has a mug like Berta's.
c. Anna hat so getanzt wie Berta. 'Anna danced like Berta.'

In this project, a **generalized account of German equatives** will be developed including scalar as well as non-scalar cases. The core piece of this account is **(i)** the idea that **equatives express similarity**, that is, indistinguishability with respect to a given set of features and **(ii)** that this results from the **meaning of the standard marker *wie***, which is not semantically empty (as assumed in standard degree semantics) but has a meaning of its own. Though starting from German, it will be hypothesized that the results prove valid in other **languages featuring correlative equatives,** like Polish and Italian (but not English).

The proposal builds on the results of the preceding project ***Expressing similarity***, which focused on the German demonstrative *so* in deictic and anaphoric usage, including scalar as well as non-scalar occurrences (see the next section). The core result is a semantic interpretation of the demonstrative such that it has a deictic component and a similarity component – in short, ***so*** means ***wie dies*** ('like that') – and creates similarity classes which in the nominal and verbal case though not in the degree case constitute **ad-hoc kinds**. The similarity relation is spelt out in a cognitively motivated multi-dimensional framework that is integrated into referential semantics.[2] This analysis will be adopted for *wie* claiming that *wie* expresses similarity like *so* but lacks the deictic component – in short: ***wie*** is like ***so*** **without deixis**.

The proposed project will make a substantial contribution to the **semantics of equatives** in German and other languages, and it will promote semantic research incorporating **cognitive aspects** of meaning into **referential semantics**.

[1] Mit Rücksicht auf die Kooperationspartner ist der inhaltliche Teil des Antrags auf Englisch formuliert.

[2] The notion of similarity is adopted from Cognitive Science and is more narrow than the meaning of the adjective *similar* – similarity in this analysis is not mere resemblance but rather "near-sameness" or "indistinguishability with respect to certain features".

The project will be linked to the project of Stephanie Solt (ZAS) on *Degree Attenuators* by a bridging theme which is ***Topics in English-German semantic micro-variation***, see attachment.

1.a Results of the project *Expressing Similarity*

While there existed analyses of particular uses of **German *so***, e.g., as a connector or an intensifier (for references see Umbach & Gust 2014), a semantic account of its core function as a demonstrative expression had been missing.[3] In the project *Expressing Similarity* an analysis was developed accounting for the fact that German *so* is a **genuine demonstrative**, that is, directly referential, but at the same time serves as a cross-categorical modifier combining with verbal, nominal and also adjectival expressions. It turned out in the course of the project that this type of demonstratives occurs in many languages – König & Umbach (to appear) speak of **demonstratives of manner, quality and degree** .

The main result of the project is that these demonstratives express **similarity** instead of identity, that is, indistinguishability with respect to contextually given features (see footnote 2). While in the case of regular demonstratives like *dieser* ('this') the referent of the demonstrative phrase and the target of the demonstration gesture are identical – this is an in-build feature of the Kaplanian theory of demonstratives – in the case of *so* the referent and the target of the demonstration are similar with respect to relevant features. Consider the examples in (2).[4] In (a), Anna's mug is said to be similar to the mug the speaker is pointing at. In (b), Anna's manner of dancing is said to be similar to the dancing event the speaker is pointing at. Finally, in (c) Anna's height is said to be similar to the height of the person the speaker is pointing at. In all of these cases, the use of the demonstrative *so* creates a set of items similar to the target of the demonstration: in (a) a set of mugs similar to the one pointed at, in (b) a set of dancing events similar to the one at, and in (c) a set if individuals similar in size to the individual pointed at. In the nominal and the verbal though not the degree case (see 1.a.3) these similarity classes constitute **ad-hoc generated kinds**.

(2) a. (speaker pointing to a mug on the table):
So eine Tasse hat Anna auch. 'Anna has such a mug / a mug like this, too.'

b. (speaker pointing to someone dancing):
So tanzte Anna gestern auch. 'Yesterday, Anna danced like this, too.'

c. (speaker pointing to a person):
So groß ist Anna auch. 'Anna is this tall, too.'

The similarity analysis of German *so* (and other demonstratives of manner/quality/degree) includes a compositional interpretation based on a predicate SIM, see **(1.a.1)**. This predicate is implemented in multidimensional attribute spaces which are integrated into referential semantics by means of generalized measure functions, see **(1.a.2)**. The similarity analysis facilitates distinguishing different varieties of kinds, see **(1.a.3)** and explains restrictions on kind formation, see **(1.a.4)**. Finally, the similarity relation expressed by the demonstrative *so* has to be distinguished from the meaning of adjectives like *ähnlich* / *similar*, see **(1.a.5)**. Similarity expressed by *so* is a means of classification and plays a primary role in cognition. Following Quine, "… there is nothing more basic to thought and language than our sense of similarity; our sorting of things into kinds." (Quine 1969, p. 116). The similarity analysis offers a way to include cognitive aspects of classification into referential semantics, which places it at the leading edge of the current efforts to reconcile referential semantics with insights in cognitive semantics.

[3] But see Ehlich (1986), Streeck (2002) and Stukenbrock (2010).

[4] Due to restrictions of space, examples in the proposal will be artificial (but see section 2.3 for methodology).

1.a.1 Compositional interpretation of the demonstrative *so* in nominal and adjectival phrases is shown in (3) and (4). (Verbal phrases are skipped due to restrictions of space.) The demonstrative is interpreted as a three-place predicate SIM(x, t, $\mathcal{F}$), relating two individuals x and t, and a (possibly singleton) set of features of comparison $\mathcal{F}$ (where t represents the target of the demonstration or antecedent, and x represents the referent of the demonstrative phrase). In (3), *so* is interpreted as a modifier of the determiner, thereby accounting for the ad-determiner position. Alternatively, *so* can be interpreted as an adnominal modifier (moved to the ad-determiner position), analogous to the demonstrative *solch* ('such') which is equivalent in meaning but occurs in ad-determiner as well as adnominal position. The resulting quantifier is the same in both analyses. For details see Umbach (2014) and Umbach & Gust (2014).

(3) $[_{DP}\ [_{DET}$ so eine] Tasse] ('such a mug')

[[so]] = λD. λP. D(λx. SIM(x, **t**, $\mathcal{F}$) & P(x))
[[so eine]] = λP. λQ. ∃x. SIM (x, **t**, $\mathcal{F}$) & P(x) & Q(x)
[[so eine Tasse]] = λQ. ∃x. SIM(x, **t**, $\mathcal{F}_{mug}$) & mug(x) & Q(x)

The interpretation of ad-adjectival *so* differs from the nominal and verbal cases with respect to their features of comparison. In the nominal and verbal cases features are provided by the context (which is why they are represented by a free variable $\mathcal{F}$ in (3)), and the addressee may ask for clarification, e.g., *In which respects is Anna's mug like this one?* In the adjectival case, asking for clarification is infelicitous – *# In which respects is Anna as tall as this person?* – and at the same time unnecessary because the (only) feature of comparison is specified by the adjective itself.[5]

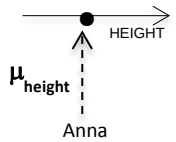
(4) $[_{DegP}$ so $[_{AP}$ groß]] ('this tall')

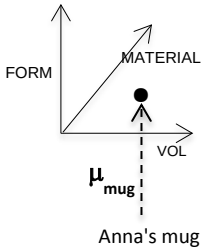
[[so]] = λf. λx. SIM(x, t, {f})
[[so groß]] = λx. SIM (x, t, {height})

1.a.2 The similarity relation is spelled out by means of **multi-dimensional attribute spaces** and **generalized measure functions**. The former are feature structures plus a notion of granularity. The latter are a generalized version of adjectival measure functions in degree semantics (cf. Kennedy 1999): While adjectival measure functions map individuals to degrees on a single ratio scale (or interval scale) dimension, generalized measure functions map individuals point-wise into attribute spaces with multiple dimensions of arbitrary scale types (including ordinal and nominal scales). Examples are shown in (5), where μ_{height} in (a) is a standard adjectival measure function taking individuals to degrees of height and μ_{mug} in (b) is a generalized measure function taking individuals to points in a multi-dimensional space with dimensions MATERIAL, FORM, VOLUME etc. Measuring Anna with respect to her height yields a degree, e.g. **μ_{height}(Anna)=180cm**. Measuring (or describing) Anna's mug with respect to its material, form and volume yields a vector, that is, a point in a multi-dimensional space, e.g. **μ_{mug}(Anna's mug)=<CROCKERY, ROUND, 200>**.

(5) a. μ_{height}: U → ℜ

b. μ_{mug}: U → MATERIAL × VOLUME × …
where μ_{mug} (x) = <$\mu_{material}$(x), μ_{volume} (x), … >
and $\mu_{material}$ (x) ∈ {PORCELAIN, CROCKERY, PLASTICS, …}
μ_{form} (x) ∈ {ROUND, STRAIGHT-SIDED, TULIPSHAPED, …}
μ_{volume} (x) ∈ $\Re^3$





[5] Multi-dimensional adjectives like *healthy*, cf. Sassoon (2011), will be handled like nouns. Evaluative adjectives like *beautiful* and *tasty* also require a multi-dimensional interpretation, see Umbach (in press).

The range of values in a dimension can be of different granularity. For example, the volume of a mug can be measured on a metrical scale of cubic millimeters, but also on a less fine-grained scale with only three values, e.g. SMALL, MEDIUM, LARGE. The similarity relation is defined as **indistinguishability** in a given attribute space with respect to a given granularity: two individuals (or events) are *similar* if and only if the points they are mapped to cannot be distinguished – **SIM(α, β, F) iff $\mu_F(\alpha) \approx \mu_F(\beta)$**. The formal system was developed in cooperation with Dr. Helmar Gust (Cognitive Science, Osnabrück). It is sketched in Umbach & Gust (2014) and laid out in more detail in Gust & Umbach (2015) .

Multi-dimensional attribute spaces provide a **conceptual level** of representation in addition to the level of referential semantics. They are close to Gärdenfors' (2000) conceptual spaces, but they facilitate a qualitative (feature-based) instead of a quantitative (distance-based) similarity relation (cf. Tversky 1977). More importantly, while Gärdenfors' conceptual spaces are isolated systems, the attribute spaces employed here are **integrated into referential semantics** (see in particular Gust & Umbach 2015).

1.a.3 Similarity classes denoted by *so* phrases may, but need not, constitute **kinds**. This is evident when comparing nominal and verbal cases to adjectival cases: The former can easily be combined with the noun *Art* ('kind') – *so eine Tasse* is equivalent to *diese Art von Tasse* ('this kind of mug'), and *so tanzen* is equivalent to *diese Art zu tanzen* ('this kind of dancing'). In contrast, adjectival cases require a dimension specific noun – *so groß* is equivalent to *diese Größe* ('this size') but not to *diese Art von groß sein* ('this kind of being tall').

Zooming in on nominal cases, the kinds denoted by *so* phrases differ from those denoted by definite demonstratives NPs. Consider the example in (6).[6] While (a) is true because Shockley in fact invented the transistor, (b) is intuitively false, or at least inadequate, because he did not invent any other electronic components. This suggests, first, that kinds denoted by *so* phrases are not equivalent to those denoted by definite NPs. Secondly, following Krifka et al. (1995) definite demonstratives NPs are restricted to previously established kinds or subkinds. [7] In Umbach (2014) evidence is shown that *so* phrases are insensitive to this requirement. This leads to the conclusions that the kinds denoted by *so*-phrases need not be given in advance and are instead ad-hoc generated by similarity.[8]

(6) Speaker points to a transistor:
   a. Diesen Baustein hat Shockley erfunden.
      'This component was invented by S.'
   b. So einen Baustein hat Shockley erfunden.
      'Such a component / a component like this was invented by S.'

The similarity analysis differs significantly from was suggested by **Carlson (1980)** for the anaphoric use of English *such* and adapted for Polish *tak* by **Anderson & Morzycki (2015)**, where these demonstratives are considered as pronouns directly referring to kinds. Polish *tak* behaves like German *so* in combining with nominal, verbal and adjectival expressions. Anderson & Morzycki postulate the existence of verbal kinds (cf. also Landman 2006) and degree kinds in addition to regular (nominal) kinds. This allows for a directly kind referring analysis of Polish *tak* as referring to nominal kinds or event kinds or degree kinds.

[6] Thanks to Manfred Krifka, p.c.

[7] The generic use of *the Coke bottle* is context-independent since Coke bottles are a well-established kind, while that of *the green bottle* requires a special context, Krifka et al. (1995).

[8] For different varieties of kinds see Rothstein (2013). For a link between kinds and distributional semantics see McNally (to appear)

The similarity approach and the directly kind-referring approach are **complementary in their focus**. Anderson & Morzycki focus on the details of a compositional derivation of equative constructions (see section 1b) without considering the question how the kinds referred to come into existence and how they differ from other types of kinds discussed in the literature.

The focus of the similarity approach is on the meaning of the demonstrative *so*. The analysis shows how it compares to regular demonstratives – *so* is equivalent to *like that* – and it makes use of similarity as a classification mechanism matching with findings in Cognitive Science. It has the advantage of leaving sufficient freedom – some but not all similarity classes yield kinds – and to distinguish between previously established kinds and those created ad-hoc by similarity. Finally, the similarity analysis is able to explain the restrictions found for the use of *so* by construing them as restrictions on licit features of comparison and link them to restrictions on concept formation observed in Cognitive Psychology (see below). So when considering the emergence of kinds and their varieties, and their relation to theories of concept formation, the similarity analysis has a clear advantage over the directly kind-referring approach.

1.a.4 Features of comparison in the nominal and the verbal case are only implicitly given by the context. There are, however, constraints on which features are licit in combination with particular nominal or verbal predicates. This is shown in the examples in (7) and (8), in which the use of the demonstrative *so* in the second sentence is supposed to pick up a property or manner of an antecedent in the first sentence. In (7a), being a diesel as well as being a Japanese car are easily picked up, leading to the interpretation that Berta has a Japanese car and a diesel, respectively. In (7b), however, being new does not qualify as a feature of comparison – the second sentence cannot be understood such that Berta has a new car. Similarly, in (8a) preparing a chicken in the wok or by frying can be picked up for comparison. However, preparing it the garden does not qualify as features of comparison – (8b) cannot normally mean that Berta prepared the duck in the garden.

(7) a. Anna hat einen Diesel / ein japanisches Auto. Berta hat auch so ein Auto (nämlich einen Diesel/ ein japanisches Auto).
b. Anna hat ein neues Auto. Berta hat auch so ein Auto (*nämlich ein neues Auto).
'Anna has a diesel / a Japanese car / a new car. Berta has such a car, too (namely a diesel / a Japanese car / a new car).'

(8) a. Anna hat das Huhn im Wok zubereitet / gebraten. Berta hat die Ente auch so zubereitet (nämlich im Wok / gebraten).
b. Anna hat das Huhn im Garten / heimlich zubereitet. Berta hat die Ente auch so zubereitet (*nämlich im Garten).
'Anna prepared the chicken in the wok / by frying / in the garden. Berta prepared the duck like this, too (namely in the wok / by frying / in the garden).'

Clues as to how to explain these restrictions are found in different domains of semantics, following the different research traditions in the nominal and the verbal domain. In the domain of genericity, Carlson (2010) discusses restrictions on kind formation linking these to the experimental studies by Prasada & Dillingham (2006). They show that there are **principled connections** between kinds and properties an entity has because it is the kind of thing it is, which are different from merely statistically correlated properties. In the domain of event semantics, Maienborn & Schäfer (2011) distinguish event-external and **event-internal adverbial modifiers**. While external ones modify the overall the event, internal ones modify a manner dimension given by the verbal kind/concept. Bringing these insights together it seems reasonable to assume that features licit in similarity comparison corresponds to properties relevant in establishing kinds – be it

kinds of individuals or kinds of events. A Japanese car is a kind of car while a new car is not. Likewise, preparing a chicken in the wok is a kind of preparing a chicken while preparing it in the garden is not.

However, beyond clear cases like the ones in (7) and (8) judgments are shaky and highly context-dependent. In order to get reliable data, a series of four **experimental studies** was conducted collecting naturalness ratings for nominal and verbal stimuli analogous to the examples in (7) and (8). Design and evaluation was supported by Prof. Britta Stolterfoht (Tübingen). The results not only confirm the distinction between kind establishing properties and those involving accidental properties, but also confirm the distinction between previously given kinds and merely ad-hoc created ones (Umbach in prep).

1.a.5 Adjectives like English *similar* and German *ähnlich* ('similar') obviously express similarity. This suggests examining the difference between adjectives expressing similarity and demonstratives like German *so* and English *such*. Although the two types of similarity expressions appear equivalent in meaning at first sight, there are fundamental differences. It is shown in Umbach (2014) that the adjectives carry an in-built distinctiveness requirement on their two arguments, which is not the case for the demonstratives. The distinctiveness requirement leads to the conclusion that the similarity relation expressed by adjectives is **irreflexive** while that expressed by demonstratives is **reflexive**. This difference has grammatical consequences in various contexts, for example in combination with additive particles. Being irreflexive also explains why adjectival similarity expressions lack a kind-forming capacity – kinds have to be equivalence classes. For details see Umbach (2014).

1.b Other approaches relevant for the proposal

The current proposal is based on the results of the project *Expressing Similarity* and the research cited therein. In this section, approaches on equative comparison will be listed that are particularly relevant for the current proposal. The terminology will be as in Haspelmath & Buchholz (1998), see Table 1.

Anna	ist	so	groß 'tall'	wie	Berta (groß ist) 'Berta is tall'
Anna	hat	so	ein Auto 'a car'	wie	Berta (eins hat) 'Berta has one'
Anna	ist	so	gefahren 'drove'	wie	Berta (gefahren ist) 'Berta drove'
comparee		**parameter marker** (PM)	**parameter**	**standard marker** (SM)	**standard**

Table 1: Components of equatives

The descriptive study of German equatives in **Thurmair (2001)** provides a comprehensive picture of the range of equative constructions. In particular, she points out that equative constructions are not confined to the form *so … wie* and instead may use other parameter markers (e.g., *dasselbe*) and even occur without parameter marker. Moreover, she shows that equatives can be used for coordination and discusses constraints on this use (cf. work package 3). Finally, she convincingly argues against the widespread idea that *wie* indicates equality while *als* indicates inequality, which will be relevant when considering the use of *wie* in comparatives in work package 5.

The typological study of equatives in **Haspelmath & Buchholz (1998)** presents ways of realizing equatives across European languages. It is shown that adjectival equatives and verbal equatives (or 'similatives') are

realized by correlative constructions in many European languages.[9] In correlative equatives the parameter marker is given by demonstrative pro-forms and the standard marker is an interrogative pronoun heading a free relative clause. A world-wide survey of equatives including 119 languages will be given in **Haspelmath (to appear)**. A typological perspective on equatives is also taken in the collaborative action in the CNRS (France) focusing on equatives (in a broad sense) in African languages, *Expression des comparaisons d'égalité et de similitude*.[10]

In standard degree semantics equatives are considered as mere variants of comparatives, differing from the latter only in that they express a non-strict instead of a strict order: while '*A is taller than B*' is true iff A's height is greater than B's height (>), '*A is as tall as B*' is true iff A's height is greater or equal to B's height (≥). This idea is usually implemented such that the standard as well as the matrix clause denote sets of degrees and the parameter marker represents a 2-place relation between such sets, that is, a generalized quantifier over degrees (see **Beck 2011**). **Kennedy (1999)** deviates from this implementation in assuming that the parameter marker represents a relation between degrees (instead of sets of degrees). But as before, the difference between equatives and comparatives is nothing more than that between a non-strict partial order and a strict partial order. The non-strict/strict partial order interpretation was already suggested in **Bierwisch (1987)** although in his system there is an additional feature accounting for the different capacities of equatives and comparatives in accommodating measure phrases. Bierwisch also provides a broad range of distributional data to be accounted for by any degree semantic account.

Krasikova & Penka (2012) present a formal semantic analysis of scalar equatives going beyond the standard picture. They argue that there are two different strategies in forming equatives in European languages. One is found in, e.g., English (*as tall as*) and is parallel to comparatives the parameter marker denoting a degree quantifier. The other is found in German (*so groß wie*) and also in, e.g., Polish and Italian where equatives are correlative constructions as described by Haspelmath & Buchholz (see above).

Krasikova & Penka provide a semantics for correlative equatives such that they express is a non-strict order, as in standard degree semantics – '*Anna ist so groß wie Berta*' means that Anna is at least as tall as Berta. But due to the difference in composition the order stems from the meaning of the adjective (λd.HEIGHT(Mary) ≥d) rather than from the meaning of the parameter marker. As before, their interpretation does not furnish the standard marker *wie* with a meaning of its own and excludes non-scalar equatives.

In distinguishing between the two strategies of equative comparison, Krasikova & Penka account for a number puzzling differences between English and German. For example, in English, but not in German, measure phrases and NPIs are allowed in the standard (for measure phrase equatives in English see also Rett 2014), whereas in German, but not in English, negative indefinites are allowed in the standard. The proposed analysis will account for these findings (see work package 2 and attached *Bridging Theme*).

Lenerz & Lohnstein (2005) present one of the rare semantic approaches combining scalar and non-scalar equatives. In their approach (for German) non-scalar equatives are reduced to scalar ones by assuming that verbal predicates include an empty degree modifier and nominal predicates include a degree of satisfaction (the degree to which an individual satisfies the salient properties of the nominal concept). However, the fact that the majority of verbal and nominal predicates reject overt degree modifiers casts serious doubt on an analysis reducing non-scalar equatives to scalar ones by assuming covert degree modifiers.

[9]Here, the term *correlative* refers to pronoun-based constructions like *Maria bedauert es, dass Lisa weg ist.* ('Mary regrets it that Lisa left.'), not to proportional constructions (*the more the better*).
[10]http://www.typologie.cnrs.fr/spip.php?rubrique103

Rett (2013) treats non-scalar (verbal) cases as degenerate scalar ones by, first, assuming that the standard delivers either degrees or manner objects and, secondly, switching the semantic contribution of the parameter marker on and off. In the scalar case the parameter marker is active denoting a non-strict order on sets of degrees. In the non-scalar (verbal) case, in contrast, the parameter marker is silenced and the standard provides a predicate modifier. This solution predicts that verbal equatives block parameter markers, which is true in English (*Anna (*as) danced as Mary.)* but not in, e.g., German and Polish (*Anna hat (so) getanzt wie Maria* / *Anna tańczyl tak jak Maria*). So Rett's analysis is tenable for English only.

Anderson & Morzycki (2015) start from the observation that Polish *tak* ('so') occurs across categories and is used deictically and anaphorically and also as a standard marker in equatives, as does German *so*. Their analysis builds on Carlson's (1980) analysis of English *such* as a pronoun directly referring to (nominal) kinds, and on Landman's (2006) adaptation to verbal kinds. In order to extend this approach to scalar cases they introduce *degree kinds* conceived of as kinds of states of individuals. This allows for a uniform interpretation of Polish *tak* by reference to kinds – nominal kinds, event kinds and degree kinds.

Anderson & Morzycki's strategy in unifying scalar and non-scalar equatives is similar to the one pursued in this proposal: Instead of reducing non-scalar equatives to scalar ones, they are both subsumed under a common generalization. In Anderson & Morzycki's analysis the generalization is "being of the same kind", whereas in the similarity analysis it is "being similar (in certain respects)".

The focus of Anderson & Morzycki's account is on the syntax-semantics interface. They analyze Polish equatives as correlative constructions, as suggested in Haspelmath & Buchholz (1998), and present a detailed derivation such that the standard of comparison denotes a set of kinds which is (after some shifting) applied to the comparee. The analysis of Anderson & Morzycki can be seen as being complementary to the similarity analysis where the focus is on the meaning of *so* and *wie*, and on the question of when and why kinds are created. There are a number of interesting questions Anderson & Morzycki do not go into in depth:

- Subsuming scalar equatives under a kind-referring interpretation requires a conception of degrees as kinds. Regardless of how it is implemented (Anderson & Morzycki consider degrees as kinds of states holding of individuals of the same degree in a dimension) this conception contradicts natural language usage – a degree of height cannot be described as a kind of height (see section 1.a.3 and work package 4).
- Since kinds are equivalence classes, Anderson & Morzycki's account predicts that scalar equatives have only *exactly* readings. While this is an issue for any account of equatives based on kinds or classes (including the similarity analysis, see work package 2), there is no solution offered by Anderson & Morzycki (and it is hard to imagine what such a solution would look like in their framework).
- Being directly kind-referring Anderson & Morzycki's account ignores matters of kind formation thereby blocking the way to account for restrictions on the use of equatives (which are explained as restrictions on features of comparison in the similarity account) and to follow the link to concept formation (see section 1.a.4). Anderson & Morzycki observe (some of) these restriction but instead of giving an explanation they posit a class of *distinguished properties* not motivated otherwise.
- Finally, the deictic and anaphoric uses of German *so* are equivalent to the composite expression *wie dies* ('like this'). Likewise, the deictic and anaphoric uses of Polish *tak* is equivalent to *jak ten* ('like this'). A directly kind-referring account obscures the connection between demonstratives like *so* and *tak* and regular demonstratives.

Project-related publications

Articles published by outlets with scientific quality assurance, book publications, and works accepted for publication but not yet published.

Umbach, Carla (2012) Strategies of additivity: German additive '*noch*' compared to '*auc*h'. *Lingua 122 (15)*. 1843-1863.

Umbach, Carla, & Helmar Gust (2014) Similarity Demonstratives. *Lingua* 149, 74-93

This paper describes the basic idea of interpreting the demonstrative *so* as denoting similarity. Section 5 lays out the multi-dimensional framework and was contributed by H. Gust

Umbach, Carla (2014) Expressing similarity: On some differences between adjectives and demonstratives. *Proceedings of IATL* 2013, MIT Working Papers in Linguistics.

In this paper, the contrast between the demonstrative *so* and the adjective *ähnlich* is explored.

Hinterwimmer, Stefan & Carla Umbach (2015) Grading and Hedging by *gewiss*. In L. Alonso-Ovalle & P. Menéndez-Benito (eds.) *Epistemic Indefinites.* Oxford University Press.

This paper presents a notion of gradability for nominal expressions which is relevant in the scalar interpretation of nominals combined with *so*.

Gust, Helmar & Carla Umbach (2015) Making use of similarity in referential semantics. In H. Christiansen, I. Stojanovic, G. Papadopoulos (eds.) *Proceedings of Context 2015*, LNCS Springer, 425-439.

In this paper, the formal framework of the similarity analysis is detailed.

Umbach, Carla (in press) Evaluative propositions and subjective judgments. In J. van Wijnbergen-Huitink & C. Meier (eds.) *Subjective meaning*. Berlin, de Guyter.

This paper suggests a multi-dimensional interpretation of evaluative predicates exploiting the framework in Umbach & Gust (2014). The volume will appear in 2016.

König, Ekkehard & Carla Umbach (accepted) Demonstratives of Manner, of Quality and of Degree: A Neglected Subclass. In M. Coniglio, A.Murphy, E. Schlachter & T. Veenstra (eds.). *Demonstratives: syntax, semantics and typology*. Berlin, de Gruyter Mouton, expected year of publication: 2016.

This paper combines two separate parts written by each of the co-authors, focusing on the same phenomenon from complementary perspectives.

1.1.2 Other publications

Umbach, Carla (submitted) Evaluative Predicates beyond *fun* and *tasty*. In L. Matthewson, C. Meier, H. Rullmann, T. E. Zimmermann (eds.) *Wiley's Companion to Semantics.*

Invited contribution, under review.

2 Objectives and work programme

2.1 Anticipated total duration of the project

The first project (*Expressing similarity*) started 1.10.2012 and ended 30.9.2015. The follow-up project is planned to start **1.10.2016 and end 30.9.2019**. Funding is applied for a period of 3 years.

2.2 Objectives

The proposed project is a follow-up of the project *Expressing similarity*. In the latter, a semantic analysis of the German demonstrative *so* was developed including scalar as well as non-scalar occurrences in nominal, verbal and adjectival phrases. The core result of the analysis is that *so*-phrases denote similarity classes that in the nominal and verbal cases (though not in the adjectival case) constitute ad-hoc generated kinds. The analysis covers the deictic and the anaphoric use of *so*-phrases, leaving open their interplay with *wie*-clauses in equative comparison.

		adnominal	adverbial	ad-adjectival
previous project	deictic	*A hat **so** eine Tasse*	*A hat **so** getanzt*	*A ist **so** groß*
	anaphoric			
current project	equatives	*A hat **so** eine Tasse **wie** B (eine hat)*	*A hat **so** getanzt **wie** B (getanzt hat)*	*A ist **so** groß **wie** B (groß ist)*
		non-scalar[11]		scalar

Table 2 Uses of the demonstrative *so*

In the follow-up project, the focus will be on German ***wie*-clauses** (possibly elliptic) in **equative comparison**. *Wie*-clauses provide the standard of comparison in scalar as well as non-scalar equatives and combine with nominal, verbal and adjectival parameters, as does *so* (cf. Table 2). *Wie*-clauses in equatives occur with *so* but also with *dasselbe* and *ähnlich* as a parameter marker and may even occur without parameter marker. The examples in (9) demonstrate the range of equatives considered in the proposal.[12]

(9) a. Anna hat so eine Tasse / eine ähnliche Tasse /dieselbe Tasse / eine Tasse wie Berta (eine hat).
'Anna has such a cup / the same cup / a similar cup / a cup like Berta's.'

b. Anna hat so getanzt / ähnlich getanzt / auf dieselbe Art getanzt / getanzt wie Berta (getanzt hat).
'Anna danced in the same way / a similar way as Berta. / danced like Berta.'

c. Anna ist so groß / ähnlich groß / hat dieselbe Größe / ist groß (,) wie Berta (groß ist).
'Anna is as tall / is similarly tall / has the same size as Berta.'

In standard degree semantics, equatives are considered nearly exclusively from the **perspective of comparatives** (*Anna is taller than Berta*), and are assumed to differ from comparatives only in expressing a non-strict ($\geq$) rather than a strict order. However, while comparatives are (mostly) scalar, equatives can be scalar as well as non-scalar and while comparatives are (mostly) adjectival, equatives occur with adjectival, nominal and verbal parameters. Secondly, the semantics of equatives has been been studied nearly exclusively from the **perspective of English,** which does not suggest a uniform analysis of scalar and non-scalar cases due to their different grammatical forms (see the English translations in (9)). In German, scalar and non-scalar equatives have the same form – both are built by means of *wie*-clauses – and there are a number of European languages sharing this pattern, e.g. Polish and Italian. Following Haspelmath & Buchholz (1998) these equatives will be called **correlative equatives**.

In the proposed project, a **generalized account of German equatives** will be developed encompassing scalar as well as non-scalar cases. The core of this account is the idea that equatives express similarity and that this is due to the meaning of the standard marker *wie* and its interplay with the parameter marker *so*.

[11] Even nouns and verbs can be scalar, e.g. *Mut* 'courage' and *rasen* 'race' (see Hinterwimmer & Umbach to appear).

[12] A number of equative-like cases will be excluded, in particular sub-comparatives (*Er ist so groß wie breit* 'He is as tall as wide', *Er schreibt so wie er redet.* 'He writes the way he talks.'), subcategorized *wie*-clauses (*Es schmeckt wie Bier.* 'It tastes like beer') and hypothetical comparatives (*Er rennt wie blöd / wie wenn er blöd wäre.* 'He is running like mad.')

Though taking German as its starting point, the generalized account of equatives is expected to prove valid for correlative equatives in other languages.

The analysis will combine the results of the preceding project on similarity with the findings on equatives in descriptive studies of German and with the insights in standard degree semantics. It will be guided by five research questions targeting the semantics of scalar and non-scalar equatives while testing the theory against atypical cases and differences within the range of equatives.

(i) What is the **contribution of *wie*-clauses** in equative comparison?
(ii) How to account for the insights from **degree semantics**, in particular on asymmetry and negation?
(iii) How to interpret equatives with **parameter markers** other than *so* (*dasselbe*, *ähnlich* or none)?
(iv) How to account for the **differences within *wie*-clauses** in equatives?
(v) How do *wie*-clauses in equatives compare to *wie*-clauses in **comparatives**?

The objectives of the current project meet with an upcoming interest in equative comparison across manner, quality and degree in formal semantics as well as in typology (see section 1b). Research will be implemented against the background of efforts in formal semantics taking advantage of findings in **cognitive semantics** and **distributional semantics** documented in a number of recent workshops and projects[13], and in particular in the ESSLLI 2016 workshop "*Referential Semantics One Step Further: Incorporating Insights from Conceptual and Distributional Approaches to Meaning*" co-organized by the applicant.[14] The current project will follow the path paved in the previous project of combining referential semantics with multidimensional attribute spaces, placing it at the leading edge of approaches reconciling referential semantics with cognitive aspects of meaning.

Beyond its central objectives, the current project will be connected to the project on *Degree Attenuators* (Stephanie Solt) by studying four cases of **English-German semantic micro-variation** relating to issues investigated in the individual projects, cf. *Bridging Theme* (attached).

2.3 Work programme incl. proposed research methods

Methodology. The research described in the work packages will be based on data resulting from in-depth **corpus studies**. Artificial examples will be used when controlled conditions are required, and also for expository ease. The corpora and search facilities are provided by the Department of German Studies and Linguistics at Humboldt University Berlin. In addition, **three experimental studies** are planned (cf. work packages 1, 2, 5) making use of acceptability rating, sentence-picture verification and self-paced reading techniques. The experiments will be carried out in cooperation with one of the partners listed in section 5.4.

Organization. Work will be organized in five packages, where package 1 and 2 are the core ones. In **work package 1** the generalized account of equatives will be developed and **work package 2** focuses on scalar equatives. Work packages 3-5 test the theory against further data and related phenomena. In **work package 3**, atypical and degenerate cases of equatives will be considered. In **work packages 4**, differences with-

[13] see, e.g., the workshops on *Bridging Formal and Conceptual Semantics (*April 2014, Düsseldorf, http://www.sfb991.uni-duesseldorf.de), *Linguistic versus Non-Linguistic Knowledge* (Dec 2014, Tübingen, http://www.pi.uni-tuebingen.de/arbeitsbereiche/kognition-und-sprache/arbeitsbereich/sonstiges/workshop-2014.html), and *Formal Semantics Meets Cognitive Semantics* (January 2015, Nijmegen, https://sites.google.com/site/formcogsem/), and also the research agenda of the *CONNECT* project in Barcelona (http://www.upf.edu/glif/projects/) and of the SFB 991 in Düsseldorf (http://www.sfb991.uni-duesseldorf.de/).
[14] http://esslli2016.unibz.it/?page_id=397

in *wie*-clauses are examined. Finally, in **work package 5** *wie*-clauses in equatives are compared to *wie*-clauses in comparatives. Research in the project will proceed in the order of the work packages.

Work package 1: A generalized account of equative comparison

In work package 1 a generalized account of German equatives will be developed including scalar as well as non-scalar equatives. The core piece of this account is **(i)** the idea that equatives express similarity, that is, indistinguishability with respect to a given set of features (section 1 a.2) and **(ii)** that this does not result from the construction – there is no meaning of German equatives as such – but instead from the meaning of the standard marker *wie* and its interplay with the parameter marker *so*. This approach differs from approaches reducing non-scalar to scalar cases (Lenerz & Lohnstein 2005), or treating non-scalar cases as degenerate scalar ones (Rett 2013). It is also different from the approach in Anderson & Morzycki (2015), where equatives are understood as expressing identity of kinds (see section 1b on other approaches.)

The analysis will follow Haspelmath & Buchholz (1998) in assuming that *wie*-clauses in equatives are (elliptical) free relative clauses and that equatives are correlative constructions with *wie*-clauses resolving a pro-form *so*. It will be hypothesized that German *wie*-clauses are similarity predicates modifying individuals or events (<e,t> or <ev,t>) – *being similar to some other mug / dancing similar to someone else* / *being similar in height to someone else*. In order to avoid vacuous shifting operations, **term unification** will be employed as a means of resolving the pro-form. A tentative version of the semantics is shown in (10) (the free variable **t** is resolved to **bertas-mug** by unification).

(10) a. [[so eine Tasse]] = λQ. $\exists$x. SIM(x, **t**, $\mathcal{F}_{mug}$) & mug(t) & Q(x)
b. [[wie Bertas Tasse]] = λy. SIM(y, **bertas-mug**, $\mathcal{F}_{mug}$) & mug(**bertas-mug**)
c. [[so eine Tasse]] [wie Bertas]] = λQ. $\exists$x. SIM(x, **bertas-mug**, $\mathcal{F}_{mug}$) & mug(**bertas-mug**) & Q(x)

The similarity analysis of equatives differs from standard degree semantics in important respects:

- While in standard degree semantics the standard marker is assumed to be meaningless, in the similarity analysis it has a a meaning of its own – [[wie]] = λx.λy.SIM(x, y, $\mathcal{F}$).
- While in standard degree semantics the parameter marker *so* introduces a non-strict ordering relation between degrees (or sets of degrees), in the similarity analysis it introduces a SIM relation which does not require an ordered domain – things can be similar with respect to material and color as well as with respect to height. This explains why in German (and languages with correlative equatives) scalar and non-scalar equatives can be construed in the same way.
- In standard degree semantics the parameter marker *so* introducing the partial order has to be a lexical item different from the demonstrative *so*. In the similarity analysis, the parameter marker *so* is identical in meaning to the demonstrative, the difference being in usage: When used deictically *so* looks for a demonstration target, when used anaphorically it looks for an antecedent, and when used as a parameter marker it looks for a standard (in König & Umbach the latter use is called cataphoric).
- While in standard degree semantics the parameter marker takes the standard as an argument, in the similarity analysis it is combined with the standard by unification, thereby accounting for its pro-form characteristics.

Given that *wie*-clauses are interpreted by similarity, it is predicted that they are subject to the same restrictions as found for *so*. This question will be targeted in an experimental study following the study of features of comparison in the first project (section 1 a.4). Three conditions will be compared, **(a) equatives with parameter marker *so*, (b) equatives with parameter marker *ähnlich*** and **(c) equatives without pa-**

rameter marker (*so ein Auto/ ein ähnliches Auto / ein Auto wie das von Berta*). As before, naturalness ratings will be collected for nominal and verbal stimuli (cf. ex. (7)/(8)). It is predicted that kind-establishing properties are relevant in (a) and (c) but not in (b), implying that (a) and (c), but not (b) trigger ad-hoc kind formation (cf. work package 3). The experiment will carried out in cooperation with Prof. Britta Stolterfoht.

Work package 2: Scalar equatives in a generalized account of equatives

Work package 2 focuses on the question of whether a generalized account of equatives based on similarity is able to meet the demands of degree equatives. The core issue is that of ***exactly* vs. *at-least* readings** – does *A ist so groß wie B* mean that A is exactly as tall as B or that A is at least as tall as B? – where the *exactly* reading expresses a symmetric and the *at-least* reading an asymmetric relation. While both readings are attested in the data, standard degree semantics and the similarity analysis differ in which reading is predicted to be primary. In standard degree semantics equatives are assumed to have an *at-least* interpretation as their meaning and the *exactly* reading is derived by scalar implicature. In the similarity analysis, on the other hand, equatives (scalar as well as non-scalar) are interpreted such that their meaning is symmetric, since similarity is an equivalence relation – *A ist so groß wie B* means that **A is similar in height to B** – raising the question of how to derive the *at-least* reading from the *exactly/similar* reading. It is important to realize that this problem is not specific for the similarity analysis – any analysis unifying scalar and non-scalar equatives based on classes or kinds has to face this problem.[15] In the proposed project a two-pronged approach will be taken, (i) strengthening the empirical basis and (ii) working out a formal solution.

(i) In the area of numerals (*five children*) the issue of *exactly* vs. *at-least* readings has been discussed extensively and is by no means settled (cf. Geurts 2006, Kennedy 2013). Recent empirical findings provide evidence that the *exactly* reading is primary as compared to the *at-least* reading (which is different in the case of regular scalar items like *some*), see Marty et al. (2013). In the area of equatives there are no empirical data available. Since degree equatives are semantically close to degree measure phrases (*180 tall*) the assumption that they behave like numerals appears reasonable. Still, **empirical data for degree equatives are mandatory**. In work package 2 a series of experimental studies addressing the questions below:

a) Can one of the *exactly/similar* or the *at least* reading be shown to be primary in equatives? A sentence-picture matching experiment plus memory load is planned, analogous to that in Marty et al. This experiment will be implemented in cooperation with the XLinC Lab, Prof. Schuhmacher, University of Cologne.
b) Which contexts facilitate *at least* readings on the surface, as opposed to *exactly/similar* readings? This can be investigated by naturalness ratings, using either pictures or verbal descriptions as contexts. Stimuli are currently developed in a student project at the university of Cologne.
c) For negated scalar equatives, when can a symmetric reading be expected? That is, in which contexts is *A ist nicht so groß wie B* meant to say that A is either smaller or taller (see below)?
d) Does the position of the standard on the scale and/or its distance to the comparison object influence availability of *at-least* readings (see below)?

(ii) Since similarity is an equivalence relation the formal framework of the similarity analysis first of all predicts *exactly* readings.[16] But there is a straightforward way to account for *at-least* readings by exploiting the granularity encoded in similarity. Simplifying substantially, scalar similarity classes can be considered as

[15] Anderson & Morzycki acknowledge the problem without, however, providing a solution.
[16] Recall that similarity is implemented as *indistinguishability with respect to certain features*, see section 1a.2). In Gust & Umbach (2015) a detailed comparison to the notion of similarity in Tversky (1977) can be found.

granularity classes, for example 160cm, 170cm, 180cm etc. In order to achieve an *at-least* reading, **a filter can be defined reducing granularity** such that from a certain point on, distinctions are filtered out, that is, all degrees above that point count as similar (technically, a filter is defined such that only right closures survive). Note that the result is still an equivalence class, even if there is no upper bound. This filter can be conceived of as a (possibly silent) operator deriving a (quasi) *at-least* reading from the *exactly/similar* reading . Take *Anna ist so groß wie Berta.* Filtering out distinctions above Berta's height has the effect of an *at-least* reading, that is, the sentence is true if Anna is at least as tall as Berta.

For negated scalar equatives the prominent reading of *A ist nicht so groß wie B* is asymmetric: A is smaller than B (see the duality facts in Bierwisch 1987). Since in negated sentences the asymmetric reading is far more natural than in positive sentences, the question arises of whether the two asymmetries are of the same origin. Intuitively, the asymmetry of negated equatives hinges on the direction of the scale – lower degrees are entailed by higher ones, which is called ***downward implication* of degrees**. Assuming downward implication asymmetry in negated equatives results from the fact that a disjunctive (symmetric) reading ("smaller or taller") would lead to a contradiction.[17]

The filter solution for positive equatives as well as the downward implication solution for negated ones make interesting predictions to be tested empirically (see the questions (c) and (d) above). Downward implication predicts that disjunctive/symmetric readings are licensed in contexts blocking downward implication. Filtering out distinctions beyond the standard's (B's) height will only be innocent if they are irrelevant. This predicts that an *at-least* reading of equatives is acceptable if A and B are both tall (distinctions beyond tall being irrelevant), but less so if B is small and A is tall (because we would be reluctant to lose this distinction). Alternatively, the distance between standard and comparison object could be relevant: If A's height is close to B's height an *at-least* reading is acceptable, but less so if there is a substantial difference.

In work package 2 solutions for both types of asymmetries will be worked out and tested empirically. Technical details will be implemented in cooperation with Dr. Helmar Gust (Cognitive Science Osnabrück).

One final topic to be addressed in work package 2 are the observations in Krasikova & Penka (2012) showing that languages with correlative equatives, like German, Polish and Italian, differ from, e.g., English in blocking NPIs and measure phrases while licensing negative indefinites (see section 1b). Concerning measure phrases, a possible explanation would be that **English equative standards represent degrees** while **German equative standards represent similarity classes of individuals** corresponding to degrees. Blocking measure phrases in German would be a natural consequence (see the attached *Bridging Theme*). Blocking of NPIs can also be accounted for by the similarity analysis: The standard degree semantics for (English) equatives is based on a relation between sets of degrees such that the standard provides a downward-entailing environment licensing NPIs. The similarity analysis is based on a relation between individuals. So there is no downward-entailing environment that might license NPIs in the standard. The third distributional difference observed by Krasikova & Penka is about negative indefinites which are licensed in German standards but not in English ones. Investigation of this difference will be part of work package 2.

Work package 3: Ways of equatives beyond "*so … wie*"

In order to test the viability of the similarity analysis, three borderline cases of equatives are investigated in this work package. First, there are equatives in which the parameter marker is different from *so.* Thurmair (2001) points out that equatives are not confined to the form *so … wie* and instead may have, e.g., *ähnlich*

[17] For comparatives, a standard measure function analysis will be employed, see section 1.a.2.

'similar' and *gleich/selb* 'same' as parameter markers, as in *dasselbe/ähnlich … wie*, cf. the examples in (9). Research on anaphoric uses of *ähnlich* and *gleich/selb* shows that they differ from *so* in not readily allowing generic interpretations (see Umbach 2014). One issue to be investigated in work package 3 is whether this effect recurs in equatives, cf. (12). The prediction is that *wie*-clauses combined with *ähnlich/gleich/selb* do not give rise to ad-hoc kind formation (see condition (b) of the experiment in work package 1).

(12) (Anna hat eine goldverzierte Tasse.)
a. So eine Tasse (wie die von Anna) ist meistens teuer.
b. ? Dieselbe / ? eine ähnliche Tasse (wie die von Anna) ist meistens teuer.
'Anna has a golden cup. Such a cup / the same / a similar cup (like Anna's) is usually expensive.'

The second borderline case of equatives to be examined are "generic equatives", cf. (13). These equatives are always scalar and impose *Normbezug* (i.e. the gradable property exceeds the cut-off) employing prototypical items as their standards. Haspelmath & Buchholz (1998) show that parameter markers tend to be omitted in these cases, while in regular scalar equatives they cannot, cf. (13a,b). Interestingly, omitting the parameter marker in non-scalar cases seems not restricted to prototypical standards, cf. (13c).

(13) a. Hans ist stark wie ein Bär.
b. Hans ist *(so) stark wie mein Bruder.
c. Hans hat (so) eine Frisur wie ein Beatle / mein Bruder.
'Hans is strong like a bear / as strong as my brother / has a hair-cut like a Beatle / my brother.'

The third borderline case to be examined is "coordination *wie*", as in (14). Thurmair argues convincingly that these examples should be considered as a case of equatives rather than involving a homophonous conjunction *wie*. Coordination *wie* provides an interesting test case for the similarity interpretation because it is a degenerate case asserting similarity without specifying a parameter: In (14a) the politicians Schmid and Erler appear similar only in being subject to the same predication. Compared to regular coordination (*und* 'and'), coordination *wie* is special because it blocks reflexive uses of verbs and collective readings, cf. (14b,c) (see Thurmair 2001). Coordination *wie* seems to open a window to explore the interaction between similarity and additivity that was observed in the preceding project (see section 1).

(14) a. Schmid wie Erler lehnten es ab, diese Frage zu beantworten. (DEWAC1)
'Schmid and Erler (likewise) refused to answer the question.'
b. *Peter wie Karin treffen sich. (Thurmair 2001, 224b,
c. Peter wie Karin fahren (*gemeinsam) nach Griechenland. 225b)
'Peter and Karin meet / go to Greece together.'

Work package 4: The variety of *wie*-clauses in equatives

Although the uniform appearance of *wie*-clauses in equatives suggests a uniform analysis there are differences between the manner, quality and degree cases which should not be ignored. They are revealed by, e.g., embedding *wie*-clauses under the noun *Art* ('kind') and under the verb *wissen* ('know'). [18] *Wie*-clauses embedded under the noun *Art* indicates a split between non-scalar and scalar cases: While (15a) and (b)

[18] Syntactically, *wie*-clauses embedded under *Art* are relative clause whilethose embedded under *wissen* are interrogatives. However, both qualify as antecedents of *so*-phrases, which is evidence that *wie*-clauses in these positions are semantically akin to *wie*-clauses in equatives.
(a) Otto kennt die Art, wie Anna tanzt. Seine Mutter tanzte auch so [wie Anna tanzt].
(b) Otto weiß, wie Anna getanzt hat. Seine Mutter tanzte auch so [wie Anna tanzt].
'Otto knows the way / how Anna dances. His mother danced that way, too.'

are fine, (15c) does not have a scalar interpretation (although it may be understood in a non-scalar way). Scalar *wie*-clauses require terms specialized for the particular dimension, e.g. *Größe* ('height') or *Gewicht* ('weight'). The fact that they do not license embedding under the noun *Art* ('kind') is strong evidence against the interpretation of scalar *wie*-clauses as denoting kinds.

(15) a. Die Art zu tanzen, wie Anna es tut, …
b. Die Art von Haus, wie Anna eins hat, ….
c. *Die Art groß zu sein, wie Anna es ist, ….
lit: 'The way of dancing like Anna does /'the kind of house like Anna has one /
'the way of being tall like Anna'

Wie-clauses embedded under the verb *wissen* reveal an additional split: While (16a) is fine, the *wie* version in (16b) is ungrammatical. Nominal cases require *was für* (lit: 'what for') instead of *wie*, which may indicate a difference between manner and quality in construing taxonomic subkinds (in the sense of Krifka et al. 1995). (16c) shows that scalar cases differ from non-scalar ones in using the adjective as their unique respect of comparison (see section 1.a.1).

(16) a. Otto weiß, wie Anna tanzt.
'Otto knows how Anna dances.'
b. Otto weiß, *wie ein Haus Anna hat. / was für ein Haus Anna hat.
'Otto knows what kind of house Anna has.'
c. Otto weiß, ?? wie Anna groß ist./ wie groß Anna ist.
'Otto knows how Anna is tall.'

The differences revealed by embedding *wie*-clauses under *Art* ('kind') and *wissen* ('know') show that one has to be careful not to overgeneralize. The similarity account provides a uniform interpretation of *wie*-clauses allowing at the same time sufficient leeway to account for their differences. [19]

Work package 5: Comparing *wie*-clauses in equatives to *wie*-clauses in comparatives

It has been claimed in the literature that ***wie*** expresses **equality** while ***als*** expresses **inequality**. Thurmair (2001) convincingly argues that this cannot be correct in view of the diachronic data (cf. Jäger 2010) and of the facts that (i) *wie* frequently occurs in comparatives, (ii) *als* and *wie* can be combined, and (iii) *als wenn* and *wie wenn* are parallel in hypothetical comparatives (cf. Bücking in prep.).

In this work package, two questions will be addressed. First, do ***wie*-clauses** occurring in **comparatives** (*Die Anlage war besser wie erwartet* 'The resort was better than expected.' DEWAC corpus), pattern with *als*-clauses (which are standard in comparatives) or with *wie*-clauses in equatives? Recall the findings in Krasikova & Penka (2012) for German *wie*-clauses in equatives, i.e. blocking of measure phrases and NPIs and licensing of negative indefinites. If this behavior is due to the meaning of the *wie*-clause rather than its occurrence in equatives, the same behavior is predicted for *wie*-clauses in comparatives.

Since conscious judgments on *wie* in comparatives are not reliable due to interference with prescriptive grammar (allowing only *als* in comparatives), a **self-paced reading study** is planned. Reading times for measure phrases, NPIs and negative indefinites in *wie*-clauses occurring in equatives will be compared to those occurring in comparatives. The prediction will be that *wie*-clauses in comparatives behave like those

[19] One interesting question set aside in this proposal is the question of whether so-called event readings of *wie*-clauses (*Hans sah wie Anna den Bus bestieg* 'Hans saw how Anna got on the bus') relate to manner readings.

in equatives, i.e. block measure phrases and NPIs and license negative indefinites. In this experiment, subjects will be from Swabia where *wie* in comparatives is even more frequent than in the North of Germany. The experiment will again be carried out in cooperation with Prof. Britta Stolterfoht (Tübingen).

The second question relates to the combination ***als wie*** which is mainly found in comparatives (… *sie nicht mehr verbrauchen sollen als wie vorher*. '… they should not consume more than before.' DEWAC corpus). The sequence *als wie* is substandard and appears redundant but is fully comprehensible. The reversed order, however, is ungrammatical (*… *mehr wie als zuvor*.) raising the question of how the standard markers *als* differs from *wie* and why the reversed order is blocked.

In **Dutch**, prescriptive grammar requires *dan* in comparatives and *als* in equatives. As in German there is a shift of the comparative particle. But while in German the shift is from *als* to *wie*, in Dutch it is from *dan* to *als*. De Hoop et al. (2015) propose a language-independent explanation referring to two conflicting constraints in grammar, *Iconicity* and *Economy*. Iconicity favors separate forms for equatives and comparatives because they are different in meaning, whereas Economy favors a single form because both express comparison. The tendency of replacing *dan* by *als* in Dutch as well as *als* by *wie* in German is attributed to an unresolvable conflict between Iconicity and Economy. The experimental work on *wie* in German comparatives will be done in close cooperation with Prof. de Hoop and Prof. Jäger. Collaboration was set up in a common workshop in Cologne in December 2015.

2.4 Data handling

Experimental and corpus data will be stored on a central server at the ZAS. Data in anonymous format will be made available to other interested researchers.

2.5 Other information

The proposed project will be linked to the project proposed by Stephanie Solt on *Degree Attenuators* by a *Bridging Theme*, see attachment.

2.6 Descriptions of proposed investigations involving experiments on humans, human materials or animals

The experimental studies in this proposal are non-invasive. Subjects will be healthy adults between 18 and 65 years of age. Participation is confidential and voluntary. Subjects in in-lab experiments will sign an informed consent form and can withdraw. Data are stored and reported anonymously.

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