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Do degree adverbs guide adjective learning crosslinguistically? A comparison of Dutch and Russian

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Abstract: A fundamental question in language acquisition research is how language-specific input interacts with (pre-linguistic) universal concepts. In order to shed more light on this issue, the present paper reports the results of two experiments, set up as a modified version of Syrett, Kristen & Jeffrey Lidz. 2010. 30-month-olds use the distribution and meaning of adverbs to interpret novel adjectives. *Language Learning and Development* 6(4). 258–282. Their study has revealed that English-speaking 30-month-olds use degree adverbs for interpreting novel adjectives; the participants were more likely to assign a relative meaning (e.g., tallness) to a novel adjective if the adjective was modified by the booster *very* and to select an absolute interpretation (e.g., straightness) if the adjective was preceded the maximizer *completely*. The distribution in Dutch, although typologically similar to English, is obscured by phonological, morphological and semantic factors, which makes the Dutch degree adverbs *heel* 'very' and *helemaal* 'completely' less reliable cues to a language learner. In Russian, the booster *očen'* 'very' is a reliable cue and the maximizer *sovsem* 'completely' is not, since it can be used with both absolute and negative-pole relative adjectives. The results demonstrate that children's performance is related to the reliability of cues in their input. Russian-speaking toddlers only relied on the booster *očen'*, but not on the maximizer *sovsem* for assigning novel adjectives to semantic classes, and their Dutch-speaking peers did not show evidence of using degree adverbs for adjective learning at all. No evidence of interfering universal predispositions was found.

Keywords: language acquisition, gradable adjectives, degree adverbs, language-specific input, cue reliability, conceptual development

1 Introduction

Children start comprehending words around the age of 8 months and producing their first words a few months later. In the second year of life children start

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combining words into short sentences. It is important to keep in mind that prior to this breakthrough to language children have not lived in a vacuum. For almost a year, they have interacted with the world in multiple ways and acquired some basic concepts, such as agency, containment, and causality. What role do these pre-linguistic concepts play in language acquisition? Over the years, there has been quite some debate on this issue.

Early crosslinguistic research in language acquisition revealed striking similarities between first word combinations produced by children acquiring typologically different languages. Irrespective of the target language, children's early utterances revolved around a number of recurrent salient concepts, such as action, agency, possession, existence, and location (Braine 1976; Brown 1973; Slobin 1973). According to the so-called *Cognition Hypothesis*, children acquire language by mapping their pre-linguistic (and thus universal) concepts to linguistic expressions in the input language (Slobin 1973). Much of this research dealt with the acquisition of spatial language.

Children have predispositions towards some ways of categorizing space. If infants acquiring different languages are given an instruction containing a spatial term, their act-outs reveal great similarities. For example, they would usually return the object to a canonical position and put things into a container, irrespective of the preposition used in the instruction (e.g., *on, in, under*) and irrespective of the language being acquired. Hence, their early behavioral response is determined by the general gestalt principles such as canonical orientation and containment rather than by the language-specific semantics of spatial prepositions (see Clark 2004 for a review). Children's initial reliance on pre-linguistic concepts is then used to explain early systematic errors and the order of acquisition. Where the outcome of a cognitive strategy coincides with the meaning of a word, acquisition of that word is expected to be relatively easy. In contrast, the mapping between a word and a conceptual spatial relation should be more demanding if there is only a partial match between the pre-linguistic concept and the word or no match at all (Clark 2004: 473). For example, 6-month-olds are sensitive to containment, but sensitivity for support emerges later. Accordingly, the preposition *in* is usually acquired easily and early, whereas *on* is acquired later (Gentner and Bowerman 2009).

The opposite view posits that linguistic categories are formed by exposure to the target language and are therefore language-specific from early on. This view has been supported, for example, by the findings demonstrating clear cross-linguistic differences in how children talk about domains such as space and motion well before age 2 (Bowerman 1996; 2000; Bowerman and Choi 2001; Choi and Bowerman 1991; Slobin 2001). For example, in event talk children learning satellite-framed languages reveal early preference for goals and children learning verb-framed languages tend to focus on actions (Slobin et al. 2011).

Toddlers not only learn to talk about the world in a language-specific way, they also learn to attend to the distinctions and aspects of the situation that are relevant in their language and ignore others. Slobin (2001) calls this *thinking-for-speaking*, in the sense that linguistic categories influence the way people process situations in the conceptualization phase. For instance, people speaking aspectual languages more commonly focus on motion events and ignore goals, whereas speakers of non-aspect languages more often attend to goals that need to be encoded in their language (Bylund et al. 2013).

More recently, researchers came to acknowledge that neither the concept-first nor the language-first view is correct. It would be over-simplification to say that children move from concepts to language or from language to concepts, since language acquisition is based on a complex interplay between a common cognitive basis and language-specific patterns of the input language. On the one hand, there is evidence that children's language production in the second year of life reflects language-specific patterns. On the other hand, we cannot ignore obvious similarities in the acquisition paths across languages.

Support for the view that universal conceptual mechanisms and language-specific input interact in child language development comes from Clark's work on emergent categories. Clark (2001) has demonstrated that children sometimes start with unconventional ways of expressing salient meanings, before they discover how these meanings should be expressed in the language they are acquiring. For example, the concept 'more than one' is so salient in the infants' world (Dehaene 1997) that children start looking for ways to express that meaning before they actually acquire the relevant grammatical markers of plurality. For instance, English-speaking children may use combinations of the numeral *two* with singular nouns (as in *two cow*) or reduplicate the noun (as in *cow-cow*) to express the notion "more than one" before they learn the English plural marking (Clark and Nikitina 2009). Since the acquisition of plurals is a gradual piecemeal process, conventional plural forms co-exist with non-conventional plural markers for some time.

Clark (2001) further noticed that children's errors are often motivated, in the sense that they reflect salient semantic distinctions, which are often valid semantic categories in other world languages, but not necessarily in their target language. For example, children acquiring English sometimes make a distinction between temporary properties (e.g., *crumbed* 'now covered in crumbs') and inherent properties (e.g., *crumby* 'producing many crumbs'), which is not relevant in English, but is perfectly motivated and manifest in other languages (e.g., the copulas *ser* and *estar* in Spanish, short and long adjective forms in Russian). Clark (2001) introduced the term *emergent categories* to refer to such categories "that happen not to be given conventional expression *in a particular language*,

even though they are accessible at the conceptual level" (Clark 2001: 381). Emergent categories, Clark maintains, provide "evidence for a set of general conceptual categories underlying language" (Clark 2001: 379) and "offer further evidence for a common cognitive basis to most or all languages" (p. 476). Emergent categories often appear in child language in the second year of life and are usually fleeting. However, some manifestations were even attested the speech of children as old as 5 years of age (Clark 2001).

There is also evidence that children do not completely discard their pre-linguistic conceptual representations once they have acquired the linguistic ones. Both representational systems remain accessible to them, even though the conceptual system that is not supported by language usually recedes into the background, just like sensitivity to non-native phonemes (Clark 2004). For example, an eye-tracking study by Huettig et al. (2010) has shown that the presence of numeral classifiers influenced the way Mandarin speakers processed a visual array. When the classifier was explicitly presented, they were likely to shift attention to an object from the same classifier category. However, in the absence of an explicit classifier, they did not attend more to the classifier match. Similarly, children may sort the same array in two different ways, depending on the presence of a word. For example, toddlers would sort a rabbit and cabbage (rather than a rabbit and a cat) together if no linguistic marker is provided, but would respect the taxonomic assumption for the use of words and group a rabbit and a cat together in the presence of a common label (Markman and Hutchinson 1984). Such findings suggest that both adults and children can entertain multiple representations, depending upon the nature of the task at hand. Salient conceptual distinctions that happened to be nonrelevant in the first language remain available and can be invoked later, for example, when a person's typologically different second language becomes dominant (Bylund and Athanasopoulos 2014).

It is important to notice that the semantic domains that have so far been investigated in research on the interaction of pre-linguistic concepts and language-specific meanings are largely the domains that are acquired very early (within the first 17 months). It is less clear whether pre-linguistic concepts also play a role in the acquisition of domains, whose acquisition starts later, beyond age 2. The present paper extends this line of research into the linguistic domain of adjectival scalarity. The focus of this paper is on combinations of adjectives and adverbs of degree (e.g., *very big*, *completely full*). Hence, we will only focus on gradable adjectives, i.e., words denoting properties that can be present in an object to a greater or lesser extent (Lyons 1977; Sapir 1944). Gradable adjectives are adjectives that can participate in comparative and superlative constructions (e.g., *bigger*, *the biggest*) and take degree modifiers (e.g., *very clean*, *extremely tired*). Non-

gradable adjectives such as *legal, private* and *vegetarian* will be excluded from consideration.

Longitudinal research on early adjective production has revealed that children start acquiring adjectives at high pace around the age of 20 months, and by age 3 adjective frequencies in child speech reach plateau (Tribushinina et al. 2015; Voeikova 2011). Overall, adjectives are infrequent in child speech and parental input (about 3% of word tokens are adjectives), and adjectives marked for degree (e.g., *taller, very all*) are even less frequent (Tribushinina 2015; Tribushinina and Gillis 2012). The proportion of degree-marked forms in child speech keeps growing until at least age 6 (Tribushinina and Gillis 2012). Hence, children start acquiring adjectival degree modification when they already have over two years of experience with their mother tongue. It is then plausible to assume that, even if children had some universal pre-linguistic expectations about scales, these expectations would not interfere with the acquisition of adjectival degree modification because children have been exposed to their language long enough to construct language-specific scales from the earliest stages of adjective learning. Alternatively, one may suggest that pre-linguistic concepts do play a role even after two years of exposure to the target language because such universal expectations, based on general cognitive principles and interaction with the world, remain available to the child (Clark 2004). This paper aims to shed light on this issue by comparing the learning of novel adjectives by children acquiring Russian and Dutch, languages that reveal intriguing typological differences in the realm of adjectival degree modification.

The present research was inspired by the experimental study reported in Syrett and Lidz (2010), and Syrett (2007). Before discussing the results of their experiments, it is necessary to introduce the semantic classification of adjectives that served as a basis of the experimental work by Syrett and Lidz (2010).

2 Degree adverbs as cues to scalar structure

One of the basic cognitive operations is individuation (Talmy 2000). An important aspect of individuation is *state of boundedness*. Something can be construed either as having clear boundaries (bounded) or as having no boundaries (unbounded). The notion of boundedness has been used in semantic analyses of nouns (e.g., count *vs*. mass nouns) and verbs (e.g., perfective *vs*. imperfective forms). Mass nouns and imperfective verbs construe entities and processes as lacking clear boundaries, whereas count nouns and perfective verb forms construe individual entities and bounded actions (Talmy 2000: 63–64)

The notion of boundedness is also relevant to adjectival semantics. To the best of my knowledge, Paradis (1997; 2000; 2001) was one of the first researchers who thoroughly studied boundedness as a fundamental characteristic of adjectival gradability. Following Bolinger (1967), Paradis distinguishes between two modes of construal relevant to gradable terms – one of totality (either-or conception) and one of scalarity (more-or-less conception). Both adjectives and adverbs have been shown to display this dichotomy. Gradable adjectives are divided into bounded (associated with a boundary, e.g., *clean, full, true*) and unbounded (not associated with a boundary, e.g., *wide, fast, interesting*) adjectives. Degree adverbs are also divided into two similar categories – totality and scalar modifiers. Totality modifiers include maximizers (e.g., *absolutely, completely, entirely, perfectly, totally, utterly*) and approximators (e.g., *almost, nearly*). Scalar modifiers include boosters (e.g., *awfully, extremely, frightfully, highly, jolly, very*), moderators (e.g., *fairly, pretty, quite, rather*) and diminishers (e.g., *a bit, a little, slightly, somewhat*).

Paradis (1997) argues that an adjective and its degree modifier have to fit each other in the mode of construal. So unbounded adjectives select modifiers indicating a subrange on a scale (e.g., *very tall, fairly tall*), whereas bounded adjectives require modifiers interpreted vis-á-vis an endpoint of the scale (*completely full, almost clean*). This claim has been supported by the data from several corpus studies (Paradis 1997; 2000; 2001; Paradis and Willners 2006; see Tribushinina 2008; for a review).

Like Paradis, Kennedy and McNally (2005) use the distribution of degree modifiers with gradable adjectives in their categorization of adjectives into relative and absolute terms. Relative adjectives such as *tall* evoke open scales and are therefore fully acceptable with boosters (e.g., *very tall, extremely fast*), but cannot be combined with proportional modifiers (e.g., *half* and *mostly*) and maximizers (e.g., *completely, fully*). By contrast, absolute adjectives such as *closed* and *full* are associated with closed scales. Closed scales are further divided into totally closed (e.g., *completely visible/invisible*), lower closed (e.g., *fully?bent/straight*), and upper closed scales (e.g., *absolutely pure/?impure*). For our present purposes, we are only interested in maximum-standard absolute adjectives (cf. Syrett and Lidz 2010). Such adjectives can only be used felicitously if a maximum degree of a property is attained. For instance, a thing can in principle only be called *clean* if it is maximally free from dirt (of course, actual language use also includes imprecisions and context-specific construals, see Syrett 2007; Tribushinina 2008). Minimum-standard adjectives, i.e., words that are used if an entity contains a non-zero degree of a property (e.g., *dirty, wet*), are beyond consideration in this study. For convenience, the term *absolute adjective* will be used in this paper with reference to maximum-standard

absolute adjectives. Further, for brevity, the term *relative property* will be used with reference to properties denoted by relative adjectives in the target language; and *absolute property* will refer to properties that are expressed by means of absolute adjectives.

In their pioneering work, Syrett and Lidz (2010) investigated whether English-speaking toddlers are sensitive to the semantic distinctions between relative and absolute adjectives and whether they can use the distribution of novel adjectives with degree adverbs as a cue to scalar structure. A preliminary corpus study revealed that English maximum-standard adjectives are more likely to be modified by maximizers than are relative adjectives and that boosters are more likely to modify relative adjectives. Two preferential-looking experiments reported in Syrett and Lidz (2010) addressed the question whether toddlers use this distributional information for assigning meanings to novel adjectives.

In Experiment 1, 30-month-olds first saw two objects (e.g., sticks) sharing a relative property (both long) and an absolute property (both straight), and heard the objects being described, for instance, as either *pelgy* (no-adverb condition), or *completely pelgy* (maximizer condition), or *very pelgy* (booster condition). During a contrast phase, they saw a stick that was short and curly; it was described as *not pelgy*. In the test phase, the two properties were teased apart: one stick was long and curly, the other was short and straight. The proportion of looks to the relative property (length) decreased if the children first heard the novel adjective modified by *completely*. By contrast, there was an increase in the proportion of looks to the relative property in the *very*-condition. In the no-adverb condition, the subjects did not have a preference for either of the properties. These results suggest that young children use the distribution of adverb-adjective combinations in the target language as a cue for the range of the possible adjectival meanings. Interestingly, neither a less frequent booster (*extremely*) nor a novel adverb (*pencitly*) had that effect (Experiment 2), which suggests that the different responses to *very* and *completely* were related to the semantics of these two adverbs.

3 Crosslinguistic diversity

Syrett and Lidz (2010) conclude that 30-month-olds are sensitive to the distribution of gradable adjectives with degree adverbs and use that knowledge in word learning. If this conclusion is correct, then the domain of adjectival degree modification presents an excellent test-lab for the crucial question about the

interaction of universal pre-linguistic concepts and language-specific distributions. As Syrett and Lidz (2010: 279) put it: "it is not clear from our results whether this expectation is innate or has simply developed by the time children begin tracking the distributional information that enables them to succeed at our task".

It seems unlikely that expectations about scalar structures are innate, since crosslinguistically there is no one-to-one mapping between semantic types of adjectives and scalar structures associated with them (Tribushinina 2009). Tribushinina (2011a) reports the results of a crosslinguistic corpus study comparing the distribution of relative adjectives with maximizers in English and Russian (written and spoken corpora). The results have revealed that in English both positive-pole relative adjectives (e.g., *big, long, wide, rich, expensive, fast*) and their negative-pole counterparts (e.g., *small, short, narrow, poor, cheap, slow*) are barely used with maximizers. In contrast, Russian negative-pole relative adjectives, unlike their positive-pole counterparts, are often combined with maximizers, having a particular combinatorial preference for the adverb *sovsem* 'completely'. So this maximizer frequently modifies both absolute adjectives as in (1) and negative-pole relative adjectives as in (2):

(1) *Smotri, ėto sovsem odinakovye mašinki, bliznecy.*
look this completely identical cars-DIM twins
''Look, these cars are completely identical, twins.'
(Gagarina corpus, input to Vanja, 2;5)

(2) *Vitja, nu sovsem blizko-to k vodičke ne nado.*
Vitja PCL completely near-PCL towards water-DIM not needed
'Vitja, you shouldn't come so extremely close to the water.'
(Gagarina corpus, input to Vitja, 2;9)

Interviews with speakers of Russian have demonstrated that it is not just a linguistic, but a conceptual difference (Tribushinina 2008). In the Russian world-view, things can be maximally small, short, cheap, etc. For example, a mountain that is 'completely low' is as low as a mountain can be. If it were even lower, it would no longer be a mountain, but a hill. And Vitja in (2) probably approached the water as close as was still allowed; if he approached it even further, it would become too dangerous.

This pattern has been well documented for Russian (Apresjan 1974; Filipenko 1998; Tribushinina 2008; 2009; 2011a; Vorotnikov 2000), but is also relevant in other Slavic languages (e.g., Bulgarian, Croatian, Slovene), as well as, for example, in Lithuanian, Hebrew and Greek. Some speakers also report

similar asymmetries in Spanish and French, though the distribution in these languages is less clear (Tribushinina 2008: 400). The English-like distribution can also be found, for instance, in Dutch (Hoeksema 2011a; Kamoen et al. 2011; Vanden Wyngaerd 2001), Swedish (Paradis and Willners 2006), Finnish, Turkish and Italian. There even is a third typological type, including Hungarian and Cantonese, where both members of the relative antonym pair seem acceptable with maximizers (Tribushinina 2009: 440). Hence, relative adjectives do not always map onto open scales; they can also be associated with lower-closed or totally closed scales. I am not aware of any languages where relative adjectives would evoke upper-closed scales.

In view of this crosslinguistic variability, children's performance with adverb-adjective combinations may serve as a window on the complex interaction of pre-linguistic concepts and language-specific input. In order to get more insight into this important issue, this paper compares the performance of toddlers acquiring Russian and Dutch – languages representing the two contrasting typological types described above – in a word-learning experiment, similar to Syrett and Lidz's (2010) Experiment 1.

4 Cognitive predispositions *vs.* language-specific meanings

4.1 Predictions from the typological prevalence hypothesis

Syrett (2007: 21) suggests that children use distributional cues in the input "to recruit pre-existing conceptual representations in the word learning process in order to assign the right interpretations to new adjectives they encounter". An important question arising in this connection is where that pre-existing knowledge comes from. Syrett and Lidz (2010: 279) assume that this prior knowledge is either "language-specific knowledge or knowledge about more general cognitive representations". A prime task of language acquisition research is to distinguish between these two possibilities. In Genter and Bowerman's words: "The most fundamental issue in the study of first language acquisition is to distinguish between two sources of structure and determine how they interact: the capacities and predispositions learners bring to the task themselves on the one hand, and the contribution of the language being learned on the other" (Genter and Bowerman 2009: 466). In order to pinpoint the contribution of these two sources of semantic knowledge, we need crosslinguistic studies on typologically different languages. This is exactly what the experiments reported in this paper will do.

According to the concept-first view reviewed in Section 1, toddlers should map adjectives onto pre-linguistic conceptual scales that they have constructed as part of their cognitive development and interaction with the world (cf. Bloom 1970; Braine 1976; Brown 1973; Slobin 1973; 1985). If the acquisition of scalarity is steered by such pre-linguistic expectations, it may be hypothesized that toddlers acquiring different languages will initially rely on more or less the same semantic scales and, therefore, make similar production errors and interpret novel gradable adjectives in a similar way in word-learning tasks. As against this, a proponent of the language-first view would assume that scalar concepts emerge through exposure to the target language (cf. Bowerman 1996; 2000; Bowerman and Choi 2001; Choi and Bowerman 1991; Slobin 2001). In this case, it can be hypothesized that conceptual scalar structures will be language-specific from early on, which would result in language-specific production and interpretation of gradable adjectives from the earliest stages of adjective acquisition.

As follows from the literature review in Section 1, the pure versions of the concept-first and language-first views are no longer maintained by researchers in the field. Nowadays most scholars of child language assume that the acquisition of linguistic meanings is a complex process involving interaction of salient pre-linguistic concepts and language-specific semantic categories attested in the input (e.g., Clark 2004; Gentner and Bowerman 2009; Slobin 2001).

This interaction of pre-linguistic concepts and input in the target language allows making predictions for the order of acquisition. Across cultures, children are predisposed to some particular ways of conceptualizing that are more salient and/or "cognitively more natural" (Gentner and Bowerman 2009: 467). Such preferred conceptual categories also tend to be more prevalent across languages, which Genter and Bowerman (2009) refer to as the Typological Prevalence Hypothesis. Language-specific meanings that map onto these preferred concepts are generally acquired relatively easily. For example, infants prefer to categorize all kinds of support together. Therefore, the English preposition *on* which coincides with this cognitively salient spatial concept is acquired faster than the corresponding Dutch preposition *op*, whose semantics is restricted to support-from-below (for other kinds of support Dutch uses prepositions *om* 'around/by/on' and *aan* 'against/by/on'). Interestingly, Dutch-speaking children make a lot of over-generalization errors that reflect the typologically prevalent (English-like) pattern.

Turning back to adjectival scalarity, Russian and Dutch present two clearly different typological types as far as relative adjectives are concerned. Which of the two conceptual systems (lower-closed or open) is acquired more readily with the help of language? It should be the scalar type that is cognitively more natural and more frequent crosslinguistically. The scalar type that is less cognitively transparent and less frequent in the world's languages should require

more experience with language to be learned. Given the scarceness of crosslinguistic semantic research on this issue, we cannot make predictions based on typological prevalence, since it is at this point not clear which of the two types is more frequent across languages. This said, we can try to speculate on the naturalness of each scalar type and on the sources of knowledge about scales pre-linguistic infants and children in the earliest stages of their linguistic development may acquire in the course of their cognitive development.

As explained in Section 2, state of boundedness is relevant not only in the adjectival domain, but also in the domains of nominal mass-count distinction and verbal aspect. In a similar vein, Syrett (2007) suggests that children can learn a great deal about scales through the structure of paths in event representations, since some events have endpoints and goals, and others not. Additionally, I would like to suggest that children may learn a great deal about boundedness by exploring objects and their properties.

Imagine a toddler filling a beaker with water. At a certain point the beaker will be filled to the brim. Similarly, by drinking the water from the beaker, the child will notice that the amount of water will gradually decrease until it completely disappears. In principle, the structure of absolute scales should be cognitively transparent to the child, because the absence of something (e.g., emptiness) and a maximum of a property (e.g., fullness) both seem salient enough. Hence, mapping absolute adjectives onto closed scales should be fairly unproblematic. This prediction is consistent with the Typological Prevalence Hypothesis, since no languages have so far been documented, where absolute adjectives would not combine with maximizers.

What about relative scales? Let us take the scale of tallness as an example. One of the ways a child may learn something about this scale is by piling up things, as in building Duplo towers. The child may, for instance, notice that tallness is different from fullness. If a beaker is full to the brim, you cannot add more water, as it will overflow. In contrast, you can in principle go on adding blocks to the tower. It may of course collapse, but in principle, there is no upper boundary to how tall a tower can be. Therefore, we can hypothesize that unboundedness of the upper pole is also relatively easy to grasp. Crosslinguistically, relative scales are more often upper-unbounded than not, which bolsters the idea that this way of conceptualizing is cognitively preferred. Language-specific input then works in tandem with the pre-existing expectations, as positive-pole relative adjectives are generally not combined with maximizers.

But what about the lower boundary? A short crosslinguistic survey in the previous section has revealed that this is the locus of the most intriguing crosslinguistic differences. Tribushinina (2009) argues that the asymmetry between positive- and negative-pole adjectives attested in Russian and other languages

may be conceptually motivated by the presence of a salient reference point (absolute zero) in the vicinity of the lower boundary. Let us get back to the toddler playing with a toy tower. The child may notice that removing blocks from the tower is not an endless process; at a certain point, she will remove the last block and the tower will disappear. The Russian phrase *sovsem nizkij* 'completely low/short' refers to the stage just preceding the disappearance of the tower (adjacent to the absolute zero). Since the zero point (disappearance/absence) is a salient concept, the stage close to it might be conceptualized in relation to the lower boundary. Based on such experiences, the child may conclude that the scale of tallness is lower-closed. Due to the lack of studies investigating infant' preferences for scale types, such predictions remain speculative. But let us assume, for the sake of argument, that the lower-closed scale, like the one in Russian, is cognitively more natural. In this case, we would expect that children will acquire scalar structures of Russian relative adjectives easily, with minimal support of language. In contrast, the acquisition of scalar meanings of English and Dutch relative adjectives should then have a more protracted time course and involve errors revealing the preference for half-closed scales. As far as the predictions for the word-learning experiment are concerned, children acquiring Dutch would perform in the ways that reveal interference of the cognitively preferred half-closed scales for relative adjectives. They do not necessarily have to match the performance of Russian-speaking children perfectly because pre-linguistic concepts interact with the language-specific input. Nevertheless, even Dutch- and English-speaking toddlers may show some preference for bounded interpretations of negative-pole relative adjectives.

The findings from Syrett and Lidz (2010) are not informative in this respect, because their set-up only included properties corresponding to positive-pole relative adjectives in English (e.g., wide, long, tall). Hence, in the experiments reported below both positive- and negative-pole items will be included.

4.2 Evidence from production studies: language-specific patterns

Production studies can also be informative about the possible interactions of cognitive predispositions and language-specific meanings in the input language. If half-bounded relative scales are cognitively preferred, children may search for ways to express that concept, for example, by combining negative-pole relative adjectives with maximizers. If this construal does not match the pattern in the target language (as is the case with English and Dutch), then the half-closed relative scale could be seen as an emergent category (Clark 2001). In languages with a half-closed scale structure, such as Russian, these categories are robust. If

this view is on the right track, we can make two predictions about production of adjectives and degree adverbs. First, children acquiring Russian will have an advantage in acquiring the scalar structure of relative adjectives and may be expected to arrive at the target-like forms of degree marking earlier. Second, Dutch-speaking children may sometimes make errors revealing their alleged preference for half-closed scales. More specifically, they may combine negative-pole relative adjectives with maximizers (as in 'completely small') at early stages of adjective acquisition, at higher rates than adults in their language do.

Several production studies have targeted this issue. Tribushinina (2011b) studied the distribution of gradable adjectives and degree adverbs in the longitudinal transcripts of spontaneous interactions between parents and children acquiring Netherlandic Dutch (age range: 1;5–5;6). The results have demonstrated that children use adverb-adjective combinations by and large appropriately. The mean error rate was 5% for *heel* 'very' and 8% for *helemaal* 'completely'. Importantly, there was no evidence of ontological errors, i.e., Dutch-speaking children did not make Russian-like errors such as 'completely small' and 'completely low'. The most common error type were infelicitous combinations of *heel* with maximum-standard adjectives (e.g., *De deur is heel open* 'The door is very open') and with non-gradable adjectives (e.g., *een heel apart hok* 'very separate cage') (Tribushinina 2011b: 88–89). The combinations of the adjectives *open* and *apart* with the booster *heel* are only possible when these adjectives are metaphorically used with reference to open people and weird people, respectively. Therefore, the child may have heard these combinations in the input, but has not yet learned that the adjectives *open* and *apart* are not felicitous with *heel* when used in the literal sense.

However, it is also possible that children confuse the booster *heel* 'very' with the maximizer *helemaal* 'completely', which would have been perfectly acceptable in such cases. These two degree adverbs have a significant phonological overlap, which is particularly conspicuous when the booster is used in its inflected form *hele* (as in *hele hoge toren* 'very tall tower'). Furthermore, the two adverbs are also etymologically and morphologically related. Hoeksema (2011a) also notices that children acquiring Netherlandic Dutch may confuse *heel/hele* 'very' and *helemaal* 'completely' due to phonological similarity and morphological relatedness.

Another factor that may contribute to the confusion of *heel* en *helemaal* is that the maximizer *helemaal* 'completely' in present-day Netherlandic Dutch is undergoing a semantic change from a maximizer meaning 'completely' to a booster meaning 'extremely' (Hoeksema 2011b; Tribushinina and Janssen 2011). In the past, similar development was observed for various maximizers in several different languages (Lorenz 2002; Mendez-Naya 2003; Nevalainen and Rissanen

2002; Peters 1994). For example, the former German maximizer *ganz* 'entirely' no longer denotes a maximum of a property and is nowadays only used to express a high degree. Likewise, the Dutch adverb *heel* 'very' is derived from the adjective *heel* 'whole' and used to have a maximizer meaning of 'fully/wholly'. Similarly, the English adverb *totally* is now also used as an extreme booster (Tribushinina 2008: 256). In this connection, a relevant difference between English and Dutch is that in English *completely* can be used as a maximizer, whereas in Dutch *helemaal* is the most commonly used maximizing adverb, all other maximizers are recruited in more formal registers. Analyses of child-directed speech reveal that *helemaal* is virtually the only maximizer Dutch-speaking parents use talking to their children (Hoeksema 2011a; Tribushinina 2011b).

Since this semantic change is still ongoing in Netherlandic Dutch, *helemaal* is currently a kind of chameleon, fulfilling both functions – the old maximizer function in combination with closed-scale adjectives and the new booster function in combination with open-scale adjectives. This semantic change started in the realm of evaluative adjectives and is now slowly shifting to the domain of more objective dimensional adjectives (Tribushinina and Janssen 2011). Example (3) from the Groningen corpus (Bol 1995) in the CHILDES database (MacWhinney 2000) illustrates the old function and Example (4) the new one.

(3) *Nee, het zit nog helemaal vol.*
no it sits still completely full
'No, it is still completely full.'
(Groningen corpus, input to Tomas, 2;6)

(4) *Ben je helemaal mooi?*
are you completely beautiful
'Are you extremely beautiful?'
(Groningen corpus, input to Matthijs, 2;6)

This semantic change has so far only affected Netherlandic Dutch, but not Belgian Dutch, where *helemaal* is still used only as a maximizer (Tribushinina and Janssen 2011). Interestingly, children acquiring Belgian Dutch appear to have less trouble distinguishing between the booster *heel* and the maximizer *helemaal*, as evidenced by the results of the cross-sectional corpus study reported in Tribushinina and Gillis (2012). However, just like the Dutch participants in Tribushinina (2011b), the Belgian participants (age range: 1;11–7;2) in Tribushinina and Gillis (2012) did not make the ontological errors such as 'completely small'; they appropriately combined boosters predominantly with open-scale adjectives and maximizers with closed-scale adjectives. These results

are more compatible with the view that scalar types are acquired through exposure to the target language.

Similar conclusions have been made by Tribushinina (2015), a study comparing production of degree markers by Dutch- and Russian-speaking children (age range 1;8–7;0). Converging evidence from a longitudinal analysis of spontaneous parent-child interactions and a cross-sectional production experiment have revealed two important things. Firstly, the use of degree adverbs was language-specific across all age groups in both languages; Dutch children did not make Russian-like errors such as 'completely small' and 'completely cheap'. Secondly, Russian-speaking children did not have a rate advantage, which we could expect if their language input matched the pre-linguistic expectations. In fact, Russian children lagged behind their Dutch-speaking peers in the acquisition of degree markers.

In sum, the production studies thus far have not found any evidence of pre-existing (universal) scalar concepts interfering with language-specific meanings in the acquisition of adjectival degree modification. However, based on production data alone we cannot be confident about how children interpret adjectives. It might be the case that they merely repeat adverb-adjective combinations they have stored in the ready-made form from the input language. In order to get a more complete picture, we need to compare the performance of Dutch- and Russian-speaking children in a word-learning experiment to establish whether their interpretation of novel adjectives might be influenced by some pre-existing conceptual expectations.

4.3 Hypotheses

In Section 4.1,we have formulated several hypotheses based on the predictions of the Typological Prevalence Hypothesis (Gentner and Bowerman 2009). To reiterate:

Hypothesis I: Universal expectations interfere with language-specific meanings

a. Russian-speaking children will have an advantage in the acquisition of adjectival scales, because the language-specific meanings in their input are aligned with experiential commonalities.
b. Dutch-speaking children will lag behind their Russian-speaking peers in the acquisition of adjectival scalarity, because the linguistically relevant scale type in their input does not match the pre-existing expectation.

c. Dutch-speaking children will initially make ontological errors such as 'completely small' (emergent category) and may associate negative-pole relative adjectives with bounded scales in word-learning experiments.

As explained in Section 4.2, none of these predictions has been supported by the data from production studies. The production studies reviewed above indicate that children rely on language-specific patterns from the earliest ages of adjective use. In view of these findings, it seems likely that scales are different from the fundamental conceptual domains such as space and plurality. As explained in Section 1, infants develop basic spatial concepts and the concept of "more-than-one" in the first year of life. Spatial prepositions and plural markers emerge in child speech in the second year of life, and their acquisition is influenced by the pre-linguistic cognitive expectations (see above). The domain of adjectival scalarity may be different in this respect, because scales are conceptually less salient than spatial relations and number, but also because adjectives are acquired at high pace only after age 2, which is relatively late to disentangle the relevant conceptual and linguistic influences, as the two are probably intertwined. In the light of the production data discussed above, it is plausible to assume that children's performance in a word-learning experiment, similar to the one reported in Syrett and Lidz (2010), will be contingent on the patterns in the input rather than on some general cognitive expectations.

So in order to formulate hypotheses for the experiments reported in this paper, we need to know the distributions of adjectives and degree adverbs in child-directed speech (analyses of the adult corpora discussed above appear less suitable because child-directed speech often differs from adult-directed speech in important ways). Table 1 summarizes the percentages of cases where the Russian and the Dutch counterparts of *very* and *completely* are used to modify relative and absolute adjectives in child-directed speech. These data come from the corpus studies published in Tribushinina (2015) for Russian and Tribushinina and Gillis (2012) for Dutch.

It should be noticed that the Dutch data in Tribushinina and Gillis (2012) represent Belgian rather than Netherlandic Dutch. As explained above, the

Table 1: Percentage of uses of 'very' and ' completely' in combination with relative and absolute adjectives in Dutch and Russian.

	Relative adjectives		Absolute adjectives	
	Russian	Dutch	Russian	Dutch
'very'	98	79	2	21
'completely'	49	0	51	100

distribution of *helemaal* 'completely' in Netherlandic Dutch is less transparent than the one presented in Table 1 (no analyses of degree adverbs in Netherlandic input are available so far). According to a corpus study of adult-directed speech, *helemaal* is used with maximum-standard adjectives in 57% of cases and with relative adjectives in 13% of cases, 25% of which are new, booster-like uses (Tribushinina and Janssen 2011).

If the interpretation of novel gradable adjectives is guided predominantly or exclusively by the distributions in the input, rather than by salient pre-existing concepts, we could make a number of predictions based on the relative frequencies presented in Table 1. The basic assumption is that the distributions in the input can be taken as indicators of cue reliability (MacWhinney 2001). If a degree adverb is used predominantly with one semantic class of adjectives, that adverb is a reliable cue for a young language learner and is likely to steer the interpretation towards that adjective class. In contrast, if a degree adverb is used with both adjective types (more or less equally often), its reliability appears quite low.

Hypothesis II: Adjective interpretation is language-specific from early on

a. The Russian booster *očen'* 'very' will direct toddlers' attention towards relative adjectives, since it is unambiguously associated with relative adjectives in the input to Russian children;
b. The Dutch booster *heel* 'very' is a less reliable cue of relative scale structure than its Russian counterpart, but may still steer the interpretation towards relative adjectives.
c. The Russian maximizer *sovsem* 'completely' is uninformative about scalar structures, as it is used equally often with (negative-pole) relative and absolute adjectives; the ambiguity should be particularly problematic in cases where a child has to choose between an absolute interpretation and a negative-pole relative interpretation.
d. Based on the frequencies in Table 1, we could hypothesize that the Dutch maximizer *helemaal* 'completely' would be taken as an unambiguous cue of absolute adjectives. However, taking into account that the Dutch-speaking participants of this study are raised in the Netherlands (and not in Belgium) and in view of the semantic change from a maximizer to a booster, it can be hypothesized that *helemaal* is no longer a reliable cue for children acquiring Netherlandic Dutch.

These predictions will be tested in the experiments reported below. Section 5 presents the results of the experiment with Russian toddlers. Section 6 reports on the experiment in Dutch. Finally, a general discussion follows in Section 7.

5 Experiment 1: Russian

5.1 Method

5.1.1 Participants

Forty-eight children (23 male and 25 female) participated in the experiment (mean age: 3;3; age range: 2;2–3;11). The subjects were recruited through two daycares in Kemerovo. All children were monolingual speakers of Russian and came primarily from middle-class families. An additional eight children were excluded because they did not finish the task.

5.1.2 Materials

Although many successful studies of novel adjective learning have used picture stimuli (Booth and Waxman 2009; Syrett and Lidz 2010; Waxman and Guasti 2009; Waxman et al. 1997), it was decided to use real objects rather than pictures as experimental materials in the present study (cf. Booth and Waxman 2003; Klibanoff and Waxman 2000; Mintz 2005; Mintz and Gleitman 2002; Waxman and Booth 2001; Waxman and Klibanoff 2000; Yoshida and Hanania 2013). There were two main reasons for choosing real objects. First, there is ample evidence that young children do not understand the relation between real-world objects and their pictorial representations the way adults do (DeLoache et al. 1998; 2003). For example, an ERP study reported in Carver et al. (2006) has shown that 18-month-olds are able to distinguish between familiar and unfamiliar entities very quickly when presented with real objects, but are much less efficient when presented with two-dimensional representations of objects. Toddlers are also insensitive to picture orientation: they tend to reorient upside-down objects (i.e., return them to a canonical position), but rarely bother about upside-down orientation of picture books (DeLoache et al. 2003). With time, children slowly and gradually learn to grasp the symbolic nature of representations. Although 18-month-olds do have some understanding of the dual nature of pictures (i.e., artefacts and at the same time representations of other objects) (DeLoache et al. 1998), the development of pictorial competence takes several years (DeLoache et

al. 2003). In view of these findings, it appears that the use of objects rather than pictures could make the task easier for the participants.

The second reason for using real objects rather than pictures was to give the children an opportunity to explore and manipulate the objects. It is well established that young children acquire information about object properties through action (Piaget 1952). Actions on objects have been shown to be an important source of information in infants' object representation, since actions are more salient to infants than object appearance (Perone et al. 2008). Manual object exploration is crucial for learning about observable properties such as shape, configuration and texture (Iverson 2010; Needham 2000; Ruff 1982).

The materials included 60 objects ranging in size from 3 cm to 15 cm. These objects formed 12 sets of 5 objects each. Two of the objects within each set were used for familiarization, one for contrast, and two for the test phase. The objects were identical on all dimensions except the two target dimensions, one denoted by a relative term and one by an absolute adjective; an example is provided in Figure 1.

Figure 1: Example stimuli (trial 5, see Table 2).

Since the number of participants is limited and there is a lot of variability between children, a within-subjects design was chosen to make sure that the differences between the conditions could not be related to the differences between the groups of children. Each child received 12 trials, 4 with the booster *očen'* 'very', 4 with the maximizer *sovsem* 'completely' and 4 without a degree adverb. In order to use all 12 sets in all three conditions, three lists were created, so that each child heard each novel adjective and saw each set only once. The children were randomly assigned to one of the three lists. The total number of participants per list was 16. The order of items was pseudorandomized, but was kept constant across all subjects.

For each trial, a novel adjective was used. The target words were designed in conformity with the Russian phonotactic rules (Crosswhite et al. 2003) and were counter-balanced (across lists) with respect to the number of syllables, type of ending and gender. An overview of the stimuli is given in Table 2.

Table 2: Novel adjectives and experimental materials used in Experiments 1 and 2 (the first property in each list corresponds to a relative adjective, the second to an absolute one).

			Experimental objects (5 per set)		
Trial	**Russian adjective (Exp.1)**	**Dutch adjective (Exp. 2)**	**Familiarization (2)**	**Contrast (1)**	**Test (2)**
1	*tokadkij*	*zwuur*	Red wires: both long and non-glittering	Red wire: short and glittering	Red wires: one long and glittering, one short and non-glittering
2	*kisilovyj*	*pelgie*	Red soft balls: both small and smooth	Red soft ball: big and fleecy	Red soft balls: one small and fleecy, one big and smooth
3	*jartovyj*	*vipsend*	White hard balls: both big and intact	White hard ball: small and damaged	White hard balls: one big and damaged, one small and intact
4	*kreloj*	*wuggend*	Green fish-nets: both narrow and starless	Green fish-net: broad and starred (decorated with stars)	Green fish-nets: one narrow and starred, one broad and starless
5	*trjusovyj*	*tung*	Wooden train rails: both short and straight	Wooden train rail: long and curved	Wooden train rails: one short and curved, one long and straight
6	*brudnyj*	*parf*	Pieces of cardboard: both wide and non-striped	Piece of cardboard: narrow and striped	Pieces of cardboard: one wide and striped, one narrow and non-striped
7	*ozrjučij*	*spirk*	White beakers: both tall and plain	White beaker: short and decorated	White beakers: one tall and decorated, one short and plain
8	*žalotkij*	*gloef*	Sheets of paper: both thin and clean	Sheet of paper: thick and dirty	Sheets of paper: one thin and dirty, one thick and clean
9	*brjakij*	*feufer*	Red ladles: both shallow and non-spotted	Red ladle: deep and spotted	Red ladles: one shallow and spotted, one deep and non-spotted
10	*nozoj*	*plitter*	Transparent containers: both deep and closed	Transparent container: shallow and open	Transparent containers: one deep and open, one shallow and closed
11	*pizarovyj*	*nuiper*	CD-boxes: both thick and transparent	CD-box: thin and opaque	CD-boxes: one thick and opaque, one thin and transparent
12	*lagučij*	*bloor*	Glasses: both short and empty	Glass: tall and full (with water)	Glasses: one short and full, one tall and empty

5.1.3 Procedure

All children were tested individually in a quiet room at their daycare. The experimenter first introduced the children to a hand puppet named Elf. The puppet was said to come from the moon and speak the moon language. After that, the child was invited to play a game with Elf and his toys. The child was sitting at a small table and the experimenter with the puppet was sitting in front of the child. Each trial consisted of three phases: familiarization, contrast, and test (Syrett and Lidz 2010; cf. Booth and Waxman 2003; Waxman and Booth 2001; 2009).

During the *familiarization phase*, the experimenter put two objects (e.g., CD-boxes, both thick and transparent) on the table. The puppet described the objects in one of the following ways depending on the condition:

1. *Smotri, oni obe* sovsem *pizarovye*. *Ėta* sovsem *pizarovaja i ėta* sovsem *pizarovaja* 'Look, they are both completely *pizarovye*. This one is completely *pizarovaja* and this one is completely *pizarovaja*' (maximizer condition)
2. *Smotri, oni obe* očen' *pizarovye*. *Ėta* očen' *pizarovaja i ėta* očen' *pizarovaja* 'Look, they are both very *pizarovye*. This one is very *pizarovaja* and this one is very *pizarovaja*' (booster condition)
3. *Smotri, oni obe pizarovye*. *Ėta pizarovaja i ėta pizarovaja* 'Look, they are both *pizarovye*. This one is *pizarovaja* and this one is *pizarovaja*' (no-adverb condition).

The child was free to touch and manipulate the objects, but was not explicitly asked to.

During the *contrast phase*, a third object was put on the table. This object was identical to the familiarization objects on all dimensions except one relative property (i.e., property expressed by a relative adjective) and one absolute property (i.e., property expressed by an absolute adjective). The first two objects were kept on the table until the end of the contrast phase (see Klibanoff and Waxman 2000; Waxman and Klibanoff 2000; for a similar procedure); this was done because (visual) contrast facilitates adjective learning (Au and Laframboise 1990; Au and Markman 1987; Klibanoff and Waxman 2000; Tribushinina et al. 2013). To continue the example, a thin opaque CD-box was used as a contrastive object. The puppet said in a disappointed voice *Oj, a ėta ne pizarovaja!* 'Oops, and this one is not *pizarovaja*!' After that the puppet pointed again to the familiarization objects and said *Ėta sovsem/očen'/Ø pizarovaja i ėta sovsem/očen'/Ø pizarovaja 'This one is completely/very/Ø pizarovaja and this one is completely/very/Ø pizarovaja'*. At the end of the contrast phase, all three objects were removed from the table.

During the *test phase*, two different objects were put on the table. They were identical to the objects in the previous phases on all dimensions except the two

target dimensions. In this case, two possible denotations of the novel adjective, the relative and the absolute one, were teased apart; one object contained only the relative property from the familiarization phase (a CD-box that is thick, but opaque) and the other object contained only the absolute property from the familiarization phase (a CD-box that is transparent, but thin). The puppet said, *Smotri, oni raznye! Daj mne, požalujsta, pizarovuju* 'Look, they are different! Please give me the one that is *pizarovaja*'. If the child misunderstood the question or refrained from fulfilling the task, the question was repeated again. The trial ended when the child gave the puppet one of the objects.

It took the children about 15 minutes to complete the task. The puppet thanked the participants for playing together. The choices made by the child were noted by the experimenter on a response sheet.

5.2 Results

Figure 2 displays the mean number of relative choices (i.e., number of times a child chose a property that is expressed by a relative adjective in Russian) on each condition.

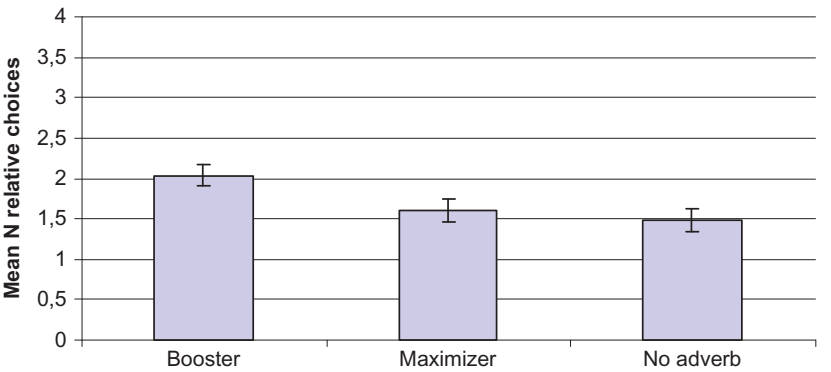

Figure 2: Mean number of relative choices by condition (Experiment 1, Russian).

The no-adverb condition is taken as a baseline, since in this condition there was no degree modifier steering the interpretation. Overall, children had a preference for an absolute interpretation, $t(47) = 2.96$, $p = 0.005$ (two-tailed). A Repeated Measures Analysis of Variance with degree adverb as a within-subjects factor revealed a significant main effect of adverb, $F(2,47) = 4.94$, $p = 0.009$. Posthoc Bonferroni comparisons show that the number of relative choices in the

maximizer condition was not significantly different from the no-adverb condition ($p = 1.0$). In the booster condition the subjects chose a relative property significantly more often than in the no-adverb condition ($p = 0.008$). No differences were found between positive- and negative-pole adjectives modified by boosters ($p = 0.78$) and maximizers ($p = 0.67$).

5.3 Discussion

Based on the patterns of degree modification in Russian it was hypothesized that only boosters would be steering adjective interpretation towards relative properties, since Russian boosters are strongly associated with open-scale adjectives in general and relative adjectives in particular. Maximizers in Russian are less informative because they are frequently used not only with absolute, but also with (negative-pole) relative adjectives. In line with these predictions, children in this experiment were more likely to assign a relative interpretation to a novel adjective when it was modified by the booster *očen'* 'very'. The maximizer *sovsem* 'completely' was not informative; the proportion of relative interpretations was in this case the same as in the baseline (no-adverb) condition. In other words, the presence of the maximizer did not add anything to the effect of a bare adjective.

An alternative explanation could be that the participants did not yet know the meaning of *sovsem* 'completely' and therefore only used semantic information in the booster *očen'* 'very' that is more frequent and acquired earlier. Syrett and Lidz (2010, Experiment 2), for example, showed that only familiar, high-frequency adverbs have a facilitating effect on adjective learning. This alternative explanation does not seem likely because *sovsem* is the most commonly used Russian maximizer, which emerges in child speech in the third year of life. It is, however, true that *sovsem* is much less frequent than *očen'*. For instance, there are 235 tokens of *očen'* in the parental input included in the Gagarina corpus (Gagarina 2008) and only 65 instances of *sovsem* (ratio *očen' : sovsem* = 0.28). The occurrence of *sovsem* in the Russian input is 0.20 per 1000 words. Notice, however, that the relative frequency of the Russian *sovsem* in child-directed speech is much higher than that of its English counterpart *completely*. For example, in the Brown corpus (comparable in sample size to the Gagarina corpus) there are 580 instances of *very* in parental input to Adam, Sarah and Eve, but there is only one instance of *completely* (ratio *very : completely* = 0.002). The relative frequency of *completely* in the English input is 0.003 per 1000 words. A very similar pattern emerges from the Manchester corpus in the CHILDES database. Hence, if the English maximizer *completely*

with its extremely low frequencies in parental input is already sufficient for assigning an absolute interpretation to novel adjectives (Syrett and Lidz 2010, Experiment 1), then *sovsem* should work as well. The fact that Russian toddlers do not seem to rely on the maximizer *sovsem* for learning novel adjectives is more likely to be attributed to the ambiguity of *sovsem* as a marker of both absolute and relative adjectives.

6 Experiment 2: Dutch

6.1 Method

6.1.1 Participants

Forty-eight children (25 male and 23 female) participated in the experiment (mean age: 3;1; age range: 2;0–3;11). The subjects were recruited through three daycares in the Amsterdam and Utrecht areas. All children were monolingual speakers of Netherlandic Dutch and belonged to a broader middle-class. An additional two children were excluded due to failure to finish the task.

6.1.2 Materials and procedure

The materials and procedure were identical to those in Experiment 1 (see Table 2 for further details) except that the experiment was run entirely in Dutch by a native speaker of Netherlandic Dutch. Target adjectives were taken from the list of novel adjectives developed in Koelen and Visser (2010). An equal number of mono- and disyllabic adjectives was used across the three lists.

The formulations used during the familiarization phase were modeled as follows (only target adjectives varied across trials): *Kijk, deze zijn allebei helemaal/heel/Ø zwuur! Deze is helemaal/heel/Ø zwuur en deze is helemaal/heel/Ø zwuur* 'Look, these are both completely/very/*Ø zwuur!* This one is completely/very/*Ø zwuur* and this one is completely/very/*Ø zwuur*'. During the contrast phase the puppet said *Oh nee, deze is niet zwuur! Deze is helemaal/heel/Ø zwuur en deze is helemaal/heel/Ø zwuur* 'Oh no, this one is not *zwuur*! This one is completely/very/*Ø zwuur* and this one is completely/very/*Ø zwuur*'. Finally, during the test phase the child was invited to make a choice using the following instruction: *Kijk! Deze zijn anders. Kan je mij degene geven die zwuur is?* 'Look! These are different. Can you give me the one that is *zwuur*?'.

6.2 Results

As in Experiment 1, the dependent variable was the number of relative choices (i.e., choices of the properties denoted by relative adjectives). The mean number of relative choices is presented by condition in Figure 3. The Dutch-speaking children, just as their Russian-speaking peers in Experiment 1, had a preference for an absolute interpretation, $t(47) = 3.1$, $p = 0.003$ (two-tailed). A Repeated Measures Analysis of Variance with degree adverb as a within-subjects factor revealed no significant effect of adverb, $p = 0.58$. No differences were found between positive- and negative-pole adjectives modified by boosters ($p = 0.18$). In the maximizer condition, children were more likely to choose a relative interpretation when the adjective mapped onto a bigger (positive) pole ($M = 1.04$, $SD = 0.74$) than when the adjective mapped onto a smaller (negative) pole ($M = 0.71$, $SD = 0.74$), $t(47) = 2.3$, $p = 0.028$ (two-tailed).

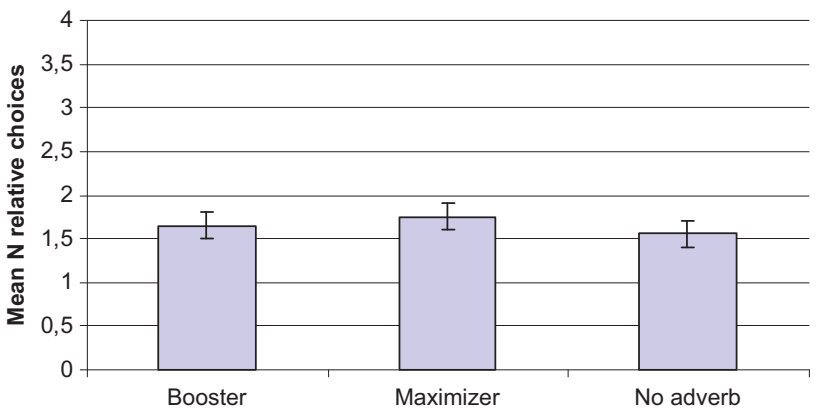

Figure 3: Mean number of relative choices by condition (Experiment 2, Dutch).

6.3 Discussion

As predicted, the Dutch children did not use the semantic information in the degree adverbs for assigning novel gradable adjectives to semantic classes. Neither the booster *heel* nor the maximizer *helemaal* was used as a cue to scalar structures. The responses in the booster and maximizer condition were not different from the choices in the no-adverb condition.

It is also noteworthy that children were more likely to choose a relative interpretation in the maximizer condition when *helemaal* was combined with a positive-pole adjective than when it modified a negative-pole adjective. This

pattern shows that children are more prone to use language-specific cues for constructing scales rather than pre-linguistic ontologically based distinctions. Ontologically, it would be more plausible to combine a maximizer with a negative-pole relative adjective, since there is generally no upper boundary to relative properties, but there is a lower boundary. However, this is not the way Dutch conceptualizes reality. *Helemaal* 'completely' is sometimes combined with open-scale adjectives, which in the majority of cases happens for purposes of emotional coloring and exaggerating. Therefore, *helemaal* as a booster has a preference for upper-pole terms (Tribushinina and Janssen 2011). Thus, the performance of Dutch-speaking toddlers in the maximizer-condition might be a manifestation of an emerging sensitivity to the distributional properties of *helemaal*. Alternatively, it is possible that children assume that *helemaal* denotes a higher degree than *heel* and, therefore, associate the former adverb primarily with positive-pole terms (for similar evidence see Tribushinina 2014).

7 Conclusion and discussion

Children bring a range of cognitive predispositions to the task of learning new words. Some concepts are so salient and important that they are available to pre-linguistic infants in the first year of life. Research on first language acquisition has shown that such pre-existing (universal) concepts may interact with language-specific meanings in the target language and influence the rate and order of acquisition. Such studies usually look at phenomena like space and plurality that are acquired relatively early. This paper pursued the question whether traces of such interaction between language and pre-linguistic cognition can also be attested in a linguistic domain that is acquired later, beyond age 2.

The focus of this research was on the domain of adjectival scalarity. Different kinds of gradable adjectives are associated with different kinds of scales, and there are typological differences between languages in this domain. In languages such as English and Dutch, relative adjectives are associated with open scales, whereas absolute adjectives evoke closed or half-closed scales. Experimental work by Syrett and Lidz (2010) has shown that 30-month-old infants recruit distribution of gradable adjectives with degree adverbs for assigning novel adjectives to semantic classes. The booster *very* directs attention towards properties expressed by means of relative adjectives in English, and the maximizer *completely* pulls attention away from such properties. This looking behavior is compatible with the distribution in English, where boosters are more likely to modify relative adjectives and maximizers are more likely to be combined with absolute adjectives.

The research reported in this paper set out to disentangle the (possible) effects of language-specific input, on the one hand, and language-independent cognitive predispositions, on the other hand. In order to do so, a modified version of the word-learning experiment from Syrett and Lidz (2010) has been conducted with toddlers learning Russian and Dutch. This comparison is interesting because Dutch, like English, associates relative adjectives with open scales, whereas Russian relative adjectives trigger lower-closed scales. Two hypotheses, each comprising specific predictions about the performance of Dutch- and Russian-speaking children in the word-learning experiment, were formulated. Based on the Typological Prevalence Hypothesis (Gentner and Bowerman 2009), it was expected that Dutch-speaking children will have more trouble acquiring scalar structures due to a mismatch between linguistic meanings and (possibly) cognitively more natural concepts. In this case, the performance of Dutch-speaking children in the word-learning task might be similar to that of their peers acquiring Russian. Since there is little support for this scenario in the recent production studies (Hoeksema 2011a; Tribushinina 2011b; 2015; Tribushinina and Gillis 2012), the second hypothesis was taken as a working hypothesis in this study. More specifically, it was predicted that children's responses in the word-learning task would reflect the distributions in their target language, without any traces of interference from pre-linguistic concepts.

The second hypothesis has been corroborated by the current results. Both groups had a preference for the absolute property (see below). However, the Russian booster *očen'* 'very' increased the chance of assigning the adjective into the relative category. In contrast, the Russian maximizer *sovsem* 'completely' was not informative about scalar structures. This performance is consistent with the distributions attested in Russian child-directed speech. The booster *očen'* is strongly associated with relative adjectives, whereas the maximizer *sovsem* combines with relative and absolute adjectives equally often.

The distribution in Dutch is even more of a challenge to a language learner. The Dutch booster *heel/hele* 'very' and the maximizer *helemaal* 'completely' are etymologically and morphologically related. Furthermore, there is a considerable overlap between the semantic ranges of the two adverbs as a consequence of an ongoing semantic change of *helemaal* from a maximizer to a booster. It was, therefore, hypothesized that Dutch-speaking toddlers would not be able to assign relative *vs*. absolute interpretations to novel adjectives based on degree modifiers at the age that their peers acquiring English and Russian can do that, albeit to a different extent. The results of Experiment 2 supported this prediction. The performance of Dutch-speaking children in the booster and in the maximizer condition was not different from the no-adverb condition. Nevertheless, it is not

the case that Dutch toddlers did not use semantic information in the degree adverbs at all. They were less likely to assign a relative interpretation to a novel adjective modified by *helemaal* when the adjective possibly mapped onto a negative-pole property (e.g., narrow, short, shallow) than when it possibly mapped onto a positive-pole property (e.g., wide, long, deep). This might be related to the distributions in present-day (Netherlandic) Dutch, where *helemaal* 'completely' tends to combine with open-scale adjectives with the purpose of emphatic evaluation (often exaggeration), which is associated with more of a property, i.e., with positive-pole terms.

It is plausible that Dutch-speaking children will start using information in the degree adverbs to a greater extent at a later age. Despite the blurred distinctions between *heel* and *helemaal* the former adverb is still primarily associated with open-scale adjectives in child-directed speech (Tribushinina and Gillis 2012) and the latter stills retains its preference for a maximum-related interpretation (Tribushinina and Janssen 2011), see Table 1. However, in view of the semantic shift and the phonological/morphological overlap, the task of figuring out these distinctions in Dutch is more complex and presumably requires more time than in English and Russian. Future experiments may investigate the capacity of somewhat older Dutch children to use the semantic information in the degree adverbs. To tease the two complicating factors (formal overlap and semantic shifts) apart, it might be rewarding to compare the performance of children learning Netherlandic Dutch with their peers acquiring Belgian Dutch, since the semantic shift from a maximizer to a booster has so far only affected *helemaal* in Netherlandic Dutch.

Taken together, the findings from the experiments reported in this paper have revealed a prominent role of language-specific factors in adjective learning by young children. These results are in line with earlier findings from production studies (Hoeksema 2011a; Tribushinina 2011b; 2015; Tribushinina and Gillis 2012). These results are also consistent with the idea of typological bootstrapping (Slobin 2001), whereby children attend to how meanings are encoded in their target language and later draw on this knowledge for making predictions about what novel forms can mean (cf. Bowerman 1996; 2000; Bowerman and Choi 2001; Choi and Bowerman 1991). It does not, however, mean that pre-linguistic concepts do not play a role in this process. Children start acquiring adjectives relatively late (around their second birthdays) and degree adverbs are acquired even later (Gathercole 2009; Tribushinina 2011b; Tribushinina and Gillis 2012). It is reasonable to assume that by that time infants have gained plenty of experience with scales. These pre-linguistic scalar concepts inevitably facilitate the acquisition of scalarity in language and may interact with linguistic development in various ways. However, production of adjectives and degree

adverbs starts relatively late; by that age children may have had enough experience with their target language to capture the influence of conceptual predispositions. It would be interesting to develop an experimental paradigm (for instance, by means of eye-tracking) that would enable us to pinpoint early conceptual preferences of infants with regard to scalar types. However, it is not at all straightforward how such preference could be pinpointed in a controlled setting.

Overall, both Russian- and Dutch-speaking children preferred absolute interpretations to relative ones. This might be attributed to the perceptual salience of dimensions referred to by means of absolute adjectives (e.g., presence *vs*. absence of stars, spots, stripes, glitters, dirt). The difference in saliency between relative and absolute items might be a consequence of working with real objects rather than their two-dimensional representations. Properties such as length, tallness, and width are more salient in pictures, whereas properties such as openness, emptiness, and intactness probably become much more salient when children are given an opportunity to explore the objects manually.

Another possible explanation has been proposed by Syrett and Lidz (2010). They suggest that it might be more economical to choose a context-independent interpretation; "thus, when given a choice between a relative GA and an absolute GA interpretation, they might opt for the latter, because its standard is not context-dependent" (Syrett and Lidz 2010: 278). Whatever the source of this preference, the Russian booster *očen'* 'very' shifted the preference towards relative properties such as height, length and width.

Yet another alternative explanation might be that the attested preference for absolute interpretations already demonstrates children's knowledge of bounded scales, which might be more accessible to children due to their greater conceptual transparency (it is easier to see when a glass is full than when it is tall). In this scenario, the use of a booster may weaken this preference. However, in this case it is not clear why this only happened in the Russian, but not in the Dutch experiment. I leave this issue for future investigation.

Before closing this article, we need to address the question why the current results diverge from those presented in Syrett and Lidz (2010). There might be several possible explanations. First, as argued in this article, differences between the performance of toddlers acquiring English, Dutch, and Russian may be due to differences in the input they get. At least in the present study, children's performance neatly reflected distributions in child-directed speech, with the exception of the Dutch maximizer *helemaal* 'completely'. As explained above, the data on child-directed speech came from a Belgian corpus and the participants in Experiment 2 spoke Netherlandic Dutch. A crucial difference between the two varieties of Dutch is that *helemaal* is still used as a pure

maximizer in Belgian Dutch and as a half-booster in Netherlandic Dutch. In this sense, the chance performance of the Dutch participants is not at all surprising. The performance of English-speaking children in Syrett and Lidz's experiments is consonant with the distributions emerging from the analysis of the British National Corpus. However, it remains to be seen whether these distributions are a fair reflection of the input children get, as child-directed speech may be qualitatively different from adult-directed speech (Majorano et al. 2012; Ravid et al. 2008).

A second possibility is that the different results are due to the different methodologies used. Syrett and Lidz (2010) used a preferential-looking experiment in which toddlers were not asked to perform any action or make any choice. The dependent variable in their experiments was proportion of looks to the property denoted by the relative adjective. In the *completely* condition the children had a slight preference for the relative property already in the baseline window (about 60 % of looks); the question in the test phase (e.g., *Which one is wuggin?*) pulled their attention away from the relative property so that the proportion of looks to the relative property dropped from 60 % to 50 %. In the *very* condition the reverse performance was observed. These changes in the proportion of looks might be interpreted as assigning different interpretations to novel adjectives based on adverbial cues. However, this interpretation may be problematic given the differences between the conditions already in the salience window (which was meant as the attention baseline).

In contrast, the experiments reported in this paper required the children to make a choice. The children were asked to give the investigator the object that was *ADJ*. A forced-choice paradigm may provide different results. For example, the adult controls in Syrett and Lidz (2010) were also asked to choose between the relative and the absolute interpretation (in a pen-and-paper task). Interestingly, their performance in the *very* condition was different from the child results: In this condition, the adults chose the relative interpretation only in 34 % of cases, which is clearly against the predictions. The authors ascribe this unexpected result to high frequencies and a wide distribution of *very*.

Yet another possible explanation of the differences between the present study and Syrett and Lidz (2010) is that the effects reported by Syrett and Lidz (2010) were not robust enough to be replicated. The Open Science Collaboration (2015) has recently published the results of a large-scale replication study (in psychology) demonstrating that in replications there is drop of significant results from 97 % to 36 %. The strength of the original effects (including p values) turned out to be the best predictor of replication success, which means that the original studies with the lowest p values and the largest effect sizes are the ones that are likely to be confirmed in replications. In this connection, it should

also be noticed that Syrett and Lidz (2010) did not replicate the effect in the *very* condition in the adult group (i.e., the effect was not replicated already in the same study).

By way of conclusion, I would like to stress the importance of crosslinguistic research. Unfortunately, it still happens too often that very strong (at times Universalist) claims are made on the basis of just one language, usually English. If we want to get more insight into the intricate interplay between language and cognition, more crosslinguistic research is clearly warranted.

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References

Apresjan, Jurij D. 1974. Leksičeskaja semantika: Sinonimičeskie sredstva jazyka. [Lexical semantics: Synonymic means in language]. Moscow: Nauka.

Au, Terry Kit-fong & Denise E. Laframboise. 1990. Acquiring color names via linguistic contrast: The influence of contrastive terms. *Child Development* 61. 1808–1823.

Au, Terry Kit-fong & Ellen M. Markman. 1987. Acquiring word meanings via linguistic contrast. *Cognitive Development* 2. 217–236.

Bloom, Lois. 1970. *Language development: Form and function in emerging grammars*. Cambridge, MA: MIT Press.

Bol, Gerard W. 1995. Implicational scaling in child language acquisition: The order of production of Dutch verb constructions. In Maaike Verrips & Frank Wijnen (eds.), *Papers from the Dutch-German colloquium on language acquisition*, 1–13. Amsterdam: Institute for General Linguistics.

Bolinger, Dwight. 1967. Adjective comparison: A semantic scale. *Journal of English Linguistics* 1. 2–10.

Booth, Amy E. & Sandra R. Waxman. 2003. Mapping words to the world in infancy: In the evolution of expectations for count nouns and adjectives. *Journal of Cognition and Development* 4(3). 357–381.

Booth, Amy E. & Sandra R. Waxman. 2009. A horse of a different color: Specifying with precision infants' mappings of novel nouns and adjectives. *Child Development* 80(1). 15–22.

Bowerman, Melissa. 1996. The origin of children's spatial semantic categories: Cognitive vs. linguistic determinants. In John J. Gumperz & Steven C. Levinson (eds.), *Rethinking linguistic relativity*, 145–176. Cambridge: Cambridge University Press.

Bowerman, Melissa. 2000. Where do children's word meanings come from? Rethinking the role of cognition in early semantic development. In Larry P. Nucci, Geoffrey B. Saxe & Elliot Turiel (eds.), *Culture, thought, and development*, 199–230. Mahwah, NJ: Lawrence Erlbaum.

Bowerman, Melissa & Soonja Choi. 2001. Shaping meanings for language: Universal and language-specific in the acquisition of spatial semantic categories. In Melissa Bowerman & Steven Levinson (eds.), *Language acquisition and conceptual development*, 475–511. Cambridge: Cambridge University Press.

Braine, Martin D. S. 1976. *First word combinations*. (Monographs of the Society for Research in Child Development 41). Chicago, IL: University of Chicago Press.

Brown, Roger. 1973. *A first language: The early stages*. Cambridge, MA: Harvard University Press.

Bylund, Emanuel & Panos Athanasopoulos. 2014. Linguistic relativity in SLA: Toward a new research program. *Language Learning* 64(4). 952–985.

Bylund, Emanuel, Panos Athanasopoulos & Marcelyn Oostendorp. 2013. Motion event cognition and grammatical aspect: Evidence from Afrikaans. *Linguistics* 51(5). 929–955.

Carver, Leslie J., Andrew N. Meltzoff & Geraldine Dawson. 2006. Event-related potential (ERP) indices of infants' recognition of familiar and unfamiliar objects in two and three dimensions. *Developmental Science* 9(1). 51–62.

Choi, Soonja & Melissa Bowerman. 1991. Learning to express motion events in English and Korean: The influence of language-specific lexicalization patterns. *Cognition* 41. 83–121.

Clark, Eve V. 2001. Emergent categories in first language acquisition. In Melissa Bowerman & Steven C. Levinson (eds.), *Language acquisition and conceptual development*, 379–405. Cambridge: Cambridge University Press.

Clark, Eve V. 2004. How language acquisition builds on cognitive development. *Trends in Cognitive Sciences* 8. 472–478.

Clark, Eve V. & Tatiana Nikitina. 2009. One vs. more than one: Antecedents to plural marking in early language acquisition. *Linguistics* 47(1). 103–139.

Crosswhite, Katherine, John Alderete, Tim Beasley & Vita Markman. 2003. Morphological effects on default stress in novel Russian words. In Gina Garding & Mimu Tsujimura (eds.), *WCCFL 22 Proceedings*, 151–164. Somerville, MA: Cascadilla Press.

Dehaene, Stanislas. 1997. *The number sense*. Oxford: Oxford University Press.

DeLoache, Judy S., Sophia L. Pierroutsakos & David H. Uttal. 2003. The origins of pictorial competence. *Current Directions in Psychological Science* 12(4). 114–118.

DeLoache, Judy S., Sophia L. Pierroutsakos, David H. Uttal, Karl S. Rosengren & Alma Gottlieb. 1998. Grasping the nature of pictures. *Psychological Science* 9. 205–210.

Filipenko, Marina V. 1998. On certain features: Adverbs with a floating sphere of action and adverbs of degree. *Russian Linguistics* 22. 275–286.

Gagarina, Natalia V. 2008. *First language acquisition of verb categories in Russian*. St. Petersburg: Nauka.

Gathercole, Virginia C. 2009. "It was so much fun. It was 20 fun!" Cognitive and linguistic invitations to the development of scalar predicates. In Virginina C. Gathercole (ed.), *Routes to language: Studies in honor of Melissa Bowerman*, 319–443. New York: Psychology Press, Taylor and Francis.

Gentner, Dedre & Melissa Bowerman. 2009. Why some spatial semantic categories are harder to learn than others: The Typological Prevalence Hypothesis. In Jiansheng Guo, Elena Lieven, Nancy Budwig, Susan Ervin-Tripp, Keiko Nakamura & Seyda Ozcaliskan (eds.),

Crosslinguistic approaches to the psychology of language, 465–480. New York: Psychology Press.
Hoeksema, Jack. 2011a. Bepalingen van graad in eerstetaalverwerving [Degree modifiers in first language acquisition]. *Tabu* 39(1/2). 1–22.
Hoeksema, Jack. 2011b. Discourse scalarity: The case of Dutch helemaal. *Journal of Pragmatics* 43. 2810–2825.
Huettig, Falk, Jidong Chen, Melissa Bowerman & Asifa Majid. 2010. Do language-specific categories shape conceptual processing? Mandarin classifier distinctions influence eye gaze behavior, but only during linguistic processing. *Journal of Cognition and Culture* 10. 39–58.
Iverson, Jana. 2010. Developing language in a developing body: The relationship between motor development and language development. *Journal of Child Language* 37. 229–261.
Kamoen, Naomi, Bregje Holleman, Rick Nouwen, Ted Sanders & Van den Bergh. Huub. 2011. Absolutely relative or relatively absolute? The linguistic behavior of gradable adjectives and degree modifiers. *Journal of Pragmatics* 43. 3139–3151.
Kennedy, Chris & McNally. Louise. 2005. Scale structure, degree modification, and the semantics of gradable predicates. *Language* 81. 345–381.
Klibanoff, Raquel S. & Sandra R. Waxman. 2000. Basic level object categories support the acquisition of novel adjectives: Evidence from preschool-aged children. *Child Development* 71(3). 649–659.
Koelen, Lieke & Saskia Visser. 2010. *Dyslexie en Engels als tweede taal*. [Dyslexia and English as a second language]. Research report, University of Groningen, Groningen, The Netherlands.
Lorenz, Gunter. 2002. *Really worthwhile* or *not really significant*? A corpus-based approach to the delexicalization and grammaticalization of intensifiers in Modern English. In Ilse Wischer & Gabriele Diewald (eds.), *New reflections on grammaticalization*, 143–161. Amsterdam, Philadelphia: John Benjamins.
Lyons, John. 1977. *Semantics*. Cambridge: Cambridge University Press.
MacWhinney, Brian. 2000. *The CHILDES project: Tools for analyzing talk*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
MacWhinney, Brian. 2001. The Competition Model: The input, the context, and the brain. In Peter Robinson (ed.), *Cognition and second language instruction*. New York: Cambridge University Press.
Majorano, Marinella, Chiara Rainieri & Paola Corsano. 2012. Parents' child-directed communication and child language development: A longitudinal study with Italian toddlers. *Journal of Child Language* 40. 836–859.
Markman, Ellen M. & Jean E. Hutchinson. 1984. Children's sensitivity to constraints on word meaning: Taxonomic vs. thematic relations. *Cognitive Psychology* 16. 1–27.
Mendez-Naya, Belén. 2003. On intensifiers and grammaticalization: The case of swathe. *English Studies* 4. 372–391.
Mintz, Toben H. 2005. Linguistic and conceptual influences on adjective acquisition in 24- and 36-month-olds. *Developmental Psychology* 41. 17–29.
Mintz, Toben H. & Lila Gleitman. 2002. Adjectives really do modify nouns: The incremental and restricted nature of early adjective acquisition. *Cognition* 84. 267–293.
Needham, Amy. 2000. Improvements in object exploration skills may facilitate the development of object segregation in early infancy. *Journal of Cognition and Development* 1(2). 131–156.
Nevalainen, Terttu & Matti Rissanen. 2002. Fairly pretty or pretty fair? On the development and grammaticalization of English downtoners. *Language Sciences* 24. 359–380.

Open Science Collaboration. 2015. Estimating the reproducibility of psychological science. *Science* 349. DOI:10.1126/science.aac4716.
Paradis, Carita. 1997. *Degree modifiers of adjectives in spoken British English*. (Lund Studies in English 92). Lund: Lund University Press.
Paradis, Carita. 2000. It's well weird. Degree modifiers of adjectives revisited: The nineties. In John M. Kirk (ed.), *Corpora galore: Analyses and techniques in describing English*, 147–160. Amsterdam & Atlanta: Rodopi.
Paradis, Carita. 2001. Adjectives and boundedness. *Cognitive Linguistics* 12(1). 47–65.
Paradis, Carita & Caroline Willners. 2006. Antonymy and negation: The boundedness hypothesis. *Journal of Pragmatics* 38(7). 1051–1080.
Perone, Sammy, Kelly L. Madole, Shannon Ross-Sheehy, Maeve Carey & Lisa M. Oakes. 2008. The relation between infants' activity with objects and attention to object appearance. *Developmental Psychology* 44(5). 1242–1248.
Peters, Hans. 1994. Degree adverbs in Early Modern English. In Dieter Kastovsky (ed.), *Studies in Early Modern English*, 269–288. Berlin and New York: Mouton de Gruyter.
Piaget, Jean. 1952. *The origins of intelligence in children*. New York: International Universities Press.
Ravid, Dorit, Wolfgang U. Dressler, Bracha Nir-Sagiv, Katharina Korecky-Kröll, Agnita Souman, Katja Rehfeldt, Sabine Laaha, Johannes Bertl, Hans Basbøll & Steven Gillis. 2008. Core morphology in child directed speech: Crosslinguistic corpus analyses of noun plurals. In Heike Behrens (ed.), *Corpora in language acquisition research*, 25–60. AmsterdamPhiladelphia: John Benjamins.
Ruff, Holly A. 1982. Role of manipulation in infants' responses to invariant properties of objects. *Developmental Psychology* 18. 682–691.
Sapir, Edward. 1944. Grading: A study in semantics. *Philosophy of Science* 11. 93–116.
Slobin, Dan I., Melissa Bowerman, Penelope Brown, Sonja Eisenbeiss & Bhuvana Narasimhan. 2011. Putting things in places: Developmental consequences in linguistic typology. In Jürgen Bohnemeyer & Eric Pederson (eds.), *Event representation in language and cognition*, 134–165. New York: Cambridge University Press.
Slobin, Dan Isaac. 1973. Cognitive prerequisites for the development of grammar. In Charles A. Ferguson & Dan Isaac Slobin (eds.), *Studies of child language development*, 175–208. New York: Holt, Rinehart & Winston.
Slobin, Dan Isaac. 1985. Cross-linguistic evidence for Language-Making Capacity. In Dan Isaac Slobin (ed.), *The cross-linguistic study of language acquisition: Vol. 2. Theoretical issues*, 1157–1256. Hillsdale, NJ: Lawrence Erlbaum.
Slobin, Dan Isaac. 2001. Form-function relations: How do children find out what they are. In Melissa Bowerman & Steven C. Levinson (eds.), *Language acquisition and conceptual development*, 406–449. Cambridge: Cambridge University Press.
Syrett, Kristen & Jeffrey Lidz. 2010. 30-month-olds use the distribution and meaning of adverbs to interpret novel adjectives. *Language Learning and Development* 6(4). 258–282.
Syrett, Kristen L. 2007. *Learning about the structure of scales: Adverbial modification and the acquisition of the semantics of gradable adjectives*. Evanston, IL: Northwestern University dissertation.
Talmy, Leonard. 2000. *Toward a cognitive semantics, Vol.1: Concept structuring systems*. Cambridge, MA: MIT Press.
Tribushinina, Elena. 2008. *Cognitive reference points: Semantics beyond the prototypes in adjectives of space and colour*. Utrecht: LOT.

Tribushinina, Elena. 2009. The linguistics of zero: A cognitive reference point or a phantom?. *Folia Linguistica* 43(2). 417–461.
Tribushinina, Elena. 2011a. Boundedness and relativity: A contrastive study of English and Russian. *Languages in Contrast* 11(1). 106–128.
Tribushinina, Elena. 2011b. Piecemeal acquisition of boundedness: Degree modifiers of adjectives in Dutch child language. In Gregory Bochner, Philippe De Brabanter, Mikhail Kissine & Daniela Rossi (eds.), *Cognitive and empirical pragmatics: Issues and perspectives*, 93–116. AmsterdamPhiladelphia: John Benjamins.
Tribushinina, Elena. 2014. Comprehension of degree modifiers by pre-school children: What does it mean to be 'a bit cold'?. *Folia Linguistica* 48(1). 255–276.
Tribushinina, Elena. 2015. Acquisition of adjectival degree markers by Dutch- and Russian-speaking children: The richer the faster?. In Björn Köhnlein & Jenny Audring (eds), *Linguistics in the Netherlands 2015*, 154–168. Amsterdam & Philadelphia: John Benjamins.
Tribushinina, Elena & Steven Gillis. 2012. The acquisition of scalar structures: Production of adjectives and degree markers by Dutch-speaking children and their caregivers. *Linguistics* 50(2). 241–268.
Tribushinina, Elena & Theo Janssen. 2011. Re-conceptualizing scale boundaries: The case of Dutch *helemaal*. *Journal of Pragmatics* 43(7). 2043–2056.
Tribushinina, Elena, Huub Van Den Bergh, Marianne Kilani-Schoch, Ayhan Aksu-Koç, Ineta Dabašinskienė, Gordana Hrzica, Katharina Korecky-Kröll, Sabrina Noccetti & Wolfgang Dressler. 2013. The role of explicit contrast in adjective acquisition: A cross-linguistic longitudinal study of adjective production in spontaneous child speech and parental input. *First Language* 33(6). 594–616.
Tribushinina, Elena, Maria Voeikova & Sabrina Noccetti (eds.). 2015. *Semantics and morphology of early adjectives in first language acquisition*. Newcastle upon Tyne: Cambridge Scholars Publishing.
Vanden Wyngaerd, Guido. 2001. Measuring events. *Language* 77. 61–90.
Voeikova, Maria D. 2011. *Rannie ėtapy usvoenija det'mi imennoj morfologii*. [Early stages in the acquisition of nominal morphology]. Moscow: Znak.
Vorotnikov, Jurij L. 2000. Bezotnositel'nye stepeni kačestva v russkom jazyke [Absolute degrees of a property in Russian]. *Izvestija AN. Serija Literatury i Jazyka* 59(1). 36–43.
Waxman, Sandra R. & Amy E. Booth. 2001. Seeing pink elephants: Fourteen-month-olds' interpretations of novel nouns and adjectives. *Cognitive Psychology* 43(3). 217–242.
Waxman, Sandra R. & Raquel S Klibanoff. 2000. The role of comparison in the extension of novel adjectives. *Developmental Psychology* 36(5). 571–581.
Waxman, Sandra R., Ann Senghas & Susana Benveniste. 1997. A cross-linguistic examination of the noun-category bias: Its existence and specificity in French- and Spanish-speaking preschool-aged children. *Cognitive Psychology* 32. 183–218.
Waxman, Sandra R. & Maria Teresa Guasti. 2009. Nouns, adjectives, and the acquisition of meaning: New evidence from Italian-acquiring children. *Language Learning and Development* 5(1). 50–68.
Yoshida, Hanako & Rima Hanania. 2013. If it's red, it's not Vap: How competition among words may benefit early word learning. *First Language* 33(1). 3–19.