# Crosslinguistic variation in comparison: evidence from child language acquisition

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## 1. Introduction

The syntax and semantics of comparison constructions is subject to substantial crosslinguistic variation (Stassen 1985; Kennedy 2009; Beck et al. 2009). Therefore we must assume that a child acquiring a particular language is faced with a non-trivial task in this domain, in which she is guided by the range of what is crosslinguistically possible (Snyder 2007). This paper reports a study of the time course of the acquisition of comparison constructions in English and in German, based on CHILDES corpora. The study builds on the analysis of crosslinguistic variation in the compositional semantics of comparison from Beck et al. (2009). That analysis in turn is based on the formal semantic analysis of comparatives developed in von Stechow (1984) and further refined by much subsequent work (e.g. Kennedy 1997; Heim 2001; see Beck 2011 for a recent overview). A meta-level goal of our paper is to illustrate how formal semantics and the study of child language acquisition can interact to their mutual benefit.

Beck et al. (2009) note that comparisons are anchored in the grammar of a language to very different extents. Motu, a language spoken in Papua-New Guinea, for example, does not seem to have developed what we would call a grammar of comparison at all. Comparison is effected indirectly by structures like the one below.[1]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (1) | *Mary* | *na* | *lata* | *to* | *Frank* | *na* | *kwadogi.* |
| | Mary | is | tall | but | Frank | is | short |
| | 'Mary is taller than Frank.' | | | | | (Beck et al. 2009: 66, ex. (20)) | |

This contrasts sharply with a language like English, which has incorporated into its grammar the tools to talk about a full-fledged scale structure: comparative morphology, measure phrases, differential comparison, *than*-clauses (and more), as illustrated by the so-called subcomparative (Bresnan 1973) in (2) on the next page.

(2) *The drawbridge is five inches longer than the moat is wide.*
'The length degree that the drawbridge reaches is five inches more than the degree of width that the moat reaches.' (inspired by Büring 2007)

Other languages may fall in between these two extremes, as Beck et al. (2009) show, and as we discuss in more detail in Section 2. They identify three dependent parameters of crosslinguistic variation. The parameters define groups of languages that behave alike with respect to clusters of properties in the domain of comparison constructions.

This crosslinguistic picture raises the question of what steps a child acquiring, say, English has to go through to ultimately reach the state corresponding to the adult grammar of comparison in English. The corpus study reported in Section 3 uses data types available in the CHILDES corpora to identify Beck et al.'s parameters. The general result is that the findings from child language acquisition support the crosslinguistic analysis. This is a very positive result, since language variation and language acquisition really should go hand in hand, and a different outcome of the acquisition study would have thrown serious doubt on the analysis of crosslinguistic variation.

In addition to this general result, the acquisition study raises several interesting new questions. Of methodological interest is the question of what kinds of data are available for the identification of properties of the grammar in fieldwork vs. corpus research. We report some of the challenges we faced. Moreover, the acquisition data have brought to light an important gap in the crosslinguistic study, namely the data we call pronominal measure phrases (*this* in the example in (3) below), whose importance the present study highlights. This paper supplements Beck et al.'s crosslinguistic results by a comparative study of this construction.

Finally, the acquisition study reveals a striking difference between English-learning and German-learning children concerning *than*-phrases, e.g. *than John* in (4).

(3) *(Mary is 1.70m tall.) John is this tall, too.*
(4) *Mary is taller than John.*

English-learning children acquire *than*-phrases more than two years earlier than German-learning children. This is wholly unexpected from the syntactic and semantic discussion of comparatives in the literature.

Section 2 sets the scene by introducing the semantic analysis of comparison constructions in English, the analysis of crosslinguistic semantic

variation and the consequences for language acquisition. We report the corpus study and its results in Section 3. In Section 4, we discuss our results and develop analyses for the novel insights gained by the study. Conclusions are offered in Section 5.

## 2. Theoretical background

In the following subsections, we will lay out the basics of the theory of comparison we assume (quite standardly) for English, and our perspective on how other languages differ syntactically and semantically from English (from Beck et al. 2009). We report the connection between language variation and language acquisition that emerges from Snyder's (2007, 2008) work and apply it to the present case.

### 2.1. The semantics of comparison in English

The subcomparative (SubC) in (2), with the differential measure phrase *five inches,* illustrates many of the relevant features of the theory of comparatives in English. We discuss the example's analysis in some detail and then extract from our discussion the general points that will be important in the following.

According to Beck (2011)'s adaptation of von Stechow's (1984) analysis, the comparative operator has the semantics in (5). (The version without the difference degree *five inches* has the semantics in (5').) The maximality operator is defined as in (6). For a detailed discussion of the concept of degrees, the reader is referred to Klein (1991) and the literature cited therein. For our purposes, it is important that they are of the semantic type <d> and are elements of scales.

(5) $[\![\text{-}er_{\text{DIFF}}]\!] = \lambda D.\ \lambda d.\ \lambda D'.\ \text{MAX}(D') \geq d + \text{MAX}(D)$ (type <<d,t>,<d,<<d,t>,t>>>)

(5') $[\![\text{-}er_{\text{simple}}]\!] = \lambda D.\ \lambda D'.\ \text{MAX}(D') > \text{MAX}(D)$ (type <<d,t>,<<d,t>,t>>)

(6) $\text{MAX}(P) = \iota d: P(d) = 1 \ \&\ \forall d' [P(d') = 1 \rightarrow d' \leq d]$

In the example, the difference degree d is *five inches*. The *than*-clause provides the set D of degrees to which the moat is wide, and the main clause provides the set D' of degrees to which the drawbridge is long. Relating the maximal elements of these two sets as described derives the

meaning captured by the paraphrase. A difficulty in the analysis of comparatives lies in deriving the appropriate sets of degrees from the syntactic structure. The example is associated with the underlying structure in (7), the surface structure in (8) and the Logical Form in (9). The Logical Form allows us to derive the intuitively appropriate interpretation for the example on the basis of standard mechanisms of interpretation (given in (10) and (11) in the style of Heim and Kratzer (1998)).

(7) *The drawbridge is* [$_{AP}$ [$_{DegP}$ 5" *-er* [*than the moat is how wide*]] *long*]
(8) *The drawbridge is* [$_{AP}$ [$_{DegP}$ 5"_ ] *long-er*] [*than how*$_1$ *the moat is* t$_1$ *wide*]
(9) [$_{DegP}$ 5" *-er* [*than how*$_1$ *the moat is* t$_1$ *wide*]] [1 [*the drawbridge is* [$_{AP}$ t$_1$ *long*]] ]

(10) $[\![ [1\ [\textit{the bridge is}\ [_{AP}\ t_1\ \textit{long}]]] ]\!]^g$ = λd. the bridge is d-long
$[\![ \textit{how}_1\ \textit{the moat is}\ t_1\ \textit{wide} ]\!]^g$ = λd. the moat is d-wide
$[\![ [_{DegP}$ 5" *-er than how*$_1$ *the moat is* t$_1$ *wide*$] ]\!]^g$ =
λD'. MAX(D') ≥ 5"+ MAX(λd. the moat is d-wide) (type <<d,t>,t>)

(11) $[\![ [_{DegP}$ 5" *-er than how*$_1$ *the moat is* t$_1$ *wide*] [1 [*the bridge is* [$_{AP}$ t$_1$ *long*]]]$]\!]^g$ =1
iff MAX(λd. the bridge is d-long) ≥ 5" + MAX(λd. the moat is d-wide)

Let us consider the crucial aspects of this analysis of comparatives. Example (2), first of all, motivates a degree semantics. We measure the drawbridge and the moat along different dimensions and relate the resulting degrees on the scale of physical extent. Moreover, we relate them rather precisely via the differential measure phrase *five inches*, using a sum operation on the differential and the *than*-clause degree. In this type of example, the comparative could not simply relate two objects (the drawbridge and the moat).

Degrees are introduced into the semantics through gradable predicates. The basic contribution of a gradable adjective is a relation between degrees and individuals. We give an example below.

(12) $[\![ \textit{long} ]\!]$ = λd. λx. x is d-long = λd. λx. LENGTH(x) ≥ d (type <d,<e,t>>)

Finally, comparison operators like the comparative quantify over degrees. Such degree operators behave at the level of Logical Form in a manner that is quite parallel to nominal quantifiers. In particular, they create properties of degrees via movement and predicate abstraction. This can be seen in the Logical Form in (9), where the comparative DegP [*5″ -er than the moat is wide*] underwent quantifier raising (QR). Its semantic type

<<d,t>,t> is parallel to the type of a quantifier over individuals, <<e,t>,t> (Heim 2001).

This analysis is supported by a range of data which follow from it as straightforward generalizations. We give a selection of relevant examples in (13) to (17) below, with the sentence in (a), a paraphrase in (b), and the Logical Form in (c).

(13) a. *Mary is exactly 1.70m tall*. **Overt Direct Measure Phrase (MP)**
b. The maximal height degree that Mary reaches is 1.70m.
c. [ [$_{\text{DegP}\ <<d,t>,t>}$ *exactly 1.70m*] [$_{<d,t>}$ 1 [*Mary is* $t_1$ *tall*]] ]

(14) a. *How tall is Mary?* **Degree Question (DegQ)**
b. For which degree d: Mary is d-tall?
c. [Q [$_{<d,t>}$ *how*$_1$ [*Mary is* $t_1$ *tall*]]]

(15) a. *Mary is taller than 1.70m*. **Comparison to a Degree (CompDeg)**
b. The maximal height degree that Mary reaches exceeds 1.70m.
c. [ [$_{\text{DegP}\ <<d,t>,t>}$ *-er than 1.70m*] [$_{<d,t>}$ 1 [*Mary is* $t_1$ *tall*]] ]

(16) a. *Mary is the tallest*. **Superlative (Sup.)**
b. The maximal height degree that Mary reaches
exceeds the maximal height degree that any other relevant person reaches.
c. [*Mary* [[$_{\text{DegP}}$ *-est* C] [$_{<d,<e,t>>}$ 1 [2 [$t_2$ i*s* $t_1$ *tall*] ]]]]

Note finally that the analysis of a gradable adjective in the simple, positive form requires the introduction of an abstract Positive operator POS to derive from the lexical semantics of the adjective (a relation between individuals and degrees) the right meaning, a context-dependent property of individuals. We provide a simple version of POS in (16c).

(17) a. *Mary is tall*. **Positive**
b. Mary counts as tall in the context of evaluation = Mary's height reaches s
(where s is the threshold for tallness in the context of evaluation)
c. ⟦*tall*⟧ = [λd. λx. x is d-tall] (type <d,<e,t>>)
⟦$\text{POS}_s$⟧ = [λAdj. λx. MAX (λd. Adj(d)(x)) ≥ s]
⟦[$_{\text{AP}}$ $\text{POS}_s$ tall]⟧ = λx. MAX (λd. x is d-tall) ≥ s
= λx. x's height reaches s (type <e,t>)

## 2.2. Crosslinguistic variation in comparison

The above-mentioned properties of the grammar of comparison are not shared by all languages, and accordingly the expression of comparisons varies widely crosslinguistically. Beck et al. (2009) – referred to in the following as B17, after the joint project funded by the German Research Foundation DFG – have conducted a systematic investigation into crosslinguistic variation in comparative constructions which was theoretically guided by the theory introduced above. The table below summarizes their main results.[2]

*Table 1: Crosslinguistic variation in comparison constructions*

| CompDeg | DiffC | NegI | Scope | SubC | MP | DegQ | Lang.Ex. |
|---|---|---|---|---|---|---|---|
| No. | No. | n/a | n/a | n/a | No. | No. | Motu |
| Yes. | Yes. | No. | No. | No. | No. | No. | Japanese, Chinese |
| Yes. | Yes. | Yes. | Yes. | No. | No. | No. | Guaraní, Russian |
| Yes. | Yes. | Yes. | Yes. | Yes. | Yes. | Yes. | English, German |

Notice that the properties in the table always occur in a cluster: either a language has both CompDeg and DiffC, or it has neither – and similarly for the other clusters (NegIs, Scope) and (SubC, MP, DegQ). According to B17, these clusters identify three dependent parameters of crosslinguistic variation, which we explain briefly in the following.

### *2.2.1. Degree semantics*

The basis of the grammar of comparison in English is the degree ontology used in the semantics. Adjectives – more precisely, gradable predicates – have an argument position for degrees. Those argument positions must be saturated in the syntax. Degree operators do so, indirectly, by quantifying over degrees. In order to determine whether the language under investigation is like English in this respect, B17 evaluated the comparison data from that language with respect to:

> (i) whether the language has a family of expressions that plausibly manipulate degree arguments: comparative, superlative, equative morphemes; items parallel to *too* and *enough*.
>
> (ii) whether the language has expressions that plausibly refer to degrees and combine with degree operators: CompDeg, DiffC.

Motu, B17's representative of a conjunctive language, gives a clear negative answer to both of these questions. Comparison in Motu is expressed as in (1), repeated from above.

(1) *Mary* *na* *lata* *to* *Frank* *na* *kwadogi*.
Mary is tall but Frank is short.
'Mary is taller than Frank.' (Beck et al. 2009: 3, ex. (2))

Other types of data that would be indicative of a degree semantics, like measure phrases or degree questions, are unavailable as well (cf. Beck et al. 2009: 47-49 for the respective data). Thus we see no evidence for an underlying degree semantics, and B17 accordingly suggest that there is the following parameter of language variation:

(18) **Degree Semantics Parameter (DSP):** A language {does/does not} have gradable predicates (type <d,<e,t>> and related), i.e. lexical items that introduce degree arguments. (Beck et al. 2009: 19)

The DSP is a point of systematic variation in the lexicon (similar in spirit to proposals in Chierchia (1998) for nominal semantics). Motu would, of course, have the negative setting -DSP. This leaves us with the task of finding a semantic analysis for Motu adjectives. They occur only in one form, which seems similar to the English positive form in its context dependency. B17's suggestion is that Motu adjectives have a context dependent semantics without involving <d,<e,t>> adjectives or POS (cf. the negative DSP setting just hypothesized). The Motu example in (1) is analyzed in (19).

(19) a. $[\![ tall_{\text{Motu}} ]\!] = \lambda x.$ x counts as tall in c
b. $[\![ short_{\text{Motu}} ]\!] = \lambda x.$ x counts as short in c
c. $[\![$ *Mary na lata, to Frank na kwadogi* $]\!] = 1$ iff
Mary counts as tall in c and Frank counts as short in c

The sentence is predicted to be true in a context as long as the context can be construed as ranking Mary and Frank with respect to their height, with Mary on the tall side and Frank on the short. The meaning that this semantics derives for *Mary na lata* is indistinguishable from the meaning of the English *Mary is* POS *tall*, but it is derived differently. The point is that Motu has no relational <d,<e,t>> adjective meanings and no degree operators; comparisons are made in an indirect manner.

### *2.2.2. Degree operators*

A more subtle variation between English and Japanese is already observed in Beck, Oda, and Sugisaki (2004). While Japanese (20) looks superficially similar to English (21a), several important empirical differences between the two languages lead Beck, Oda, and Sugisaki to propose a different semantics, closer to that of English (21b).

(20) *Sally-wa* *Joe-yori kasikoi.* **Japanese**
Sally-TOP. Joe-*yori* smart

(21) a. *Sally is smarter than Joe*.
b. *Compared to Joe, Sally is smarter*.

In contrast to English, Japanese does not permit MPs, SubC, or DegQs. Beck, Oda, and Sugisaki also note that in contrast to English, there is no scope interaction with modal verbs in a Japanese comparison construction; thus Japanese does not seem to have a comparative operator that behaves like a quantifier at the level of Logical Form. Negative island effects are also not English-like. The acceptability of a differential comparative, however, indicates that the semantics underlying the *yori*-construction is a degree semantics. These basic facts as B17 would cluster them are summarized in (22):

(22) Japanese: *SubC, *MP, *DegQ; NegIs, Scope not like English; DiffC okay!

Thus B17 take Japanese to have the positive setting of the DSP. Some other parameter must be responsible for the differences to English. B17 follow Beck, Oda, and Sugisaki's suggestion that Japanese does not permit quantification over degrees. The following parameter expresses that:

(23) **Degree Abstraction Parameter (DAP):** A language {does/does not} have binding of degree variables in the syntax. (Beck, Oda, and Sugisaki 2004: 336)

If there is no binding of degree variables, a language cannot have degree operators like the English comparative. This explains the lack of scope interaction and the properties *DegQ (which needs binding of degree variables, as seen in Section 2.1), *SubC (comparing two sets of degrees requires degree variable binding, cf. the analysis of example (2)) and *MP

(since overt direct measure constructions involve quantification over degrees, see once more Section 2.1). But of course we face the question of what the semantics of the normal comparison construction then is.

Beck, Oda, and Sugisaki (2004) consider English *compared to* and Japanese *yori* to be context setters not compositionally integrated with the main clause. They provide us with an individual (type <e>) that is used to infer the intended comparison indirectly. Thus we would be concerned in (20) above with a comparative adjective without a syntactic item of comparison, similar to English (21b). We present Beck, Oda, and Sugisaki (2004)'s semantics for Japanese *kasikoi* 'smart' in (24). The analysis implies that Japanese adjectives directly combine with a context dependent comparative operator.

(24) a. $[\![$ *kasikoi* $\text{COMP}_{\text{Japanese}}$ c $]\!]^g = \lambda x.\ \text{MAX}\ (\lambda d.\ x \text{ is d-smart}) > g(c)$
$[\![ \text{COMP}_{\text{Japanese}} ]\!] = \lambda \text{Adj}.\ \lambda d'.\ \lambda x.\ \text{MAX}\ (\lambda d.\ \text{Adj}(d)(x)) > d'$
b. $[\![$ *Sally wa kasikoi* $]\!]^g = 1$ iff $\text{MAX}\ (\lambda d.$ Sally is d-smart$) > g(c)$
c. c := the standard of intelligence made salient by comparison to Joe
= Joe's degree of intelligence

Thus even when there is evidence that the language under investigation employs a degree semantics, it may still lack English-type quantifiers over degrees. For a given language and comparison construction, we need to ask whether the constituent seemingly corresponding to the English *than*-constituent is really a compositional item of comparison denoting degrees, and whether there is a genuine comparison operator. B17 suggest that the parameter setting +DSP,-DAP is also exemplified by Mandarin Chinese, Samoan, and the *exceed*-type languages that they investigated, Moore and Yoruba.

### *2.2.3. Degree Phrase arguments*

Another group of languages appears to be closer to English than Japanese, but still not completely parallel. Russian, Turkish and Guaraní belong to this group, and show the behavior summarized in (25).

(25) Russian, Turkish, Guaraní: *SubC, *MP, *DegQ;
but DiffC, CompDeg okay, English-like NegIs and Scope.

B17 argue that Guaraní, Russian and Turkish have an English-like degree semantics for main clause and subordinate clause, i.e. have the pa-

rameter setting +DSP,+DAP. But we must ask how the differences to English degree constructions arise. B17 propose that the following parameter creates the cluster SubC, MP, DegQ:

(26) **Degree Phrase Parameter (DEGPP):** The degree argument position of a gradable predicate {may/may not} be overtly filled. (Beck et al. 2009: 24)

The degree argument position (SpecAP in this paper) is filled by the MP at the surface in measure constructions, and by overt or silent *how* in DegQ and SubC. The difference between SubC and ordinary comparatives can be tied to ellipsis, in that comparatives with ellipsis only have a filled SpecAP at the level of LF. Thus the languages with *DegQ, *SubC, *MP are identified by the parameter setting -DEGPP, while at the same time being +DSP and +DAP.

A language like English would, according to B17's analysis, have the parameter setting +DSP,+DSP,+DEGPP. Besides English, the properties identified by these settings are documented in Bulgarian, German, Hindi, Hungarian and Thai.

### *2.2.4. Subsection summary*

The table below provides a summary of the predictions that B17's three dependent parameters are designed to make. The table lists all possibilities opened by the parameters: If a language is -DSP, it must be -DAP as well, because there can be no abstraction over degree variables without degree semantics. Similarly, if a language is –DAP, B17 infer that it is also -DEGPP because the DegPs that B17 investigate are all operators over degree arguments and can only be interpreted with the help of binding of the degree argument slot.

*Table 2: Parameter settings and predictions*

| | CompDeg | DiffC | NegIs | Scope | SubC | MP | DegQ |
|---|---|---|---|---|---|---|---|
| -DSP | No. | No. | n/a | n/a | n/a | No. | No. |
| +DSP, -DAP | Yes. | Yes. | No. | No. | No. | No. | No. |
| +DSP,+DAP,-DegPP | Yes. | Yes. | Yes. | Yes. | No. | No. | No. |
| +DSP,+DAP,+DegPP | Yes. | Yes. | Yes. | Yes. | Yes. | Yes. | Yes. |

The interest in such parameters lies in the fact that they make predictions about a range of phenomena. Each parameter is responsible for a set of effects, a cluster of empirical properties. Taken together, the settings of

the proposed parameters group languages together that share a bunch of key properties in the realm of comparison constructions.

### 2.3. Time course of acquisition

The particular interest in parameters for present purposes comes from their connection to child language acquisition. Snyder (2007: 7) postulates that a "…theory of (syntactic) variation is simultaneously a theory of the child's hypothesis space during language acquisition." That is, the child has to determine, on the basis of the available evidence, the parameter settings for the language that she is learning from the range of possibilities. Snyder (2007: 7) goes on to propose two acquisition predictions for any parameter suggested:

> (i) If the grammatical knowledge (including parameter setting and lexical information) required for construction A, in a given language, is identical to the knowledge required for construction B, then any child learning the language is predicted to acquire A and B at the same time.
>
> (ii) If the grammatical knowledge (including parameter setting and lexical information) required for construction A, in a given language, is a proper subset of the knowledge required for construction B, then the age of acquisition for A should always be less than or equal to the age of acquisition for B. (No child should acquire B significantly earlier than A.)

Application of (i) and (ii) to children's spontaneous speech relies on the assumption that the child is conservative, in the sense that she won't use a construction unless she is certain of its analysis in the target language. As Snyder (2007: 166) describes grammatical conservatism: "When children do not yet know how to construct a given sentence-type, it appears that they actually refrain from producing the sentence-type, rather than risking an error of commission."

This means that parametric variation cannot only be tested in crosslinguistic studies but should also be detectable during the acquisition process. As Snyder (2007) points out, the study of acquisition even has theoretical advantages over a cross-linguistic analysis. First, we can focus on a single, well-studied language. Furthermore, testing the acquisitional predictions for each child is comparable to testing parametric predictions for a new language. Every new language in a typological study comes with the possibility for two associated grammatical characteristics to diverge and each new child comes with the possibility for the two grammatical characteristics to be acquired at different times.

## 2.4. Predictions

Let us now examine the concrete predictions about the time course of child language acquisition that the theory of comparison from B17 makes in conjunction with Snyder's understanding of the process of language acquisition.

To begin with, we expect that the initial stage is one during which we have negative settings of all three parameters involved in the grammar of comparison. Then, diverging parameter settings can be achieved on the basis of positive evidence (for example, upon hearing *Mary is six months older than Joe*, one could deduce a positive setting of the DSP). Generally, we expect that the properties that identify a particular parameter should be acquired at roughly the same time, unless a construction in the cluster also requires some independent knowledge that is acquired later.

The setting of +DSP is obligatory for a language to have the potential for a +DAP setting. Thus, the grammatical knowledge required for the constructions which are indicative of the +DSP setting is a proper subset of the knowledge required for the constructions that are indicative of the +DAP setting. Consequently, the phenomena for the +DAP setting are expected to be acquired no earlier than the phenomena of the +DSP setting. Similarly, since the required knowledge for the constructions of the +DAP setting is a proper subset of the grammatical knowledge for the constructions of the +DEGPP setting, the latter should be acquired later than the former.

How do these general expectations translate into predictions regarding the occurrences of particular comparison constructions in the child's spontaneous language, as witnessed in the CHILDES corpora? We concentrate on the acquisition of languages with the settings +DSP,+DAP,+DEGPP, which include in particular English and German.

Some of the constructions used as indicators in B17's crosslinguistic work will not be useful for the analysis of spontaneous speech of English- or German-learning children. Reliable evidence regarding the NegIs property cannot be gained from corpora as it depends on negative evidence. Other constructions, in particular the subcomparative, and scope facts, are very likely too rare to show up with any reliability in corpora. Thus we face the obvious difficulty that some crosslinguistic indicators of parameter settings are not available in a corpus study of language acquisition.

There are some further considerations to be made. With respect to child language, the question is what other factors there may be that could possibly slow down the acquisition process of a certain construction. We follow

Syrett (2007) who observes that children by the age of three share with adults an abstract representation of the positive form of gradable adjectives, that both incorporate a standard of comparison and allow for variation with respect to how the standard is set. So this is not a problem. Potentially problematic however is the knowledge of units of measurement such as meters and years, and of how they apply to degrees. Additionally to MPs, we will therefore take expressions that refer directly to a degree like the one given in (27).

(27) *I am that tall.* **Pronominal Measure Construction (PMP)**

Here, *that* stands in for a degree and fills the degree argument slot of the gradable predicate. We will refer to such data as pronominal measure constructions and have included them in our investigation, in addition to MPs, in the hope of being able to circumvent the problem of units of measurement. They were not considered by B17. Notice that this concern applies not only to MPs but also to comparison with a degree and differential comparatives. This indicates that we should specifically consider data like (28) and (29) in the acquisition study.

(28) *I am taller than that.* **CompDeg with degree pronoun**
(29) *I am taller.* **Contextual Comparative**

Besides unavailability of certain data points in acquisition that were available in the crosslinguistic study, there is fortunately also the reverse situation of certain constructions being available as evidence in acquisition that are not observationally available in a crosslinguistic study. Since the analysis of *than*-clauses in English involves predicate abstraction (cf. Section 2.1), it requires a +DAP setting. Therefore the child's conservativity in conjunction with the B17 analysis leads us to expect that constructions indicative of a +DSP setting only (degree morphology; CompDeg and DiffC *pace* the concerns voiced above) should be acquired no later than *than*-clauses. (Note that here we have an advantage over a crosslinguistic investigation because it is precisely a question of the crosslinguistic study how an apparent counterpart of an English *than*-clause is actually to be analyzed in the language under investigation. Cf. Japanese, as discussed above.)

A comparative with a *than*-clause needs to be distinguished from a contextual comparative, e.g. (29) above, which does not provide evidence for a +DAP setting. It also needs to be distinguished from a *than*-phrase, for

which it is unclear whether the same analysis must apply (e.g. Hankamer 1973; Lechner 2004; Hofstetter 2009; Bhatt and Takahashi (to app.)). Some authors argue that the *than*-phrase in examples like (30a) is really a reduced clause (30b), while others like to take it at face value, necessitating another semantic entry for the comparative operator (30c). This issue surfaces in our acquisition results. We use the term *than*-constituent when we want to remain neutral as to its status. The term *than*-phrase is used to refer to *than* followed by what seems to be one phrasal constituent (mostly a DP, referring to an individual), without prejudging its analysis as either reduced or non-reduced (like (30a)). The term *than*-clause refers to *than* followed by what is unequivocally a clausal structure (like example (2) once more).

(30) a. *Mary is taller than John.*
b. [*-er than* [*John* ~~*is tall*~~]] [*Mary is tall*]
c. *Mary* [ [*-er*$_{<e,<<d,<e,t>>,<e,t>>>}$ *than John*] [λd. λx. x is d-tall] ]

Given these considerations, here is a list of comparison constructions for which CHILDES corpora may be a good source:

- degree morphology: comparative and sup. vs. unmarked forms of adj.s
- pronominal measure constructions
- overt measure phrases occurring (i) in CompDeg, DiffC and (ii) as MP
- degree questions
- *than*-constituents occurring (i) phrasal and (ii) clausal

We make at least the following predictions about the time course of the acquisition of comparison:

(31) +DSP before +DAP:
a. No child should acquire *than*-clauses significantly before degree morphology.
b. No child should acquire *than*-clauses significantly before CompDeg.

(32) +DAP before +DEGPP:
No child should acquire DegQs and MPs significantly before comparatives (including all of degree morphology, CompDeg, and *than*-clauses).

We would like to emphasize that these predictions rule out scenarios that would otherwise be logically possible and intuitively reasonable. For example, one could imagine a child first acquiring (33a) and then (33b). But this is incompatible with the above predictions.

(33) a. *How old is Molly?*
b. *Molly has an older bike than Sue does.*

Let us now look at what we found in the CHILDES corpora.

## 3. The corpus study

### 3.1. Methodology

In order to test the acquisitional predictions above, we selected transcripts from spontaneous speech of three American and three German children from CHILDES (MacWhinney 2000). Corpora were selected by their density and sampling length. Expectations were that the majority of comparison constructions would not be acquired until late, and the corpora selected reflect this expectation in that the children were recorded up to seven years of age for German, and up to at least the age of 5;1 for English. The list of transcripts analyzed in our study is presented in the tables below.

*Table 3: Corpora analyzed for (Mainstream American) English*

| Child | Collected by | Downloaded | Ages | # of Child Utterances |
|---|---|---|---|---|
| Adam | Roger Brown | 08/20/2008 | 2;3-5;2 | 90,852 |
| Sarah | (Brown 1973) | 08/20/2008 | 2;3-5;1 | 31,369 |
| Ross[3] | Brian MacWhinney | 10/22/2008 | 2;6-7;5 | 30,912 |

*Table 4: Corpora analyzed for German*

| Child | Collected by | Downloaded | Ages | # of Child Utterances |
|---|---|---|---|---|
| Cosima | Rosemarie Rigol | 10/16/2008 | 0;0-7;2 | 76,888 |
| Pauline | Rosemarie Rigol | 10/16/2008 | 0;0-7;7 | 83,572 |
| Sebastian | Rosemarie Rigol | 10/16/2008 | 0;0-7;0 | 79,451 |

The programs provided by CLAN were used to identify potentially relevant child utterances. The results were then searched by hand for the relevant constructions, and checked against the original transcripts to exclude imitations, repetitions, and formulaic routines. Following suggestions in Snyder (2007), we excluded (i) material transcribed as mumbled, unclear, or overlapping with another person's utterance; (ii) as repetition and imitation, material occurring in the same order in an earlier utterance within the same transcript, and containing the exact same words (including inflectional morphology); and (iii) memorized routines. In order to be characterized as novel, an utterance had to contain a new word, a change in word order, or a change in morphology.

The results were then analyzed for very first use and age of acquisition, as well as for types of errors and their frequency. Following Stromswold (1990) and Snyder (2007), the age at which a child produced her or his first clear example of a construction followed soon after by regular use with a variety of lexical items was considered to be the age of acquisition for this construction (First of Repeated Uses, FRU). "Soon after" was here understood as within the next two months. Frequency of grammatical and ungrammatical constructions was determined per 1,000 utterances for each month (cf. Hohaus and Tiemann (2010: 92) for data on types of errors and their frequency). Irregular and periphrastic forms were not taken into consideration when determining the age of acquisition for the comparative and the superlative.

## 3.2. Results

The results of our search are summarized below. Table 5 presents the number of gradable adjectives that the children have at their disposal by the age of 2;3 to 2;6[4], Table 6 the results for the age of very first use, and Table 7 the results for the age of acquisition.

*Table 5: Repertoire of gradable adjectives*

| English | | | German | | |
|---|---|---|---|---|---|
| Adam (2;3) | Sarah (2;3) | Ross (2;6) | Cosima (2;5) | Pauline (2;5) | Sebastian (2;5) |
| 18 types | 11 types | 28 types | 16 types | 20 types | 17 types |

*Table 6: Age of very first use*[5]

| First use | English | | | German | | |
|---|---|---|---|---|---|---|
| | Adam (2;3-5;2) | Sarah (2;3-5;1) | Ross (2;6-7;5) | Cosima (0;0-7;2) | Pauline (0;0-7;7) | Sebastian (0;0-7;0) |
| Comp | 2;8 | 2;10 | 2;6 | 2;7 | 1;1 | 3;11 |
| Sup. | 4;2 | 3;7 | 3;5 | 3;7 | 3;5 | 3;9 |
| PMP | 3;1 | 3;0 | 2;10 | 3;3 | 2;4 | 2;7 |
| CompDeg | | | 5;4 | | | |
| DiffC | | | 4;11 | | | |
| *Than*-phrases | 3;5 | 3;11 | 3;5 | 6;6 | 5;9 | 4;8 |
| *Than*-clauses | 3;8 | | 3;5 | | | |
| MP | 4;5 | 4;5 | 3;0 | | 6;5 | |
| DegQ | 4;0 | 3;1 | 3;3 | 3;11 | 3;5 | 4;3 |

*Table 7: Age of acquisition*

| FRU | English | | | German | | |
|---|---|---|---|---|---|---|
| | Adam (2;3-5;2) | Sarah (2;3-5;1) | Ross (2;6-7;5) | Cosima (0;0-7;2) | Pauline (0;0-7;7) | Sebastian (0;0-7;0) |
| Comp | 3;4 | 3;7 | 2;6 | 2;9 | 2;8 | 3;11 |
| Sup. | 4;2 | 4;2 | 4;8 | 3;7 | 4;5 | 4;3 |
| PMP | 4;0 | 4;0 | 4;1 | 3;7 | 2;10 | Indefinable.[6] |
| *Than*-phrases | 4;2 | Indefinable. | 3;5 | Indefinable. | 6;6 | 6;3 |
| *Than*-clauses | Indefinable. | | Indefinable. | | | |
| MP | Indefinable. | 4;5 | Indefinable. | | Indefinable. | |
| DegQ | Indefinable. | Indefinable. | Indefinable. | Indefinable. | 6;10 | Indefinable. |

Let us summarize the above results. None of the children acquire all constructions before the end of the respective corpora, although Ross makes use of all constructions before the end of the corpora, by the age of 7;5. For both English and German, mean age of acquisition of regular comparative morphology was 3;1, with a range of 2;6 to 3;7 for English and of 2;8 to 3;11 for German. For English, mean age of acquisition of *than*-phrases was 3;9, with a range of 3;5 to 4;2. For the German children Pauline and Sebastian, however, mean age of acquisition of *than*-constituents was 6;4, with a range of 6;3 to 6;6. For the superlative in English, mean age of acquisition was 4;4, with a range of 4;2 to 4;8. Gaps in the recordings at 3;8 as well as 4;0 and 4;7 probably account for the late age of acquisition of the superlative by Ross. In German, mean age of acquisition for the superlative was 4;1, with a range of 3;7 to 4;5. For English PMPs, mean age of acquisition was 4;0, with a range of 4;0 to 4;1. Mean age of acquisition for PMPs for the German children Cosima and Pauline was 3;2, with a range of 2;10 to 3;7. MPs were only acquired by Sarah, at 4;5, and not by any German-learning children. Degree questions were only acquired by Pauline by the end of the corpora, at 6;10, and not by any English-learning children.

Figure 1 and 2 on the next page additionally give an overview over the course of acquisition for PMPs in English and German, as they present the focus of this paper.

*Figure 1: Acquisition of the pronominal measure construction in English*

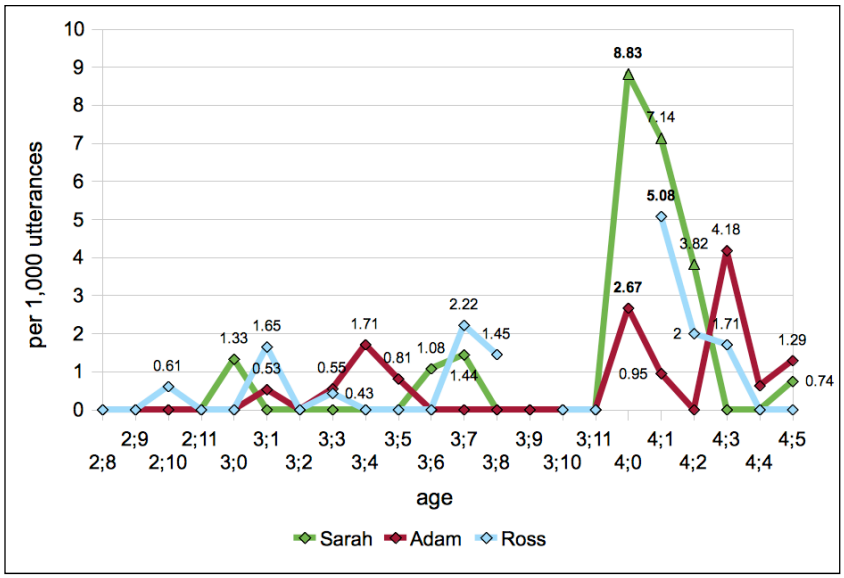
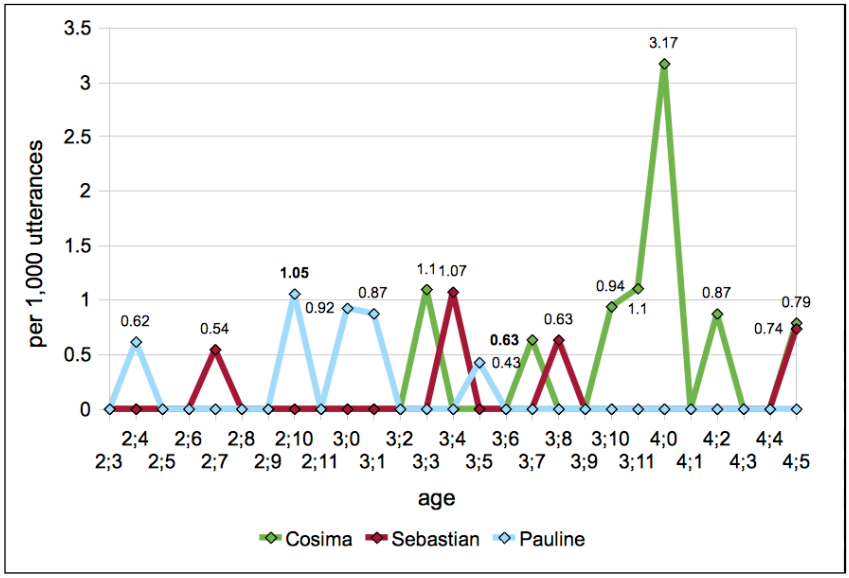


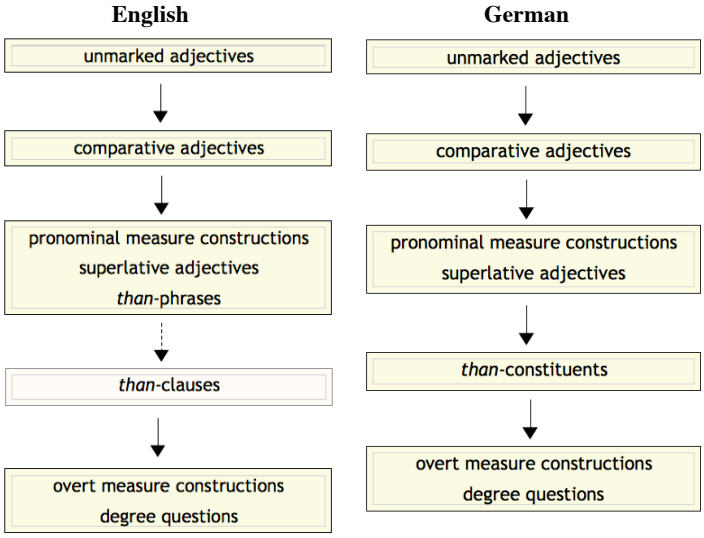

*Figure 2: Acquisition of the pronominal measure construction in German*



For German, acquisition of comparative morphology was earlier than acquisition of the superlative and of PMPs, and earlier than the acquisition of MPs and DegQs. Acquisition of MPs and DegQs seems to be last. So far, the time course of acquisition in German, too, is in line with the predictions. However, in German *than*-constituents are not acquired concurrently with the superlative but considerably later than in English. (Unequivocally clausal comparatives in both languages were used too infrequently to gain definitive insight into their acquisition.)

The sequencing indicated in Figure 3 summarizes what we find. Evidence for where to locate the acquisition of *than*-clauses in English is only suggestive, as indicated. But see Hohaus, Tiemann and Beck (in prep.) for a more conclusive discussion.

*Figure 3: Course of acquisition for English and German*




Unpredicted are the early acquisition of *than*-phrases in English when compared to German, and the early acquisition of PMPs in both languages when compared to the acquisition of MPs. The next section provides a detailed discussion of our findings.

## 4. Discussion

### 4.1. Confirmation of crosslinguistic picture

Let us first note that the acquisition study has confirmed the fundamental setup of the theory of parametric variation developed in B17. Recall that this theory irrevocably makes the following predictions about acquisition.

(34) +DSP before +DAP:
a. No child should acquire *than*-clauses significantly before degree morphology.
b. No child should acquire *than*-clauses significantly before comparison to a degree.

(35) +DAP before +DEGPP:
No child should acquire DegQs and MPs significantly before comparatives (including all of degree morphology, CompDeg and *than*-clauses).

In English and German, those expectations are confirmed. Let us take a closer look at the data we found. Children learning the +DSP,+DAP,+DEGPP languages English and German seem to go through the following stages as regards acquisition of the semantics of comparison:

0. gradable adjectives in unmarked form with Positive-like semantics
1. gradable adjectives with comparative morphology (in addition to unmarked form)
2. PMPs, Sup., *than*-phrase with predicative adjective (English)
3. all other *than*-constituents (English); all *than*-constituents (German)
4. DegQs and MPs

All six children investigated show this sequencing in their production of comparison constructions. (Admittedly, stages 3 and 4 are not identified by the data available as clearly as one would wish. But see Hohaus, Tiemann, Beck (in prep.) who provide evidence for stage 3 from attributive and adverbial comparatives with *than*-constituents and who argue that the sparsity of MPs and DegQ in the corpora shows that they have not been acquired.) What can semantic analysis say about these stages?

We suggest that the child begins with the adult semantics of a positive gradable adjective at stage 0, though without arriving at this meaning as a combination of the Positive operator and a relational adjective meaning. We suggest she uses (36) as a simple, uncomposed meaning (like Motu).

(36) ⟦*tall*⟧= λx. x counts as tall in c (type <e,t>)
(37) ⟦*taller*⟧= λx. HEIGHT(x) > $d_c$ (type <e,t>)

Once the child has acquired the comparative form of the adjective together with its correct meaning, we suppose that she uses (37).

This semantics is a first step towards a degree semantics and a +DSP setting, since a degree argument occurs in this interpretation. Once more though we propose that the child has not necessarily learned yet that this meaning arises from a combination of a relational lexical entry for the adjective plus a comparative operator.

This step must be taken next, at stage 2, when the child acquires PMPs and the superlative. A PMP only makes sense on the basis of a relational adjective meaning. PMPs are discussed in detail in Section 4.2. Superlative morphology similarly indicates that a basic relational adjective meaning combines with degree morphology to yield comparative and superlative meanings. Hence we suggest that now the child has the following semantic knowledge:

(38) a. ⟦*tall*⟧= λd. λx. HEIGHT (x) ≥ d (type <d,<e,t>>)
b. ⟦$POS_s$⟧= λAdj. λx. MAX (λd. Adj(d)(x)) ≥ s
c. PMP: ⟦*that tall*⟧= ⟦*tall*⟧(⟦*that*⟧) = λx. HEIGHT (x) ≥ ⟦*that*⟧
d. Contextual Comparative:
⟦-*er*$_1$⟧= λ$Adj_{<d,<e,t>>}$. λd'. λx. MAX (λd. Adj(d)(x)) > d'
⟦*taller* $d_c$⟧= ⟦-*er*$_1$⟧(⟦*tall*⟧) (⟦$d_c$⟧) = λx. HEIGHT (x) > $d_c$
e. Superlative:
⟦-*est* C⟧= λ$Adj_{<d,<e,t>>}$.λx.MAX(λd.Adj(d)(x)) > MAX(λd. ∃y[C(y) & Adj(d)(y)])

Now the child has gradable predicates in the same sense as the adult grammar, type <d,<e,t>> and related (+DSP setting). Note that our sketch of the process of acquisition is compatible with conservatism, since the child does not revise her assumptions; she merely refines them. She realizes that the meaning in (36) is derived by composing (38a) and (38b), and similarly for (37) and (38a) and (38d). Regarding the comparative, instances without a *than*-constituent are analyzed as contextual comparisons (cf. Section 2 on Japanese) and thereby CompDeg.

At this stage, the English-learning children also master *than*-phrases with predicative adjectives, and this is a very surprising finding of our study. It is discussed in detail in Hohaus, Tiemann, and Beck (in prep.).

The acquisition of *than*-clauses shows, according to the reasoning laid out in Section 2, that a +DAP setting is arrived at. Hence we propose that once a child produces *than*-constituents that are derived from a clausal source (stage 3), she has the following semantic knowledge:

(39) ⟦ *than how*$_1$ *the drawbridge is* $t_1$ *long* ⟧= [$_{<d,t>}$ λd. the drawbridge is d-long]

(5') ⟦ -*er*$_{simple}$ ⟧= λD. λD'. MAX(D') > MAX(D) (type <<d,t>,<<d,t>,t>>)

And finally, as expected given the B17 theory, degree questions and overt direct MPs (12) and (13) above, indicative of the +DEGPP setting, appear to come last in both languages and all children we considered. This characterizes stage 4.

The preceding discussion has demonstrated that the CHILDES corpora do not contain all the data that would be of interest in the study of the acquisition of comparison. One comment we have is that it would have been helpful to have more corpora that extend into a later age. Longer corpora would permit determination of the age of acquisition for MPs and DegQs.

In sum, we have shown that not only the general outcome, but also the details of the steps revealed in the acquisition process, support the theory of comparison from B17.

## 4.2. An unexpected result: pronominal measure phrases

In this subsection we take a closer look at PMPs. The difference that we found in the acquisition data between PMPs and MPs indicates that semantic theory needs to differentiate between the two kinds of measure phrases. Since PMPs are acquired very early in English and German, at the stage at which the +DSP setting solidifies, we propose that PMPs have the referential type <d> (as seen in the analysis proposed above and repeated in (40)). This enables them to combine directly via Function Application with the gradable predicate. The construction should be available as soon as the adjective has the <d,<e,t>> lexical entry.

(40) a. ⟦ *tall* ⟧= λd. λx. HEIGHT (x) ≥ d (type <d,<e,t>>)
b. PMP: ⟦ *that tall* ⟧= ⟦ *tall* ⟧(⟦ *that* ⟧) = λx. HEIGHT (x) ≥ ⟦ *that* ⟧
c. ⟦ *that* ⟧= $d_c$ (where $d_c$ is the contextually relevant degree) (type <d>)

The PMP thus differs semantically from the quantificational type of MPs (<<d,t>,t>). This difference is important in terms of the parameters

proposed by B17 and supported in this paper. B17 considered in their crosslinguistic survey only MPs. Being degree quantifiers, their availability hinges on the availability of degree quantification, i.e. a +DAP setting. In fact, all constructions indicative of the setting of the DEGPP depended on a +DAP setting (MP, DegQ, SubC). B17 thus investigated the DEGPP as dependent on the DAP. The theoretical relevance of PMPs lies in the fact that they do not require a +DAP setting, but nonetheless overtly fill the degree argument position of a gradable predicate. Our acquisitional findings and their analysis indicate, therefore, that (i) availability of PMPs must be determined independently of availability of MPs, and that (ii) the (in-)dependence of the DEGPP on the DAP must be reinvestigated. We first discuss the theoretical picture and then report the results of a crosslinguistic study on PMPs.

The discussion to follow presupposes that PMPs are of type <d>. While it is conceivable that this is not universally the case, our acquisition results are incompatible with PMPs of type <<d,t>,t> and therefore, at least in English and German they are of type <d>. Adding type <d> PMPs to the picture could affect the relation of DAP and DEGPP in one of two possible ways.

The first possibility is that B17 were right in the way they formulated the DEGPP. They were not right in assuming that the DEGPP depended on the +DAP setting. The consequence is that we need to ask about the DEGPP setting in +DAP and in -DAP languages. Specifically we need to ask about the acceptability of PMPs in both types of languages. We expect (i) that PMPs should pattern with MPs (and DegQ, SubC) in +DAP languages, and they could either all be okay or all be bad, and (ii) that among the -DAP languages, there may be ones that allow PMPs and ones that do not, reflecting +/-DEGPP; among the -DAP languages, overt MP, DegQ and SubC are out because they would require degree variable binding.

The second possibility is that B17 were wrong in the way they formulated the DEGPP. They were right in proposing that the DEGPP depended on the +DAP setting, and they should have formulated the DEGPP as follows to bring this out:

(26') **Degree Phrase Parameter' (DEGPP'):** The degree argument position of a gradable predicate {may/ may not} overtly host an operator.

The consequence here is that we need to ask about PMPs in all languages separately from MP, DegQ and SubC, because they are not theoreti-

cally related. In any given language, be it +DAP or -DAP, it is possible to have a -DEGPP setting but accept PMPs. We expect that in +DSP,+DAP,-DEGPP languages and in +DSP,-DAP,-DEGPP languages, PMPs should be acceptable (as opposed to MPs, DegQs, and the SubC).

We have conducted a small survey among B17's languages to establish acceptability of PMPs. The results are summarized in Table 8 below.[7]

*Table 8: Availability of measure constructions in B17's languages*

| Language | Overt | Pronominal |
|---|---|---|
| Motu | No. | ---[8] |
| **Mandarin** | **No.** | **Yes.** |
| Japanese | No. | No. |
| Moore | No. | --- |
| Samoan | No. | No. |
| Yoruba | No. | No. |
| Russian | No. | No. |
| Turkish | No. | No. |
| Romanian | No. | No. |
| Spanish | No. | No. |
| Guaraní | No. | --- |
| English | Yes. | Yes. |
| German | Yes. | Yes. |
| Bulgarian | Yes. | Yes. |
| Hindi-Urdu | Yes. | Yes. |
| Hungarian | Yes. | Yes. |
| **Thai** | **Yes.** | **No.** |

Just as in B17, judgments were elicited following the techniques presented in Matthewson (2004). Informants were presented with five contexts, including the ones in (41) and (42). In (42), informants were additionally presented with a photograph of a young boy demonstrating the size of the fish with a gesture. Informants were then asked to judge the acceptability of sentences in the target language, in which a demonstrative, among these the respective translations of English *so*, *this* and *that*, directly combined with a gradable predicate.

(41) Context 1: Mary is 5'8'' tall. John is this tall, too.

(42) Context 2: Last night, John, our neighbor went for a walk with his father along the river. At dinner, he tells his mother about a fish which he saw. His mother asks him what size the fish was. John shows her and replies: "The fish was that big."

With Mandarin Chinese, we indeed find a +DSP,-DAP language that allows PMPs but not MPs, cf. (46) and (47). In all other languages in the cluster, PMPs seem to be not available, cf. (43) to (45). For those, one of the ungrammatical examples and the alternative construction are shown below.

(43) *Sakana-wa sono *(kurai) ooki.* **Japanese**
fish-TOP. that degree big
'The fish was that big.'

(44) a. **E umi lenei foi Ioane.* **Samoan**
TAP tall this also John

b. *E umi faapea foi Ioane.*
TAP tall likewise also John
'John is this tall, too.'

(45) a. **Isaac naa ga bee.* **Yoruba**
Isaac also tall so

b. *Isaac naa ga to bee.*
Isaac also tall reach so
'Isaac is this tall, too.'

In Mandarin Chinese, an MP cannot combine with e.g. *gao* 'tall' in (46). The PMP construction in (47) with *name* or *zheme* however is acceptable, though many speakers prefer (48).[9]

(46) ??/**Yuehan shi yi mi qi gao.* **Mandarin Chinese**
John be one meter seven tall
'John is 1.70m tall.'

(47) *Yuehan ye shi name/ zheme gao.*
John also be that-*me*/ this-*me* tall
'John is that tall, too.'

The construction in (48) employs the copula *you* 'have' and that an MP is acceptable with *you* 'have' as well, e.g. (49). We follow Krasikova (2008) in assuming that neither of them can be analyzed as a measure phrase construction: She suggests that we are dealing with a secondary

predication structure (Krasikova 2008: 278). See also Xie (2011) for a similar proposal. Our classification of Mandarin hence relies on (46) and (47).

(48) *Yuehan* *ye* *you* *name/ zheme* *gao.*
John also have that-*me/* this-*me* tall
'John is this tall, too.'

(49) *Yuehan* *you* *yi* *mi* *qi* *gao.*
John have one meter seven tall.
'John is 1.70m tall.'

All +DSP,+DAP,-DEGPP languages investigated lack PMPs. The Russian example in (50) is grammatical as is the Spanish example in (55) but both may only be used as an exclamative and cannot refer to a degree. Spanish and Romanian seem to employ the degree particle *de* as a rescue strategy as has already been observed by Beck et al. (2009: 25) for MPs and is discussed for Romanian in Gergel (2009).

(50) #*Рыба* *была* *такой* *большой.* **Russian**
fish be.PAST such big
'The fish was so very big!'

(51) *Рыба* *была* *такого* *размера*.
fish be.PAST such.GEN. size.GEN.
'The fish was of such a size.'

(52) **Gör.düğü.m* *balık* *bu* *büyük.tü.* **Turkish**
see-PAST.PART-1SG. fish this big.PAST
'The fish seen by me was this big.'

(53) *Gör.düğü.m* *balık* *bu* *kadar* *büyük.tü.*
see-PAST.PART-1SG. fish this like big.PAST
'The fish seen by me was this big.'

(54) *Uite,* *aşa* *a fost* **(de)* *mare.* **Romanian**
Look so be.PAST *de* big
'Look, it was that big.'

(55) #*El* *pez* *era* *tan* *grande.* **Spanish**
the fish be.PAST so big
'The fish was so very big!'

(56) *El pez era así *(de) grande.*
the fish be.PAST so *de* big
'The fish was that big.'

We would expect that languages which have MPs at their disposal also have PMPs. In general, this is the case. But it seems possible for a language – despite the availability of MPs – not to have PMPs for the reason that it does not have a degree pronoun. Thai seems to be an example of such a language. It has a positive setting of all three parameters, and accordingly MPs can be directly combined with degree predicates, as in (57). The structure in (58) is ungrammatical, however, and the alternative structure in (59) is employed. Thai is the only language we have found that disallows PMPs for reasons orthogonal to its parameter setting.

(57) *Maria soong 172cm.* **Thai**
Mary tall 172cm
'Mary is 1.72m tall.' (Beck et al. 2009: 58)

(58) **Bplah dtoo-uh yai nee.*
fish body big this
'The fish is this big.'

(59) *Bplah dtoo-uh yai tao-nee.*
fish body big equal-this
'The fish is big like this.'

The data collected clearly support the first possibility: a -DEGPP setting affects PMPs along with the other expressions that may fill a gradable predicate's degree argument slot (MP, DegQ, SubC). The DEGPP is, for present purposes, stated correctly. However, it can no longer be seen as semantically dependent on +DAP. Among the languages investigated, Mandarin Chinese provides evidence for a +DSP,-DAP,+DEGPP parameter setting.

## 5. Summary and Conclusions

We have brought together research in child language acquisition and formal semantic theory, to show how they can both benefit when this connection is made. A theory of systematic crosslinguistic variation in semantics makes

interesting predictions about the time course of language acquisition. Conversely, acquisition data may support or falsify claims about parametric variation in semantics. While acquisition data are a rich source of evidence for theories of grammar (be they syntactic or semantic), we have also shown that compositional semantics offers new insights into the acquisition process.

The particular aspect of the grammar we have investigated is the grammar of comparison. The wide variation between languages in this area as well as the existence of a parametric analysis of this variation made it a promising field of study for acquisition. In all essential respects the acquisition data we have collected have confirmed the view on variation that B17 take. The type of data – corpora of children's spontaneous speech instead of semantic fieldwork – has made a difference, bringing to light the importance of some previously neglected constructions like PMPs. The acquisition data also contain new evidence on familiar constructions, differentiating unexpectedly between English and German *than*-constituents.

Our study highlights directions for future work. Regarding acquisition, the need for longer corpus studies has emerged. Another question is how to gain insight into the acquisition of infrequent constructions. Both follow as desiderata from the sparsity of data that affects some aspects of our study. It would be very interesting to conduct studies parallel to ours on other languages, e.g. with a -DEGPP or a -DAP setting. The investigation of child language acquisition has lead to further interesting questions about crosslinguistic semantics and will no doubt continue to do so.

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Ashutosh Singh for Hindi-Urdu; and to Jitraphan Hajjavanija, Duangkamon Poosaksrikit, and Nutaporn Vititviriyakul for Thai.

## Notes

1. In this paper, the following abbreviations are used in glosses: nom. = nominative case; gen. = genitive case; past = past; past.part. = past participle; sg. = singular; tap = tense-aspect particle; top. = marker of topicalization.
2. Explanation: DiffC stands for differential comparative, exemplified by (2) or the simpler *Mary is two inches taller than John is*; NegIs stands for an English-like negative island effect, as witnessed by the unacceptability of **Mary bought a more expensive book than nobody did*; Scope is intended for scope interaction, i.e. scope ambiguities between the comparative operator and other quantifiers, as exemplified by the ambiguity of Heim's (2001) example *The paper is allowed to be exactly five pages longer than that*. N/a means that the relevant data cannot be constructed, e.g. Scope, a judgment on wide scope degree operators, makes no sense in a language without degrees.
3. This corpus does not contain natural production data in the strict sense but elements characteristic of a diary study, i.e. recordings have only been partially transcribed. What was selected for transcription was what had been deemed interesting or remarkable. We believe we can still gain valuable insight regarding the age of very first use, though very little regarding the further course of acquisition. Ross is included because his is the only English corpus to extend past the age of seven.
4. For the American children, the age is the age at which transcripts started.
5. Empty fields indicate that there were no occurences in the transcripts.
6. Age of acquisition could not be determined due to low number of occurrences.
7. When concluding that a language does not have this particular construction or does not allow for it, we merely wish to say that the language does not allow a structure parallel to the English degree construction. We do not mean, however, that the language does not have some way of expressing a similar content. We will always provide one alternative structure as well.
8. B17 collected their data on Motu, Moore, and Guraní in New York City, Burkina Faso, and Paraguay, respectively. Unfortunately, we had no acccess to native speakers.
9. The morpheme *–me* is obligatory in (47) and (48). Its semantic contribution is for futher research to explore. If *–me* were an indicator of internal compositional complexity (for example a wh-element similar in effect to *how*), our conclusions about Mandarin and the DEGPP would be called into question be-

cause (51) could not be analysed as a simple PMP. If, on the other hand, *-me* is semantically relatively harmless (say, a classifier), the interpretation of the data is as presented in the text. Thanks to Lisa Cheng for discussion of this point.

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