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Abstract

Focusing on German, this chapter discusses children's knowledge of the syntactic-semantic interface of different types of telicity in typical and impaired acquisition. It maintains that telicity can be semantic or pragmatic, depending on whether event completion is entailed or implicated. It further delineates the *Event Structural Bootstrapping* account, arguing that *Endstate Orientation* – rather than a Manner Bias – guides children's acquisition of verb meanings. Findings from studies testing children's early verb production and comprehension are provided as evidence for a strong *Endstate Orientation* in typical development, but not in Specific Language Impairment. These data speak for modularity in the domain of semantics and for the presence of selective impairments in verb semantics. Cross-linguistic implications for further research are formulated in the conclusion.

Keywords

Telicity, Specific language impairment (SLI), typical language development, comprehension, German, semantic impairment, verb (particle), verb semantics, event structural bootstrapping, Endstate Orientation

1. Introduction

How do children learn the meaning of verbs? Although this question has instigated much research for more than 30 years (e.g., Gentner, 1982), how the child succeeds in this task is still a matter of debate. Compared to object-referring nouns like *apple* or *door*, the lexical representation of a verb is complex and comprises several distinct components like core meaning, argument selection, and event type, all of which have to be acquired. Moreover, unlike in learning object labels, children cannot rely on joint visual attention in learning labels for actions or situations. Events are typically fleeting, and the production of the label for the event often does not coincide with the time at which the event occurs. Additionally, the relation between verb and event is visually ambiguous, for a verb usually refers to a specific aspect of a scene. The same event could, for example, be described as *running into the garden, entering the garden,* or *arriving home*. Finally, in contrast to object labels, verbs are subject to considerable cross-linguistic variation in how the different event types are encoded in syntax and lexicon (e.g., English *He ran into the garden* vs. French *Il est entré dans le jardin en courant*).

Given these challenges, we might expect that verbs are difficult to learn. Words referring to events, however, occur very early in children's speech, and typically developing (TD) children master event structural concepts like telicity at a young age. This is in stark contrast to impaired acquisition: Children with Specific Language Impairment (SLI) (sometimes also referred to as Developmental Language Disorder, DLD) exhibit persistent difficulty with crucial aspects of telicity. Focusing on German, this chapter summarizes recent findings on children's knowledge of the syntactic-semantic interface of different types of telicity in

typical and impaired acquisition. It starts with a summary of the concepts of semantic and pragmatic telicity in Section 2. Section 3 outlines the acquisitional perspective on telicity and introduces the *Event Structural Bootstrapping* account that argues that *Endstate Orientation* – rather than a Manner Bias – universally guides children's early acquisition of verb meanings. Section 4 discusses findings from children's early verb production. Section 5 describes findings from a set of comprehension studies testing semantic and pragmatic telicity in both TD and SLI children. The chapter ends with a conclusion and cross-linguistic implications for further research.

Related findings in Dutch and English, referred to in this chapter, suggest that the specific findings for German hold for other Germanic languages as well (see also van Hout, XXX, this volume). How the acquisition strategy of *Endstate Orientation* may be borne out in non-Germanic languages is briefly outlined in the conclusion.

2. Semantic and pragmatic construal of telicity

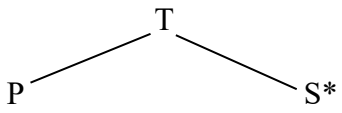
Languages across the world use a common set of event components for their verbs. I suggest that the event component 'endstate', involved in telicity, plays a crucial role in children's acquisition of verb meaning, and that this initial preference for endstates is universal. As event components are encoded differently in typologically different languages (Talmy, 1991), I predict cross-linguistic variation to exist regarding how telic event expressions are initially realized by the child. This assumption is in line with Maguire et al. (2010), who hypothesize that children initially show common, possibly universal verb construal, and only later demonstrate language specific tendencies. In contrast to Maguire et al. (2010), who argue for

an initial preference for Path interpretations, and to Gentner (1978), who argues for a Manner Bias in children's interpretation of verbs, I argue for an initial *Endstate Orientation*.

2.1. Event structure of verbs

Verbs designate events including states such as 'being happy' and actions like 'walking', 'sweeping', or 'opening', that all differ regarding their internal temporal make-up (Dowty, 1979; Vendler, 1957). Events like 'opening' have an endpoint built into them leading to a natural culmination point, while events such as 'being happy' or 'walking' do not have an endpoint allowing the event to continue indefinitely or to stop at any moment in time. Verbs designating events with an endpoint are referred to as telic, and verbs designating events without such an endpoint are referred to as non-telic. Within Pustejovsky's (1995) model of event typology, events can be further classified according to their complexity. States (S) like 'being happy' and processes (P) like 'walking' are simple events; they are referred to with atelic verbs. Complex events involve a transition (T) from a process to a state. Telic verbs like *open* designate so-called endstate-oriented transitions, i.e. the endstate subevent is the head-of-event, illustrated in (1a). To capture the intuition that some verbs such as *sweep* designate process-oriented transitions, in which the process subevent P is more prominent than the resulting state, Pustejovsky (1995) suggests that in this case P is marked as head-of-event. Diverging from this assumption, I postulate the structure in (1b). Like in endstate-oriented transitions, in process-oriented transitions the endstate is marked as head-of-event, but unlike in endstate-oriented transitions, in process-oriented transitions the endstate is optional. This structure reflects the insight that process-oriented transitions are in fact ambiguous between atelic processes and telic endstate-oriented transitions.

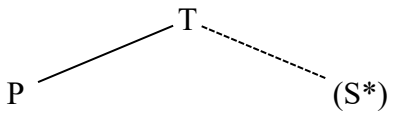
(1) a.



Endstate-oriented transition

open the door

b.



Process-oriented transition

sweep the floor

Telic interpretations of verbs can be construed semantically or pragmatically: Semantic telicity arises through entailment and pragmatic telicity though implicature (Arunachalam & Kothari, 2010; Filip, 2008; 2014; Hay, Kennedy & Levin, 1999; Jeschull, 2007). The telic interpretation of verbs like *open*, which designate endstate-oriented transitions, arises through entailment. (2a) for example entails 'the present is open' and this entailment is not cancellable, as seen in (2b).[1]

(2) a. Jill opened the present.

b. Jill opened the present, #but it is still wrapped.

Telic interpretations of surface-contact verbs like *sweep* and of degree achievements such as *cool the beer* (Filip, 2008) arise through a generalized conversational implicature, as illustrated in (3). The implicature of (3a) that the flor is clean is cancellable, as seen in (3b).

(3) a. Jill swept the floor.

[1] All examples contain perfective aspect, since imperfective aspect such as progressive in English cancels the completion entailment (Dowty, 1979):

(i) Jill was opening the present; in fact she is still opening the present.

b. Jill swept the floor, but it is still not clean.

The temporal adverbial modification test (Dowty, 1979) confirms the different status of natural culmination in predicates like *open* vs. *sweep: in an hour/in a minute* combines with telic predicates, while the durational adverb *for hours/for minutes* combines with atelic predicates ((4a) vs. (4b)). *Open* is telic, whereas *sweep* has both a telic and an atelic reading.

(4) a. Jill opened the present in a minute/ * for minutes.

b. Jill swept the floor in an hour / for hours.

In summary, atelic predicates designate processes and states; semantically telic predicates designate endstate-oriented transitions like 'opening' and pragmatically telic predicates designate process-oriented transitions like 'sweeping'.

2.2. Encoding telicity in German: a note on verb particles and particle verbs

Languages differ as to how event types are encoded by syntax and in the lexicon. In German, like in English and Dutch, verb particles play a prominent role in marking telicity by contributing to the semantics of the complex verb containing the particle. We can distinguish between different basic types of verb particles regarding their telicity properties (for German, see Schulz, Wymann & Penner, 2001, for English, see Walková, 2013). Telic verb particles (also referred to as resultative) mark the prominent endstate of a transition, like *auf* 'open' in *aufmachen* 'open' or *aus* 'out' in *ausmachen* 'turn off'. Note that in some cases complex verbs retain their atelic reading despite presence of a particle that is telic by default (e.g., *aussehen,* AUS.see 'to look'). Atelic verb particles exclusively mark the process, like *rum*

'around' in *rumlaufen* 'walk around'. Finally, ambiguous verb particles mark either the process or the endstate of a transition, like *rauf* 'up' and *runter* 'down' in *raufgehen* 'walk up' und *runtergehen* 'walk down'. This corresponds to the observation by Levin and Rappaport Hovav (1995) that verbs of directed motion such as *ascend* and *descend* are not necessarily telic. Importantly, verb particles like *auf* occur as complex verb alternations of simplex verbs (e.g., *aufessen* 'eat up' vs. *essen* 'eat') or in particle verbs (e.g., *aufmachen* 'open'), which lack a simple verb alternation.[2]

2.3. Inherent and compositional telicity

Like in English and Dutch, in German, (a)telicity of the verb is generally determined by its lexical semantics or via the interaction with the morpho-syntactic context the verb appears in (see van Hout, 1996, 1998, 2000, 2008). Inherently telic verbs such as *open*, *find*, and *arrive* designate events with a natural culmination point that is part of the verb meaning. These inherently telic verbs are all cases of semantic telicity (i.e. telicity arises through entailment, see Section 2.1). In contrast, compositional telicity of the predicate, resulting from the interaction of an atelic verb with the event-semantic properties of other morpho-syntactic elements in the sentence (Krifka, 1989, 1998), can either arise through entailment or through implicature. Among the elements triggering an event-type shift are directional phrases such as *walk into the house,* resultative phrases such as *laugh yourself silly*, complex verb formation

[2] Note that unlike their English counterparts, German particle verbs often do not have a clear adjectival base (see Hale et al., 1999). The adjective describing the endstate of *aufmachen* 'open' for example is *offen*, not *auf*.

as in particle verbs and presence of a 'quantized' NP[3] as in *eat the apple*. Recent work has shown that the type of subject (intentional or non-intentional agent) contributes to telicity as well (Demirdache & Martin, 2015). In the following I focus on those structures that have been prominent in acquisition research: predicates containing telic verb particles and/or quantized NPs, combined with intentional agents as the subject's referents.

Telic verb particles trigger telicity via entailment. They have also been referred to as strong telicity markers, because adding them to an atelic process verb obligatorily results in an event-type shift to telic (Schulz et al., 2001; Penner, Schulz, & Wymann, 2003; van Hout, 1998). This is exemplified in (5) and (6) with the process verbs *essen* 'eat' and *zeichnen* 'draw' and their telic particle counterparts. In the telic particle verb sentences (5a) and (6a) it is infelicitous to cancel the entailment that the culmination point is reached. This is in contrast to their process counterparts (5b) and (6b).

(5) a. Er hat auf-gegessen, (#aber es ist noch was übrig).
he has up-eaten.PST.PTCP (#but it is still some left
'He ate it up, (#but there is something left).'

b. Er hat gegessen, (aber es ist noch was übrig).
he has eaten.PST.PTCP (#but it is still some left)
'He ate, but there is still something left.'

(6) a. Sie hat das Haus ab-gezeichnet, (#aber es ist nicht fertig).
she has the.ACC.SG house.ACC.SG off-drawn.PST.PTCP (#but it is not done)
'She copied the house, (#but it is not completely drawn.).'

[3] A predicate P is quantized iff: if P(x) and y < x, then not P(y) (Krifka, 1998).

b. Sie hat gezeichnet, aber es ist noch nicht fertig.
she has drawn.PST.PTCP but it is still not done
'She drew, but it is not yet finished.'

Certain quantized NPs trigger telicity via implicature. They have also been referred to as weak telicity markers, because combination with a process verb does not always result in a telic predicate, as shown in (7) (=English (3b)). The implicated culmination point can be cancelled without rendering the sentences infelicitous, despite the presence of the quantized NPs.

(7) a. Jill fegte den Boden, aber er ist nicht sauber.
Jill swept the.ACC.SG floor.ACC.SG but he is not clean
'Jill swept the floor, but it is not clean.'

b. Jill ging den Hügel hinauf, aber erreichte die Spitze nicht.
Jill walked the.ACC.SG hill.ACC.SG up but reached the top not
'Jill walked up the hill, but didn't reach the top.'

The role of quantized NPs for telicity with verbs of consumption is more complex. In earlier approaches (see Krifka, 1989) quantized NPs have been assumed to trigger semantic telicity with *eat* and *drink*. This is illustrated for *eat* with the contrast between the intransitive verb (8a) and the bare, non-quantized NP (8b) vs. the quantized NP (9c). The durational adverbial combines with the atelic predicates in (8a) and (8b), but only marginally with the specific definite NP in (8c).

(8) a. Sie hat (eine Stunde lang) gegessen.

she has (an hour long) eaten. PST.PTCP

'She ate (for an hour).'

b. Sie hat (eine Stunde lang) Käse gegessen.

she has (an hour long) cheese.ACC.SG eaten.PST.PTCP

'She ate cheese (for an hour).'

c. Sie hat (? eine Stunde lang) den Käse gegessen.

she has (? an hour long) the.ACC.SG cheese.ACC.SG eaten.PST.PTCP

'She ate the cheese (?for an hour).'

More recent approaches argue that verbs of consumption may select a quantized NP without automatically triggering an event type shift (Filip, 2014; Hay, Kennedy, & Levin, 1999). This is illustrated in (9). This finding is crucial for acquisition studies, which have often used verbs of consumption with definite NPs as test items in experiments.

(9) a. Bill ate the apple bite by bite for ten minutes (and still didn't finish it)

(Jackendoff, 1996: 308)

b. She ate the sandwich but as usual she left a few bites.

(Hay et al., 1999: 139)

We hence conclude that certain quantized NPs, e.g. specific definite NPs, are indeed weak telicity markers, involving pragmatic telicity, at least when selected by verbs of motion, surface-contact, and consumption (see Section 5.3. for empirical data confirming this assumption for adults and children). Note that not all definite NPs behave alike. Measurement phrases, for example, entail telicity (e.g., #Mary ate two apples, but finished eating only one.).

Based on the notions of entailment and implicature, Table 1 summarizes the different types of telicity.

Table 1. Types of telicity and their encoding in German

Type of telicity	**Source**	**Encoding**	**Examples**
Inherent	Entailment	Lexical semantics of the verb	Morphologically simple verbs (e.g., *finden* 'find') Morphologically complex verbs (e.g., *aufmachen* 'open')
Compositional	Entailment	Resultative verb particle (strong telicity marker)	auf- (e.g., *aufessen*, eat up') aus- (e.g., *austrinken*, drink up') ab- (e.g., *abzeichnen* ,draw')
	Implicature	Certain quantized NP (weak telicity marker)	Specific definite NP (e.g., *den Apfel essen* 'eat the apple', *den Boden fegen* 'sweep the floor', *den Berg hinaufgehen* 'walk up the hill')

In summary, telicity in German is encoded either by the lexical semantic properties of the verb (semantic telicity) or formed compositionally, for example by adding a resultative particle or a quantized NP complement to an atelic verb. Telicity in resultative particles arises through entailment of the culmination point (semantic telicity), while telicity in certain

quantized NPs arises through implicature of the culmination point (pragmatic telicity).

3. The acquisitional perspective

3.1. The acquisition task of mastering telicity

Given the complex relationship between the lexical semantics of the verb determining its basic event-semantic property and the morpho-syntactic contexts that may trigger event type shifting, the acquisition task of the child is manifold. In order to determine whether a predicate is telic or not, she has to know the lexical event-semantic properties of the individual verbs. That is, she has to distinguish between inherently telic verbs and verbs that can alter their event type. She also has to learn whether the natural culmination point of the event designated by a predicate is entailed or implicated (i.e. whether the telicity marker is weak or strong). Finally, she has to learn the function of the various morpho-syntactic elements in her language (e.g., verb particles and quantized NPs) and the mapping between these elements and their role in determining the predicate's event-type.

3.2. Learning strategy for verbs: Event Structural Bootstrapping

How can the child succeed in this complex acquisition task? In previous work my colleagues and I have proposed the *Event Structural Bootstrapping* account, suggesting that typically developing children, faced with the task of verb learning, initially focus on the verb's event structure rather than on its core meaning or its argument selection (Penner et al., 2003; Schulz et al., 2001; Schulz, Penner, & Wymann, 2002). We have argued that TD children proceed in a 'piecemeal' fashion in order to overcome the input ambiguity in the

domain of the verb lexicon: They first focus on event expressions that encode endstate-oriented transitions and only later on the other event types (processes, states, and process-oriented transitions). That is, children are argued to initially show an *Endstate Orientation* guiding their early learning of verb meaning (Schulz, Penner, & Wymann, 2002). Endstate-oriented transitions are a safe starting point for learning verb meaning because their event structure is unambiguous. Inherently telic verbs like *open* only designate events with their natural culmination point reached, unlike process verbs like *sweep* that are used with events where a culmination point has been reached or not, and unlike processes and states, which lack a culmination point altogether (see Section 2.1).

Within the class of telic predicates, particle verbs of the type *aufmachen* (AUF.make, open) and *zumachen* (ZU.make, close) meet the requirement of an unambiguous event structure best, since the internal hierarchy of the transition is optimally transparent. The resultative particle *auf* unambiguously marks the endstate as head-of-event, and the dummy light verb *machen* 'make' lexically marks the process subevent as less prominent.

Supporting evidence for children's early strategy of *Endstate Orientation* comes from studies by Lakusta and colleagues. Infants' (age 16 months) preference for looking at endpoint events over starting point events (Lakusta and DiFabrizio, 2016), as well as their bias to encode goals over the source when describing events (Lakusta et al., 2016), suggest that infants consider the endpoint an essential component of events. Likewise, 5-year-old children's preference for change-of-state over motion scenes when asked to match a novel verb to one of two scenes (Kelly & Rice, 1994) points to the prominence of change-of-states in children's perception of events. In other words, the strategy of *Endstate Orientation* draws on infants' supposedly universal conceptual preference for endpoints, which supports their subsequent linguistic encoding (see Wagner & Lakusta, 2009 for a similar view). In a similar vein, Maguire et al. (2010) propose that children initially show common, possibly universal

verb construal. As *Endstate Orientation* draws on the interaction of cognitive preferences and linguistic encoding, aspects of the learning environment such as frequency of a certain structure in the input to the child should play a minor role in explaining the order of verb acquisition.

Our account predicts that the strategy of *Endstate Orientation* is generalizable across different languages and, crucially, that it extends to languages that encode goal/endstate differently. That is, across typologically different languages, children are expected to first focus on endstates in both production and comprehension. Which verbal elements the child realizes first to encode the endstate is determined by how a given language encodes endstate-oriented transitions.

Note that the strategy of *Endstate Orientation* is in stark contrast to the *Manner Bias* proposed by Gentner (1978). According to the Manner Bias, at the outset of verb acquisition language learners assume that verbs denote manners of actions; notions like 'endstate' and 'culmination point' are not part of their lexical-semantic representation of verbs (see also Gropen et al., 1991; for a critical evaluation of the manner bias, see van Hout, XXX, this volume).

3.3. Predictions for acquisition of German

Within the account of *Event Structural Bootstrapping* specific predictions for verb acquisition can be derived. Most importantly, children are expected to master differences between event types early. Regarding production, children adhering to *Endstate Orientation* are predicted to acquire event expressions referring to endstate-oriented transitions early and to first realize the prominent subevent of telic particle verbs, e.g., in German resultative particles like *auf* 'open' or *zu* 'closed', before producing full particle verbs like *aufmachen*

'open' or morphologically simple telic verbs like *öffnen* 'open', and also before non-telic verbs designating processes, states, and process-oriented transitions.

Regarding comprehension, children are expected to be sensitive to the difference between telic and atelic verbs early on. Inherently telic verbs are predicted to be mastered early, as well as compositionally telic verbs with strong telicity markers such as *aufessen* 'eat up', because the contrast to the atelic *essen* 'eat' provides clear evidence for the learner regarding its event-type. The role of quantized NPs as weak telicity markers may be acquired later, as they provide unreliable form-function cues for the learner by implicating but not entailing a telic reading.

4. Telicity in production

German-speaking children start using verbs already in their second year of life (Kauschke, 2000). Simplex verbs are generally the first verbs to appear, but both simplex and particle verbs are used frequently already before age 2. In a case study of Simone, *aufmachen* 'open', *kaputtmachen* 'break', and *abmachen* 'take off' were among the most frequent particle verbs (Behrens, 1998). Isolated verb particles play an important role in early verb acquisition as they often assume the function of a full verb and occur already in the single-word period. This is illustrated in (10) and (11) for German (see Penner et al., 2003).

(10)	Child (1;03 years):	Auf!	(trying to open an umbrella)
		open	
		'open it'	

(11) Child (1;05 years): Aus! (trying to take her sweater off)

out

'take it off'

In previous work, we investigated children's early verb lexicon between the ages of 12 to 24 months in a longitudinal design, based on data from the parent report RELATIONAL WORD INVENTORY (RWI, Schulz, 2002), which assesses production of verb particles, and from spontaneous speech corpora. The parental report data from 47 German-speaking children showed that isolated verb particles are first used between the ages of 14 and 18 months (Schulz, 2005). Most children log into the verb lexicon with isolated verb particles only, few start out with simple verbs and isolated verb particles simultaneously. Particle verbs occur sometime later, around 18 months of age. Regarding the event type of the first verb particles, 90% of the children logged into the verb lexicon with particles that in the adult system are telic as *aus* 'out'*, zu* 'closed'*, auf* 'open'*, an* 'on'*,* and *ab* 'off'.

From a subset of the children above (n=43) between the ages of 14 and 18 months spontaneous speech data were analyzed regarding frequency of verb particles, particle verbs, and simplex verbs (Schulz, 2005). Eighty-six percent of the children's spontaneous verb expressions were isolated telic verb particles such as *auf* 'open' or *ab* 'off', compared to 2% ambiguous verb particles, 9% simplex verbs, and 3% particle verbs. In line with previous findings from Penner et al. (2003), the verb particles were used in the function of verbs. In summary, the data from both parent report and spontaneous speech confirms that telic verb particles are produced early and frequently in German.

In line with the *Event Structural Bootstrapping* account, Kieburg and Schulz (2010) found that parents' verb input did not determine children's order of acquisition of event expressions.

Using a longitudinal design, the authors examined whether children's early preference for telic verb particles could be explained by word frequency in the ambient language. The analysed data comprised about 5000 utterances from three mothers recorded when their children were between 14 and 20 months old. The order of verb acquisition and the composition of the verb lexicon in 1- to 2-year-olds was not significantly correlated with simple word frequency, i.e. total token, relative token and type frequency, in parental input. Moreover, the verb particles used by the mothers most frequently (i.e. *her* 'here', *hin* 'there', *rein* 'in', *weg* 'off') differed from those initially produced by their children as documented in the parental report RWI. These were *auf* 'open', *ab* 'off', *aus* 'off', *an* 'on', *zu* 'closed', the same as the resultative verb particles reported in the study of 47 children mentioned above. These data support the assumption that *Endstate Orientation* guides young children in building their productive verb lexicon.

5. Telicity in comprehension

Under the *Event Structural Bootstrapping* account delineated in Section 3, typically developing children are expected to master the difference between telic and atelic verbs from early on. Children who exhibit Specific Language Impairment (SLI), in contrast, may show deficits in this area.

5.1 A note on children with SLI and semantic deficits

With a prevalence of 6 to 10%, SLI constitutes one of the most frequent developmental disorders and has been the topic of much linguistic research (see the overview in Leonard,

2014; for an overview of research on SLI in German, see Hamann, 2015). Children with SLI exhibit language difficulties without co-occurring cognitive or neurological deficits, or hearing impairments severe enough to explain the language impairment (Leonard, 2014). Children with SLI are delayed in their onset of speech and in their subsequent language development. Problems with morphology and syntax have been proposed to constitute the core characteristic of SLI and have been studied most extensively. Morpho-syntactic deficits have been reported for the majority of children with SLI and have often been found to persist up to school age. However, SLI is a heterogeneous disorder: The specific profiles of language deficits vary regarding the location of the deficits as well as regarding the severity of impairment (Friedmann and Novogrodsky, 2008; Schulz, 2010; van der Lely, 2005). Beyond morpho-syntax, impairments have also been reported for phonology, lexicon, and pragmatics (e.g., Bishop, 1997; Conti-Ramsden & Botting, 2006; Leonard, 2014). Finally, selective deficits have been found for specific linguistic subdomains including morpho-syntax, phonology, and lexicon (e.g., Friedmann and Novogrodsky, 2008; van der Lely, 2005).

Semantic impairments have received less attention and have mostly been considered in concert with pragmatic or lexical deficits. The few existing studies on the semantic abilities of children with SLI suggest that deficits may occur at the word, sentence, and discourse level (Botting & Adams, 2005; Roeper, 2004). Despite these findings, the difficulties children may have with semantics have not traditionally been seen as central to SLI, and only recently has it been argued that children with SLI may also exhibit isolated or co-occurring semantic deficits (Penner et al., 2003; Schulz, 2010; Schulz & Roeper, 2011; see also Hamann, 2015).

The few studies investigating telicity acquisition in SLI have mainly tested production (Kelly & Rice, 1994; Ingham, Fletcher, Schelletter & Sinka, 1998; Watkins & Rice, 1991). Focusing on resultative VPs in English, Watkins and Rice (1991) asked English-speaking children to describe video scenes and found that children with SLI used fewer resultative

particles like *off* in *kick off the shoe*, compared to their TD peers. The authors conclude that children with SLI experience problems with the syntactic and semantic properties of particles that cannot be accounted for by problems referring to functional categories. Kelly and Rice (1994) found that five-year-old SLI children, unlike their TD peers, did not show any preference in applying novel verbs to either a motion or a change-of-state scene. A related study by Ingham et al. (1998) found that 6-year-old English-speaking children with SLI have difficulty using complex resultative VPs like *shake the ball out (of the tree)* and preferred simple VPs such as *shake the ball*, when asked to describe video scenes. These studies indicate that resultative verb types may be difficult for children with SLI to acquire. In a similar vein, a comprehension study on Spanish reported that children with SLI did not use the telicity of predicates to guide their understanding of grammatical aspect and tense (Grinstead, McCurley, Pratt, Obregon & Flores, 2013). I hypothesize that SLI children's difficulty with telic verbs results from an unstable *Endstate Orientation*: They do not reliably represent the endstate as being entailed by semantically telic verbs. That is, SLI children are expected to fail to linguistically encode their preference for endstates, which I suppose is unimpaired at the conceptual level.

5.2. Inherent telicity

Three sets of studies investigated how and at what age German-speaking TD children and children with SLI master inherent semantic telicity.

5.2.1. Inherent telicity: the case of particle verbs

Previous research indicates that, starting at 3 years of age, TD children exhibit an adult-like interpretation of inherently telic verbs like *aufmachen* 'open'*, zumachen* 'close'*, abmachen* 'remove'*,* and *ausmachen* 'extinguish' (Wittek, 2002). That is, in a truth-value-judgment-task, they consistently reject telic verbs for incomplete events. Extending this research, Schulz and Penner (Penner et al., 2003; Schulz et al., 2001, 2002) investigated TD and SLI children's comprehension of inherently telic particle verbs. Their study was based on the assumption that *Endstate Orientation* guides TD children's comprehension from early on (see Section 3.2), while children with SLI, lacking *Endstate Orientation*, should not reliably recognize that the endstate is entailed by telic verbs. The authors focused on clearly endstate-oriented transitions; the telic particle verb *aufmachen* 'open' was chosen for the theoretical reasons provided above (see Section 2.2) and because it appears early in children's speech (see Section 4).

Schulz et al. (2001) tested 16 3-and 4-year-old children with SLI (mean 3;10) and compared their comprehension abilities with that of 16 younger TD children (mean 2;10); 16 adults were included as controls. The children with SLI met the standard inclusion and exclusion criteria: a) they were diagnosed by speech therapists as suffering from receptive and expressive language deficits, b) cognitive functioning was reported to be within normal range for age, and c) there was no report of hearing impairments (see Leonard, 2014). All SLI children were enrolled in programs for children with language disorders, and none had received any therapy focusing specifically on verb meanings. The TD children exhibited age-appropriate speech, language, social, and cognitive functioning according to preschool teacher and parent reports.

Using a truth-value judgment task (TVJ, Crain and McKee, 1986) eight *yes/no*-questions assessed whether children know that the meaning of *aufmachen* 'open' entails the endstate 'be open'. Two-picture sequences were shown to the child depicting different instances of

opening a container, with and without event completion. Examples for both test conditions (endstate and no-endstate) are given in Figure 1a. and 1b.

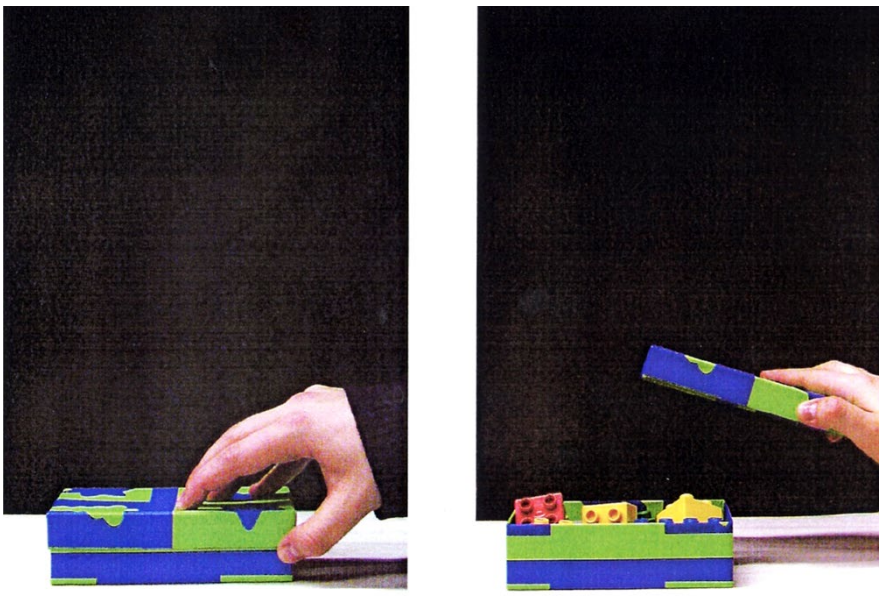


Figure 1a. Endstate condition

Test question: *Hat sie'se aufgemacht?* 'Did she open it?'

Target answer: Yes.

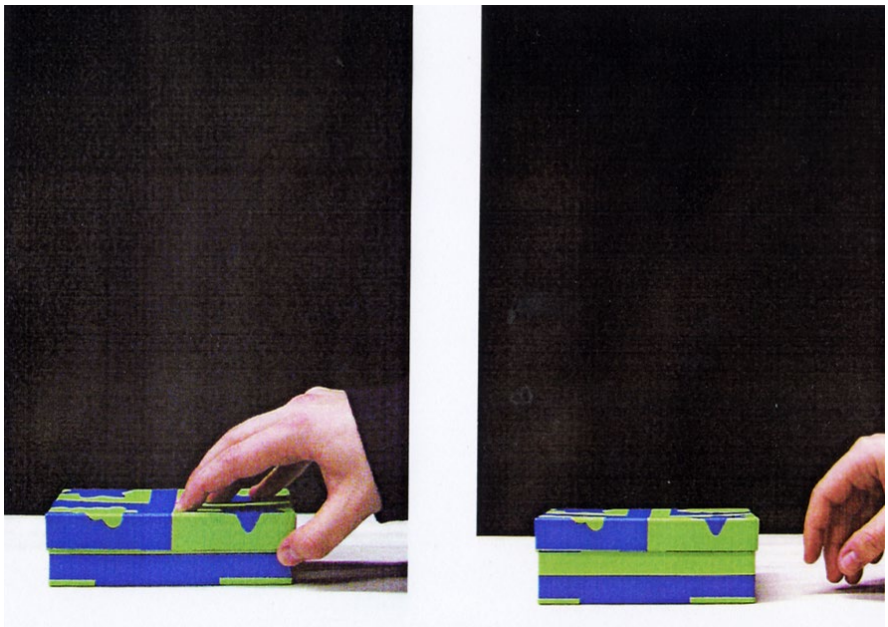


Figure 1b. No-endstate condition

Test question: *Hat sie'se aufgemacht?* 'Did she open it?'

Target answer: No.

In the relevant no-endstate condition, the 3-year-olds with SLI performed at chance level (46% correct rejections), while the 2-year-old TD children interpreted the telic verb target-like in most cases (78% correct rejections). Schulz et al. (2002) tested an additional group of 16 3-year-old TD children (mean 3;10 years), who were chronologically age-matched to the group of children with SLI, so that for each child with SLI there was a child in the age-matched TD group within 1 month of age. As expected, the TD same-age peers performed at ceiling in the no-endstate condition with telic verbs (89% correct rejections). Are SLI children's frequent *yes* responses (54%) due to a general yes-bias? This seems implausible, for only children who were able to respond to *yes/no*-questions appropriately were included in the analysis. Moreover, children with SLI, just like their TD peers, performed at ceiling in the control trials requiring a *no*-response.[4] Could it be that children with SLI merely had difficulty inferring from a photograph whether a container is open or still closed? This is unlikely, because all children were first given ample opportunity to manipulate the containers depicted in the picture sequences and experience how they open and close.

To find out whether SLI children's difficulty with inherent telicity is persistent, Penner et al. (2003) tested a group of 16 SLI children between the ages of 5 and 8 years (mean 6;09 years). As illustrated in Figure 2, which summarizes the results for all five groups tested, even at nearly 7 years of age, in only 64% of the cases did the SLI children correctly reject the telic verb *aufmachen* in the crucial no-endstate condition.

[4] In the control trials the events displayed in the picture-sequences did not match the verb used in the question.

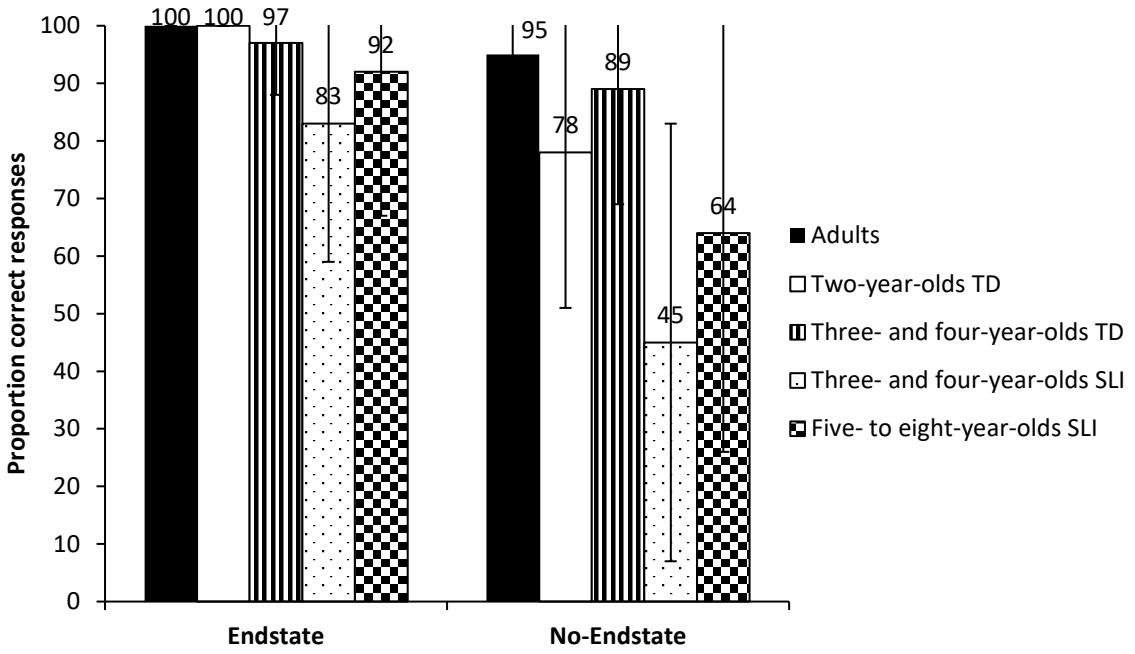


Figure 2. Inherent telicity: Mean proportion of correct responses in the Endstate and the No-Endstate condition by participant group. Error bars indicate standard deviation.

The individual interpretation patterns demonstrate SLI children's difficulties even more clearly. While 50% of the TD children at age 2 and 69% of the TD children at age 3 performed above chance (4/4 correct) with inherent telicity, only 25% of the 3-year-olds with SLI and 44% of the 6-year-olds with SLI did so. Notably, children with SLI do not simply interpret the telic verb as atelic: Only 7 out of the 32 of children with SLI overall consistently accepted telic verbs in the no-endstate condition. Extending Penner et al.'s (2003) proposal, I assume that this pattern results from an incorrect event-semantic representation of telic verbs, in which the head-of-event is optional, i.e. the endstate may be present or absent (see (1a) vs. (1b)). This lack of an *Endstate Orientation* would point to a semantic impairment that is not a result of difficulties in the syntactic, phonological, or pragmatic module, an impairment specific to the verbs' event structure (Schulz, 2010). However, as children's knowledge of atelic verbs and general lexical abilities were not assessed in this study, low performance in telicity could in principle also reflect a broad lexical deficit. Moreover, as picture sequences

were used, the studies described so far leave open the possibility that SLI children's difficulty with telicity results from more domain-general difficulties, for example, with processing complex events presented in pictures. These aspects were addressed in follow-up work described below.

5.2.2. Difficulty with inherently telic verbs: Result of a general lexical deficit?

Two subsequent studies explored whether SLI children's difficulties with telicity result from a general lexical deficit (Schulz & Kiese-Himmel, 2006; Schulz & Wittek, 2003; see also Schulz, 2010). Schulz and Kiese-Himmel (2006) tested children with SLI on telic verbs and on their active vocabulary. Telicity interpretation was assessed using the task by Schulz et al. (2001). Children's active vocabulary was tested with a standardized test that required naming pictures depicting nouns and verbs (AWST, Kiese-Himmel & Kozielski, 1996). Participants in the study were 20 5-year-old children with SLI, diagnosed in a speech therapy clinic. They all met the exclusionary criteria for SLI and exhibited expressive language deficits in morpho-syntax and phonology; eight children also showed lexical deficits. Performance on the standardized vocabulary test was in the lower normal range (mean T-value: 44.0); individual T-values confirmed the expert classification regarding lexical deficits. Confirming the previous findings, the SLI children showed chance performance on telic verbs in the no-endstate condition (63% correct). Importantly, there was no correlation between performance on the telicity task and on the vocabulary test. In addition, children who mastered telicity did not have a larger overall vocabulary or verb vocabulary than children who failed telicity. These results suggest that difficulties with telicity are independent of a general lexical deficit.

Schulz and Wittek (2003) found that SLI children's difficulty with telicity is restricted to telic verbs and that atelic verb comprehension is unimpaired. The atelic verbs tested were

malen 'draw', *fegen* 'sweep', *wischen* 'wipe', *bauen* 'build', *schneiden* 'cut', *bürsten* 'brush', *pusten* 'blow, and *puzzeln* 'do a puzzle'. In the no-endstate condition half completed events were shown (e.g., for 'Did she draw?' a half drawn car). Sixteen 5-year-old children with SLI and 16 chronologically age-matched TD children participated in this study. The children with SLI met the typical exclusionary criteria for SLI and were enrolled in a preschool program for children with language disorders. Children with SLI, just like their same-age TD peers, correctly accepted atelic verbs in the no-endstate condition (94 % correct), indicating an adult-like interpretation of atelic verbs.

5.2.3. Difficulty with inherently telic verbs: Just a matter of experimental method?

One may object that use of picture sequences is not ideal for depicting changes of states and that this may have affected SLI children's performance. That is, SLI children's difficulty with telicity may result from processing complex events presented in pictures, which could point to domain-general difficulties rather than to selective deficits with telicity. The study by Schulz and Wittek (2003) (see Section 5.2.2.) was able to evaluate this possibility, because their TVJ task involved acting out the scenes instead of using picture sequences. All scenes were acted out by a puppet in front of the child by the first experimenter. After the performance, the puppet was seated away from the scene to clearly indicate that the action had stopped. A second experimenter then asked a *yes/no*-question. This way the (in)completeness of the event was made explicit and task demands for the child were lowered. The telic verbs tested were *aufmachen* 'open', *zumachen* 'close', *anmachen* 'turn on', and *abmachen* 'take off'. In the eight relevant test trials, event culmination did not occur (e.g., a container was manipulated without opening it). As expected, the TD children performed well on telic verbs in the no-endstate condition. The children with SLI showed chance performance on telic verbs in the no-endstate condition (53% correct). An analysis by individual confirmed

that telic verbs were mastered by 80% of the TD children, but only by 50% of the children with SLI, indicating that the endstate as head-of-event in telic verbs is optional for many children with SLI. Recall that this is exactly the representation for processes like *draw* that need not result in a culmination point such as a completed picture of a flower.

The findings from this TVJ task using props are in line with the results reported above for picture-sequences and provide clear evidence that lowering the task demands did not improve SLI children's ability to interpret telic verbs. Schulz and Wittek's (2003) study then suggests that SLI children's problems with telicity cannot be accounted for by domain-general problems with processing complex events, but are related to domain-specific semantic difficulties.

5.2.4 Inherent telicity: Interim summary

If children exhibit an *Endstate Orientation*, they should recognize that verbs like *aufmachen* 'open' designate events with a natural culmination point that is entailed by the verb meaning. *Endstate Orientation* was shown to guide TD children's comprehension from early on (i.e. from age 2 onwards), the youngest age where testing with TVJ was possible. Children with SLI were found to not reliably recognize that the endstate is entailed by inherently telic verbs up to 8 years of age. A comparison with children's interpretation of atelic verbs revealed that SLI children's difficulties with event types do not extend to atelic verbs, which were correctly assigned an event structural representation without an entailed endstate. Moreover, a comparison of SLI children's knowledge of inherent telicity with vocabulary knowledge indicates no general difficulties in the lexical domain, pointing to a genuine impairment in the lexical semantics module. Depicting the events via acted out scenes rather than via picture sequences did not improve SLI children's performance. Hence the difficulty with inherently telic verbs is not caused by general difficulties with processing

complex events in picture sequences, pointing to a domain-specific problem. SLI children's difficulty is argued to result from an instable *Endstate Orientation*, which leads to a representation of endstate-oriented transitions with an optional rather than an obligatory endstate as head-of-event. This mis-setting in the event-semantic representation, which applies to telic but not to atelic verbs, points to a deficit in the sense of de Villiers (2003): A deficit is attested if a piece of grammar is missing or if something is mis-set in the structure. Whether morphologically simple inherently telic verbs like *finden* 'find' follow the same pattern reported here for particle verbs is open.

5.3. Compositional telicity

In Section 2.3, it was argued that compositional telicity results from adding resultative particles or quantized noun phrases to an atelic process verb. The function of strong telicity markers like *auf* in *aufessen* 'eat up' was predicted to be acquired as early as that of inherent telic particle verbs, while the function of weak telicity markers such as certain quantized noun phrases in triggering telicity may be acquired later.

Previous research on the acquisition of telicity investigated comprehension of particle verbs and quantized noun phrases across different languages (see van Hout, this volume: chapter XXX). Van Hout (1998, 2000) found that the particle verbs *eat up* and *drink up,* and their Dutch counterparts, were correctly restricted to telic interpretations by most 4- and 5-year-olds. As for the interpretation of quantized noun phrases, children up to age 5 allowed predicates with definite NPs such as *eat his cheese* or *drink his tea,* and their Dutch equivalents, to refer to events with and without event culmination. Since 4- and 5-year-olds in these studies correctly interpreted predicates with bare noun phrases such as *eat cheese* or *drink tea* as atelic, it is unlikely that they were simply unaware of the presence of the

determiner. According to van Hout (1998, 2008), children are more lenient than adults in accepting non-culmination with definite NPs, because there is no overt telicity marker on the verb. It may be that the child first learns overt compositional ('predicational' in van Hout's terms) telicity markers such as resultative particles and only later becomes sensitive to the role of the quantized noun phrase in encoding weak telicity.

Two sets of studies tested strong and weak telicity markers in German TD and SLI children within the same experiment (Schulz & Ose, 2008; Schulz & Penner, 2002; Schulz & Wenzel, 2005). Section 5.3.1. discusses the findings on strong telicity markers, Section 5.3.2. those on weak telicity markers.

5.3.1. Strong telicity markers

Adapting the TVJ design by Van Hout (1996), Schulz and Penner (2002) tested children's comprehension of verbs of consumption, contrasting atelic intransitive *essen* 'eat' and *trinken* 'drink' with their telic particle counterparts *aufessen* 'eat up' und *austrinken* 'drink up'. Unlike in Dutch and English, where the particle verb items were presented with a definite NP (e.g., *The mouse ate up his cheese*), in German, intransitive forms were used (e.g., *Die Maus hat aufgegessen* 'the mouse ate up'), which is grammatical in German, but not in English or Dutch. This way it was possible to assess the effect of the particle independent of the presence of a quantized noun phrase. Participants saw eight picture-sequences depicting different events of eating and drinking, either with or without event completion. Examples of both conditions are given in Figures 3a. and 3b.

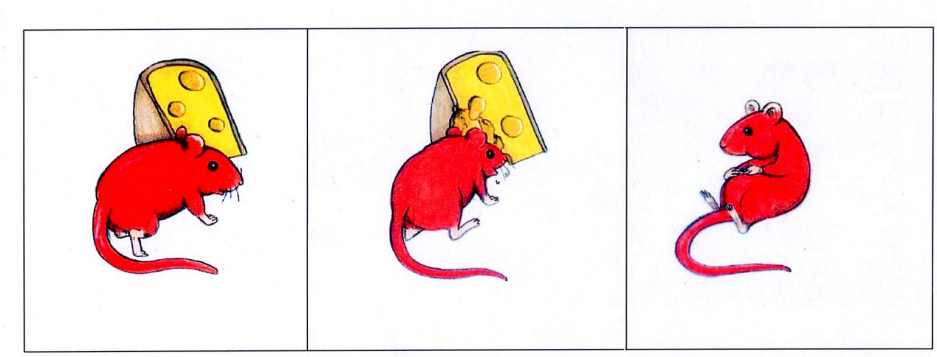


Figure 3a. Compositional telicity: Endstate condition

Test question 1: *Hat die Maus gegessen?* Did the mouse eat?

Target answer: Yes.

Test question 2: *Hat die Maus aufgegessen?* 'Did the mouse eat up?'

Target answer: Yes.

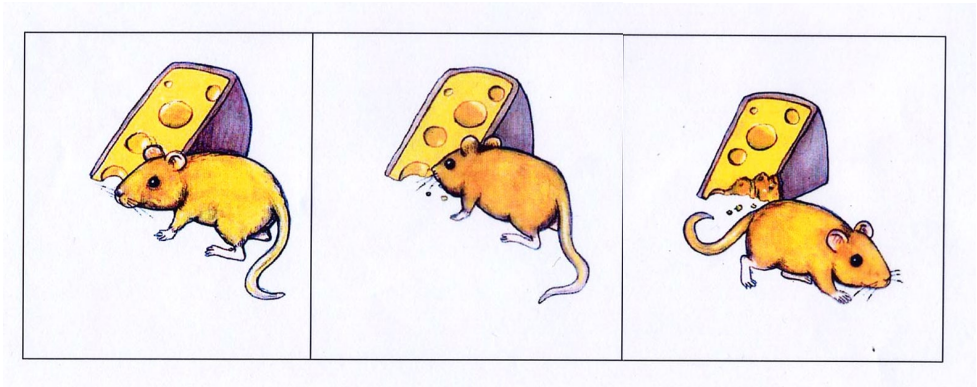


Figure 3b. Compositional telicity: No-Endstate condition
Test question 1: *Hat die Maus gegessen?* 'Did the mouse eat?'

Target answer: Yes.

Test question 2: *Hat die Maus aufgegessen?* 'Did the mouse eat up?'

Target answer: No.

Control questions asking about details of the story were added to provide an equal number of possible *yes* and *no* responses. Twenty-four German-speaking TD children aged 4 to 6 (mean 5;04) and 24 adults participated in the study. In the no-endstate condition, children, like

adults, interpreted both atelic verbs (97% correct *yes* responses) and telic particle verbs (96% correct *no* responses) as predicted. A follow-up study (Schulz & Ose, 2008) with 39 3-year-olds and a new group of 18 children 4- and 5-year-olds, who were all classified as TD via a standardized language test, substantiated the findings of Schulz and Penner (2002). Moreover, they provided evidence that, already at 3 years of age, TD children know that intransitive verbs like *eat* and *drink* can designate events without completion (87% correct *yes* responses) and that the telic particles *auf* in *aufessen* 'eat up' and *aus* in *austrinken* 'drink up' create an event-type shift from atelic to telic (87% correct *no* responses). In summary, TD children's knowledge of strong telicity markers as event-type shifters is – like their knowledge of the event type of inherently telic particle verbs – present from the earliest ages tested to date.

Using the same design, Schulz & Wenzel (2005) tested 13 5-year-old children with SLI who had been diagnosed with receptive and expressive disorders by a speech therapist and had received below-average test scores in at least two subtests of a standardized language test. In the no-endstate condition, children with SLI, like their same-age TD peers, interpreted both the atelic verbs (100 % correct *yes* responses) and the telic particle verbs (96% correct *no* responses) as predicted. This is *prima facie* surprising given the persistent difficulty of SLI children with inherently telic verbs, reported in Section 5.2. It may be that the event structure of compositionally telic particle verbs is easier to acquire than that of inherently telic particle verbs, because the alternating forms *essen* 'eat up' and *aufessen* 'eat up' map one-to-one to the different event-types atelic and telic. If this analysis is on the right track, this data would point to a very specific deficit within the domain of verbal semantics. In other words, it may be that the lack of *Endstate Orientation* is restricted to lexical but not to compositional semantics. Alternatively, it may be that the presentation of both forms within the same experiment primed learners with SLI to pay attention to the presence or absence of the particle. Data from more children with SLI, across different designs, are needed to

substantiate the findings and to decide between these two possibilities. Notably, this response pattern clearly speaks against a Manner Bias in SLI.

5.3.2. Weak telicity markers

Regarding their role in marking telicity, weak telicity markers such as quantized noun phrases are expected to be mastered later as they do not provide an obligatory cue for an event-type shift from atelic to telic. Adopting van Hout's design (1996), Schulz and Penner (2002) tested this prediction for German. Comprehension of quantized noun phrases was assessed via *yes/no*-questions like *Hat die Maus den Käse gegessen?* 'Did the mouse eat the cheese?' either with or without event completion (see Figures 3a and 3b). In the no-endstate condition, adults and the five-year-olds, who also took part in the study mentioned above, accepted predicates with quantized NPs in half of the cases (children: 56% *yes* responses, adults: 52% *yes* responses). Given that the adults' responses reflect target-like interpretation, this finding clearly confirms the assumption that with quantized NPs telicity arises though implicature. An analysis of adults' typical verbal comments (e.g., *Yes, but she left a little*) suggests that they take the quantized NP to mark the specific object mentioned previously in the discourse (i.e. the cheese mentioned in the story compared to some other cheese or food not mentioned). Judging from children's typical verbal comments (e.g., *Yes, a little*) they seem to interpret quantized NPs as specific but not as obligatorily triggering an event-type shift from atelic to telic, just like the adults.

A follow-up study (Schulz & Ose, 2008) involved a new group of 4- and 5-year-olds and a group of 3-year-olds, as well as a new group of adults. In addition to the two conditions above, transitives with quantized NPs (e.g., *den Käse essen* '*eat the cheese'*) and with bare nouns (e.g., *Käse essen* 'eat cheese') were tested. Figure 4 summarizes the results across all sentence types for the crucial no-endstate condition. As expected, bare nouns were accepted

with non-culminated events by all groups. Even more strongly than in the study by Schulz and Penner (2002), quantized NPs were accepted with non-culmination often (adults: 73%, 3-year-olds: 86%, 4-and 5-year-olds: 69%), with no difference between the groups. Whether this difference between the two studies is accidental or is related to the slightly different design cannot be answered conclusively. The latter but not the former study included bare nouns, which provide a contrast to quantized NPs, but may have also raised participants' sensitivity to the presence of a noun in general. Note that, in contrast to the English and Dutch findings by van Hout (1998, 2000), German-speaking children were not found to be more lenient than adults in accepting non-culmination with weak telicity markers. This may be due to the fact that the quantization is less clear in specific definite NPs than in measure phases (*a cup of tea*) or possessives (*his tea*).

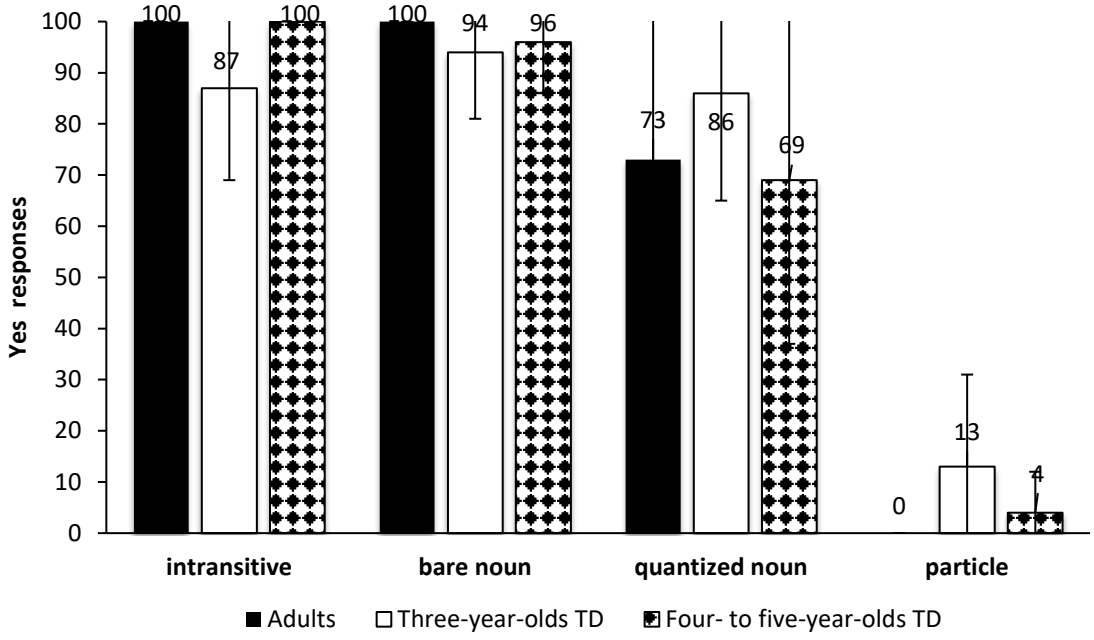


Figure 4. Mean proportion of *Yes* responses in the No-Endstate condition across sentence types and participant groups. Error bars indicate standard deviation.

We can conclude that German-speaking TD children are sensitive to weak compositional markers of telicity, and interpret transitive sentences with a quantized NPs as telic or atelic, just as the adult participants in our study are. What about children with SLI? Schulz and Wenzel (2005) also tested the 5-year-old SLI children with bare nouns and quantized NPs. Again their performance was not different from the same-age TD peers, correctly accepting bare nouns (92 % *yes* responses) in the no-endstate condition and accepting quantized NPs in this condition (81% *yes* responses) at the same rate as their same-age TD peers.[5]

In summary, starting at age 3 German-speaking TD children differentiate between strong and weak telicity markers in an adult-like manner. Telic particles like *auf* 'open' and *aus* 'off' are interpreted as obligatory event-type shifters from atelic to telic, and quantized NPs are interpreted as ambiguous between telic and atelic with verbs of consumption. That is, by age 3 children know that completion is derived by implicature in the latter and by entailment in the former case. It remains to be seen whether these findings extend beyond verbs of consumption to other verb classes including verbs of motion and surface-contact.

6. Conclusion and outlook

The acquisition studies on inherent and compositional telicity summarized in this chapter were based on the assumption that event completion can be entailed (semantic telicity) or implicated (pragmatic telicity). Inherently telic verbs and predicates with strong

[5] Note that the children with SLI did not exhibit a *yes* bias (see Section 5.3.1).

compositional telicity markers such as verb particles entail event completion, while weak telicity markers such as quantized NPs implicate event completion.

The account of *Event Structural Bootstrapping* outlined here argues that TD children initially focus on the verb's event structure. In their early acquisition of verb semantics, across languages TD children are argued to exhibit the strategy of *Endstate Orientation*, which is rooted in children's early conceptual and visual preference for endpoints. Children following an *Endstate Orientation* are predicted to focus on telic verbs designating endstate-oriented transitions, that obligatorily mark the endstate as head-of-event (see Penner et al., 2003; Schulz et al., 2001, 2002). The strategy of *Endstate Orientation* was contrasted with the Manner bias (Gentner, 1978) claiming that children focus on manner of actions. I hypothesized that children with SLI lack an *Endstate Orientation* and hence should not recognize that the endstate is entailed by inherently telic verbs. The specific predictions for acquisition made by this account were evaluated in several production and comprehension studies in German.

Our results from parental report and spontaneous speech studies revealed that TD children acquire verbs early, exhibiting a clear preference for resultative verb particles like *auf* 'open' and *aus* 'off' as their first event expressions. Accordingly, these data confirm that German TD children adhere to *Endstate Orientation* in building their productive verb lexicon.

Our studies on comprehension showed that at the youngest age tested so far, 2 years of age for inherently telic particle verbs and 3 years of age for compositional telicity, TD children distinguish between semantic and pragmatic telicity. More specifically, TD children reject inherently telic predicates and predicates with strong telicity markers for incomplete events (i.e. semantic telicity) and, like adults, often accept predicates with weak telicity markers such as quantized NPs for incomplete events (i.e. pragmatic telicity). Notably, children who have

been diagnosed with SLI, based on standard morpho-syntactic tests, were found to exhibit persistent difficulty with inherently telic verbs. These problems in SLI children were argued to result from an event-semantic representation of complex events in which the endstate as head-of-event is optional, leading to chance performance. The event-structural deficit found for German-speaking children with SLI points to a persistent deficit in the domain of (lexical) semantics that so far has not been at the center of SLI research. Results from a study on compositional telicity indicate that German-speaking children with SLI, in contrast to their persistent difficulty with inherently telic verbs such as *aufmachen* 'open', did not have difficulty with verbs like *aufessen* 'eat up' und *austrinken* 'drink up'. Note that this response pattern also speaks against a Manner Bias in SLI. Taken together, these data from SLI and TD children serve to illustrate how modular acquisition and how selective impairment can be and thus argue for modularity in the domain of verbal semantics as well.

Recently this line of research has been applied to diagnostics. A group of 3- to 8-year-old children, diagnosed with SLI using a standardized test with a focus on morpho-syntax, were reported to have lower test scores than TD children in the semantic telicity subtest of the standardized language test Lise-DaZ (Schulz & Tracy, 2011). This finding suggests that verb semantic deficits may even be robust enough to surface in a standardized language test that has to adhere to constraints different from those for an experiment.

Concluding, the account of *Event Structural Bootstrapping* and, specifically, the strategy of *Endstate Orientation* delineated in this chapter, invite several general predictions: (i) cross-linguistically, endstate-oriented transitions are acquired early, (ii) verb semantics can be selectively impaired in children with SLI, (iii) verb semantic deficits exist in children with SLI across languages, but may surface differently, depending on how the language marks telicity.

Using categories of decompositional representation (Dowty, 1979) or the level of lexical conceptual structure (e.g., Pustejovsky, 1995), the representation of a telic predicate can be roughly stated as [CAUSE… [BECOME [STATE]]]. In Germanic languages, telic verb particles transparently encode the endstate and are hence predicted to play a prominent role in early acquisition. In non-Germanic languages the endstate may not be lexicalized (e.g., absence of resultative adjective constructions in Romance). The strategy of *Endstate Orientation* then results in a further prediction: (iv) in non-Germanic languages young learners realize the endstate as a single lexeme, i.e. as the complex head [CAUSE [BECOME [STATE]]]. More research across languages and acquisition types is required to test these four predictions. This may contribute to both the field of acquisition and the field of theoretical semantics.

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