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DEVELOPMENT OF TELICITY INTERPRETATION:

SENSITIVITY TO VERB-TYPE AND DETERMINER-TYPE

By

Diane Alice Ogiela

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ABSTRACT

DEVELOPMENT OF TELICITY INTERPRETATION:

SENSITIVITY TO VERB-TYPE AND DETERMINER-TYPE

By

Diane Alice Ogiela

Previous research (van Hout, 1998) has shown that children have difficulty understanding whether a verb phrase (VP) is to be interpreted as telic (with a logical end point) or atelic (with no logical end point). To determine a VP's telicity, both nominal and verbal features of the VP must be taken into account. This dissertation examined the interpretation of VP telicity by expanding the linguistic variables examined. Four verb types and 2 determiner types were used. The verb types were (a) non-partitive, quantity-sensitive verbs (build-type); (b) partitive, quantity-sensitive verbs (eat-type); (c) quantity-insensitive verbs (push-type); and (d) the latter two with resultative particles (eat up-type and push over-type). The determiner types in the object determiner phrase (DP) were (a) the definite determiner *the* and (b) the cardinal number *two*. Study I examined how adults interpret telicity in VPs with different verb types and determiner types. Study II examined how 3-, 4-, 5-, and 6-year-old children interpret VP telicity under the same conditions. Both studies used a modified truth-value judgment task.

Study 1 hypothesized that, for adults, verb-type and determiner-type would interact to produce different response patterns to questions about non-culminating events. VPs with build-type verbs with a cardinal number in the

object DP, were predicted to induce the most telic interpretations, followed by build-type verbs with a definite determiner, eat-type verbs with a cardinal number, and finally, eat-type verbs with a definite determiner. This ranking was predicted by two linguistic factors: (a) the potential partitivity of eat-type verbs, and (b) the possible variability due to discourse-based interpretation of the definite determiner vs. a specific amount indicated by the cardinal number. Another hypothesis was that resultative particles serve somewhat different functions with push-type verbs than with eat-type verbs. Overall, the results of Study I supported the predictions.

The hypotheses and predictions for Study II were similar, with two added dimensions: (a) older children should demonstrate greater sensitivity to verb-type and determiner-type with regard to telicity than younger children and (b) because resultative particles are thought to be unambiguous indicators of telicity, children should be most sensitive to resultative particles for interpreting VPs as telic. There were group differences between the 3-year-olds and the 5- and 6-year-olds. There were no significant differences for VPs with eat-type vs. build-type verbs. There were more telic interpretations for VPs with the cardinal number than with the definite determiner. Although the particle was found to contribute to a telic interpretation when the object determiner was the definite determiner, its contribution to a telic interpretation was no greater than the cardinal number's contribution without the particle. The results suggest that even by age 6, children may not have a complete adult-like understanding of the definite determiner and of the finer distinctions between verb-types as they contribute to VP telicity.

DEDICATION

This dissertation is dedicated to my parents, Zdzisława and Wincenty Ogiela; to my husband, John Ader; and to my children, Logan and Marlena Ader.

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Completing my doctorate and this dissertation would not have been possible without the help, support, and influence of many wonderful people who I am fortunate to count among my friends and colleagues. I have many people to thank, it is hard to know where to start. Perhaps the beginning is a good place.

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specific hypotheses and determining the verb-types that were examined in these studies.

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CHAPTER 1

Introduction and Background

The goal of this dissertation was to contribute to the understanding of verb phrase (VP) telicity. The term *telicity* is used to refer to the temporal property of linguistic descriptions associated with logical endpoints. If a description of a situation includes a logical endpoint, it is said to be a *telic description*; and if it does not, it is said to be an *atelic description*[1].

Past research has indicated that cross-linguistically, there is a relationship between verb morphology and VP aspect in the language of young typically developing (TD) children (e.g., Antinucci & Miller, 1976; Bloom, Lifter & Hafitz, 1980; Bronckart & Sinclair; Harner, 1981; Johnson & Fey, 2006; Shirai & Andersen, 1995; Wagner, 2001; Weist, Wysocka, Witkowska-Stadnik, Buczowska & Konienczna, 1984). Specifically, it has been shown that TD children exhibit sensitivity to VP aspect in their early differential use of verb morphology. They tend to first use the progressive morpheme in activity VPs and the past tense morpheme in event VPs. Telicity is one of the features embedded within VP aspect. Activity VPs are atelic and event VPs are telic. The feature of VP aspect that seems to be responsible for this relationship is telicity. Children appear to be matching the telic or atelic characteristic of the VP aspect with the perfective (i.e, *-ed*) and imperfective (i.e., *-ing*) characteristics of viewpoint

[1] Some authors prefer the terms bounded and unbounded rather than telic and atelic. The terms telic and atelic will be used here and are considered essentially synonymous to bounded and unbounded.

aspect,[2] respectively. Thus, it can be said that TD children seem to show sensitivity to verb telicity in their early differential use of verb morphology.

Although there have been many studies on the relationship between tense and aspect as cited above, there has been relatively little research conducted on children's ability to interpret telicity itself, without the influence of verb morphology. In order to better understand this relationship it is important to study children's interpretation of telicity itself. Focusing on the compositionality of telicity, van Hout (1998) conducted a study in which she examined adults' and children's and interpretations of telicity in a variety of syntactic conditions not involving bound verb morphology. This dissertation builds on that work by examining the interpretation of telicity in adults and children using different verb-types and determiner-types.

This project was comprised of two related studies. The first examined adults' interpretation of telicity under various verb-type and determiner-type conditions and the second examined children's interpretation of telicity in a cross-sectional developmental study of 3-, 4-, 5-, and 6-year-olds. Chapter 1 begins with examples of telic and atelic descriptions and provides relevant linguistic background concerning telicity and its relationship to other temporal properties of language. The first chapter concludes with a description of an important earlier study that experimentally examined theoretical predictions regarding the interpretation of telicity in both adults and typically developing (TD) children (van

[2] The motivation for the relationship between VP aspect and tense morphology has been the topic of much discussion, but is beyond the scope of the present paper. See Li and Shirai (2000) for a detailed discussion regarding various past accounts that have been proposed as the source of this correlation. See Bohnemeyer and Swift (2004) for a more in depth account.

Hout, 1998). Chapter 2 discusses the specific linguistic variables, hypotheses, and predictions examined in the studies. Chapters 3 and 4 report the methodology used and the results obtained. Finally, chapter 5 discusses the interpretation of the results and makes suggestions for future research.

Linguistic Choices and Telicity

There are many ways in which we can describe any given situation. When we speak, we make many linguistic choices[3] that convey our specific intended meaning. When we describe an event, the semantic and syntactic choices we make interact to indicate whether or not the event, as we are describing it, has a logical endpoint or not. Whether or not a description includes a logical endpoint is referred to as telicity. If a description indicates that the situation described culminates in a logical endpoint, it is *telic*; if it does not indicate that it culminates in a logical endpoint, it is *atelic*. For example, the sentence in (1a) is telic; the logical endpoint is reached when John arrives at the park. The sentence in (1b) is atelic. There is no time at which walking in the park will culminate at a logical endpoint. There are several tests used for determining whether a verb phrase (VP) is telic or atelic. One of the most important tests is the contrast between adverbials such as, *for X time*, and *in X time*. If I say (1a), and modify it with *for two hours*, we don't know whether John ever arrived at the park. In contrast, if I say (1a) with the adverbial *in two hours*, I am asserting that the walking to the park took two hours. Now consider the sentence in (1b). If I say (1b), and modify

[3] The use of the word *choices* here is not meant to refer to conscious choices; rather it refers to the selection of particular linguistic forms in the course of speaking.

it with the adverbial *for two hours*, I am asserting that the activity of walking in the park continued for a period of two hours, but I am not asserting that some logical endpoint was reached. If I say (1b) and modify it with *in two hours*, the sentence is awkward because there is no logical endpoint to walking in the park. *In two hours* provides the temporal interval within which the event is to be completed but *walk in the park* does not have a completion point.

(1). a. *John walked to the park* (#*for two hours*/*in two hours*).

b. John walked in the park (*for two hours*/**in two hours*).

Another test used to determine if a VP is telic or atelic is the completion entailments test. The test goes as follows: Suppose a particular VP was in progress (using the imperfective *–ing* form of the verb), and it was suddenly discontinued. Is it true that it occurred? If the answer is *yes*, then the VP is atelic. If the answer is *no*, then the VP is telic. Consider the sentences in (2) and (3). In order to determine if the VP in (2a) is telic or atelic, the sentence can be put into its imperfective form as in (2b), and one can ask, "If Logan was running, and suddenly stopped running, did he run?" The answer is *yes*; therefore the VPs in the sentences in (2) are atelic. The result is different for the VP in (3). If (3a) is put into its imperfective form as in (3b) and one asks, "If Logan was drawing a circle, and suddenly stopped drawing a circle, did he draw a circle?" The answer is *no*, therefore the VPs in the sentences in (3) are telic. In other words, if a telic event is discontinued suddenly (i.e., before it reaches its logical endpoint) then

the VP that describes it is not true. The behavior of telic predicates became known as the imperfective paradox (Dowty, 1979).

(2) a. *Logan ran.* (atelic VP)

b. *Logan was running.*

(3) a. *Logan drew a circle.* (telic VP)

b. *Logan was drawing a circle.*

The telicity of a VP is not overtly indicated by a simple word or morpheme. Rather, it is dependent on an interaction between semantic and syntactic features of the elements in the VP. When we choose a particular verb, determiner, verb particle, or prepositional phrase, etc., among other choices, we are essentially choosing whether or not the sentence we produce includes an endpoint. Although we are most likely unaware of it, when we choose particular elements to include in a sentence, we are making a decision about its telicity. In the case of the sentences in (1) the type of prepositional phrase determined whether the description was telic or atelic. The VP elements impacting telicity that were examined for this project are: verb-type, determiner-type and resultative verb particles.

Linguistic Background

Temporal properties of verb phrases

Prior to discussing the particular elements that were examined here, it is important to place the notion of telicity within the larger context of the temporal properties of VPs. Telicity is just one of the temporal properties of VPs. In order to provide a more complete description of telicity, I will outline other temporal notions that are encoded in language. Specifically, I will briefly discuss tense, VP aspect (which includes telicity), viewpoint aspect, and how they relate to each other.

Sentences describe states, activities or events. The term *eventuality description*, from Bach (1986), will be used to encompass states, activities, and events. Eventualities happen in time. In natural languages, *tense* encodes the relationship between the time at which an eventuality takes place (i.e., *event time*) and the time at which it is talked about (i.e., *speech time*). It is a deictic relation that depends on the speech time, that is, the time of speaking about an eventuality (Comrie, 1976). Eventualities, independent of being identified as past, present, or future, also have other temporal properties. *Aspect* is the term used for the various ways in which we linguistically encode the internal temporal contour of a situation, that is, how a situation unfolds, regardless of the speech time. (e.g., Comrie, 1976; Klein, 1994; Smith, 1991).

Languages vary as to how richly they overtly encode tense and/or aspect.[4] Natural languages make use of only a small set of the possible temporal

[4] Note that aspect is a larger construct than telicity, but that the telic/atelic distinction is important to aspectual understanding.

eventuality contours. This project will concentrate on the division of eventualities on the basis of telicity, that is, based on whether the eventuality description has an inherent logical endpoint, and is therefore telic; or whether its description does not indicate an inherent logical endpoint, and is therefore atelic.

There are at least two layers with which we construct the contour of a situation syntactically prior to locating an event as occurring before or after the speech time. First, an eventuality description is built by combining a verb with its internal arguments; the result of which is a telic or an atelic VP. This layer, which we will call the VP layer, is generally referred to as *lexical aspect* or *aktionsart,* since it heavily depends on the lexical properties of the verb. After the internal contour of the VP is constructed, other aspectual markers such as the progressive or the perfect are added to the VP. This second aspectual layer is generally referred to as *grammatical* or *viewpoint aspect.*

The aspect of the first layer (i.e., the VP layer) is compositional, resulting from the interaction between the lexical properties of the verb, particles, and the internal arguments (e.g., determiner phrases). Therefore, it is necessary to address the properties of the entire VP, or predicate, and not just the verb itself in determining telicity and categorizing the aspect of the VP layer (Krifka, 1989; Verkuyl, 1989, 1993). The term lexical aspect implies that aspect is a property of a specific lexical item rather than a property of the whole VP, obtained compositionally. However, it is not just the properties of the verb that determine

aspect/telicity. The properties of the verb's determiner phrase[5] (DP) complements play a particularly important role in aspectual interpretation (Krifka, 1989; Schmitt, 1996; Verkuyl, 1989, 1993). Although the term lexical aspect is often used in the literature as referring to compositional aspect, for clarity, I will refer to the aspect of the VP layer as *VP aspect* rather than lexical aspect. Telic VPs will be referred to as events and non-stative atelic VPs will be referred to as activities.[6]

Because of the compositionality of VP aspect, any given verb will interact with the syntax of the rest of the VP. Thus, in one syntactic context a particular verb may be part of an activity/atelic VP, and in another syntactic context the same verb may be in an event/telic VP. The examples in (4) below illustrate that the presence of determiner phrases of varying types in the object position, or a resultative particle, can alter the telicity of a VP. Note that the characterizations in (4) are pure semantic descriptions and do not reflect exactly how these sentences are processed and evaluated within a context, as will be addressed in the research presented here.

(4). a. *He ate.* (intransitive; atelic/activity; If he was engaged in eating, the sentence is true whether or not he finishes all of what he was eating).

b. *He ate apples.* (bare plural DP; atelic/activity; If he engaged in eating more than one apple, the sentence is true whether or not he finished eating any of the apples).

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[5] Some readers may be more familiar with the term *noun phrase* rather than *determiner phrase*. In generative linguistics the determiner is the head of the determiner phrase and contains the noun phrase.

[6] States are also atelic, but will not be discussed here.

c. *He ate the/two apples.* (determiner/cardinal number + noun; telic/event; If he finished eating the given apples, the sentence is true).

d. *He ate up the/two apples.* (resultative verb particle; telic/event; If he finished eating all of the given apples, the sentence is true).

In optionally intransitive constructions, as in (4a), the VP is atelic. The described eventuality does not have an inherent logical endpoint. Note that with a VP that has a bare DP as in (4b) there is a direct object, but it carries no quantity (i.e., how many) information. Therefore, there is no logical endpoint to the eventuality, and it is atelic (e.g., Borer, 2005; Schmitt, 1996; Verkuyl, 1993). In a VP that has a determiner + noun as a direct object as in (4c), the eventuality is rendered telic because we have quantity information from the object. In a VP that has a resultative particle, as in (4d), the eventuality is telic because the particle forces a result state, indicating the completion or culmination of the event.

The VP layer is fundamental for the whole interpretation of the aspectual properties of a clause because the viewpoint aspect layer takes the VP layer as its input and modifies its eventuality description. With regard to viewpoint aspect, a speaker chooses a particular portion of the eventuality to assert (Klein, 1994) and it is this interval that is actually located by tense as being before, during, or after the speech time. The description can refer to the entire eventuality or just a part of it. This type of aspect is usually indicated through the use of linguistic elements such as inflectional morphemes. For example, consider the descriptions of the 'bridge building' eventuality in (5). We can assert that it is or was in progress, as in (5a), or we can assert that the event has culminated as in

(5b). Both VPs are telic and have logical endpoints. The difference is that the sentence in (5a) specifies that the event is/was in progress at the time that is being referred to and (5b) specifies that it is/was already completed at the time that is being referred to. In other words, in (5a) the speaker is choosing to talk about only a portion of the eventuality, whereas in (5b) the speaker is choosing to talk about the entirety of the eventuality.

(5) a. *John is building a bridge/was building a bridge.*

b. *John has built a bridge/had built a bridge.*

In many languages the overt marking of viewpoint aspect is a much more integral part of the grammar than it is in English. In English, the only morphemes that explicitly and overtly mark viewpoint aspect are the progressive (imperfective) *be* + *-ing*, and the perfect *have* + *-en/-ed*. Some languages such as Mandarin, mark viewpoint aspect but do not mark tense. Others, such as Polish and Russian, mark both tense and aspect obligatorily. In English, tense and aspect interact in predictable and interesting ways. The third-person singular present-tense and the past-tense morphemes do not explicitly mark viewpoint aspect, but they do affect aspectual interpretation by triggering inferences called implicatures. For example, consider the sentences in (6).

(6). a. *John walks home.*

b. *John walked home.*

c. *John walked home while Mary drove to work.*

d. *John is/was walking home.*

In (6a), the present tense third-person singular morpheme, *-s*, is associated with a generic/habitual interpretation in which the activity is most likely not taking place in the present moment, although it may be. It is imperfective. In (6b) the past-tense morpheme, *-ed*, imparts a perfective reading that implies that the activity of walking home has been completed. However, this is not necessarily so. As can be seen in (6c) both events take place in the past, but the reading of the sentence is not unequivocally perfective because it does not specify whether, in fact, John ever arrived at home, or if Mary ever arrived at work, just that the two were taking place simultaneously at some time in the past. By contrast, the progressive in (6d) overtly indicates that the walking eventuality was in progress, either at the time of speech in the case of the present tense, or prior to the time of speech in the case of the past tense, without indication that the walking eventuality stopped by the time of speech. It is imperfective.

In sum, viewpoint aspect is related to perfectivity and imperfectivity and is expressed through grammatical devices. Although VP telicity, viewpoint aspect, and tense interact within a given sentence, they are independent from one another. In other words, a telic VP does not preclude the use of a tense morpheme that implies imperfectivity or the use of an aspect morpheme that marks atelicity (be + *-ing*). Telic VPs express eventualities that have inherent endpoints, regardless of the verbal morphology that accompanies them and the

time at which the event takes place, as the examples in (7) below demonstrate. Atelic VPs do not have inherent endpoints, regardless of the verbal morphology that accompanies them, as the examples in (8) below demonstrate.

(7) a. *Logan is building a bridge/built a bridge.*
(The inherent endpoint is when the bridge is completed).

b. *Marly is sewing/sewed a dress.*
(The inherent endpoint is when the dress is completed).

c. *The dog is dying/died.*
(The inherent endpoint is when the dog is dead).

(8) a. *John is walking in the park/John walked in the park.*
(There is no logical endpoint).

b. *Marly is swimming in the pool/swam in the pool.*
(There is no logical endpoint).

c. *The dog is eating/ate.*
(There is no logical endpoint).

The examples above demonstrate that, although VP aspect and viewpoint aspect interact with regard to interpretation of a sentence, they are independent of one another. Imperfective morphology can occur in either a telic or atelic VP and perfective morphology can occur in either a telic or atelic VP.

Telicity Ingredients

Verb type: Quantity-sensitive vs. quantity-insensitive verbs. Non-stative verbs can be divided into two categories, quantity-sensitive verbs and quantity-insensitive verbs. For quantity-sensitive verbs the amount of the object being affected matters for the interpretation of the VP as telic or atelic, but for quantity-

insensitive verbs information about the quantity of the object does not matter. For example, the verb *build* is a quantity-sensitive verb because information about the object is relevant to determine an activity reading (atelic) or an event (telic) reading. For example, the sentence *He built houses for years* is an acceptable atelic sentence but the sentence *He built two houses for years,* is not. The latter requires some semantic coercion in order to get a reasonable interpretation. The verb *push* is an example of a quantity-insensitive verb, in that the amount of pushing does not matter, once any pushing has begun, pushing has taken place. For example, *He pushed the cart/two carts* would be judged as true whether the cart/two carts were pushed two centimeters or two kilometers, as long as there was a cart in the context and it was pushed. Whether the object is *carts*, *a cart*, *the carts*, or *two carts* has no bearing on the interpretation of telicity with push-type verbs. In sum, quantity-insensitive verbs are not sensitive to the quantity information in the object DP, while quantity-sensitive verbs are very sensitive to the quantity information in the object DP.

Quantized and non-quantized DPs. Determiner phrases may be divided into two main types: *quantized* and *non-quantized.* A quantized DP provides information about the size of the set that is being referred to or specifies the particular set of objects that is being referred to. For example, the DP, *two toys,* indicates the quantity of toys being referred to. When no quantity information is present, the noun phrase is said to be *non-quantized.* For example, the DP, *toys,* does not provide information about the amount of toys being described. Potentially, the DP *toys* can be associated to an infinite quantity of toys. It simply

indicates more than one toy, or the concept of toys, as in *Toys are expensive,* with no information about the size of the set (i.e., the number of toys or the particular set of toys). Besides DPs that contain a cardinal number, other examples of quantized DPs include those with a possessive pronoun or a definite determiner such as in *her toys* or *the toys.* Although these DPs do not indicate a specific number of toys, in order to interpret the definite determiner or the possessive in an DP in argument position, there must be a specific set in the discourse that is being referred to. In this case the quantity is the whole set, no matter how many individual objects the set contains. Quantized DPs include those with definite or indefinite determiners, cardinal numbers, or possessive pronouns, among others. Non-quantized DPs include those with bare plurals or mass nouns (e.g., *cheese*, *milk*, *rice*, etc.).

Resultative particles. The presence of a resultative particle verb in a VP also contributes to its telicity. Although different authors may categorize particle verbs differently, the categorizations tend to be similar and commonly distinguish between three types. Dehé (2002) summarizes these as 1) *compositional particle verbs* whose meanings are the combination of the meaning of the verb and the meaning of the particle (e.g., *take out*, *carry in*); 2) *idiomatic particle verbs* that are a complete unit, but whose meanings are not literally composed of the meanings of the verb and the particle (e.g., *turn down*, *put off*); and 3) *aspectual particle verbs* in which the particle contributes an aspectual interpretation to the verb (e.g., *eat up*, *used up*). Only compositional and aspectual particles are of interest here. Both compositional and aspectual resultative particle verbs can

indicate a result state and therefore contribute to a telic interpretation. For example, *She carried out the suitcases* contains a compositional particle verb and indicates a result state in which the suitcases are in a new location outside of the original location and *She ate up the sandwich* contains an aspectual particle verb and indicates a result state in which the sandwich has been completely consumed. Both resultative particle verbs cause the VP to have an unambiguously telic meaning. However, there is an important difference as well. In the compositional resultative particle verb, the particle is directional or goal oriented and the lexical meaning of the verb itself is altered. In the aspectual resultative particle verb, the particle verb unambiguously indicates telicity, but the lexical meaning of the verb itself is not altered.

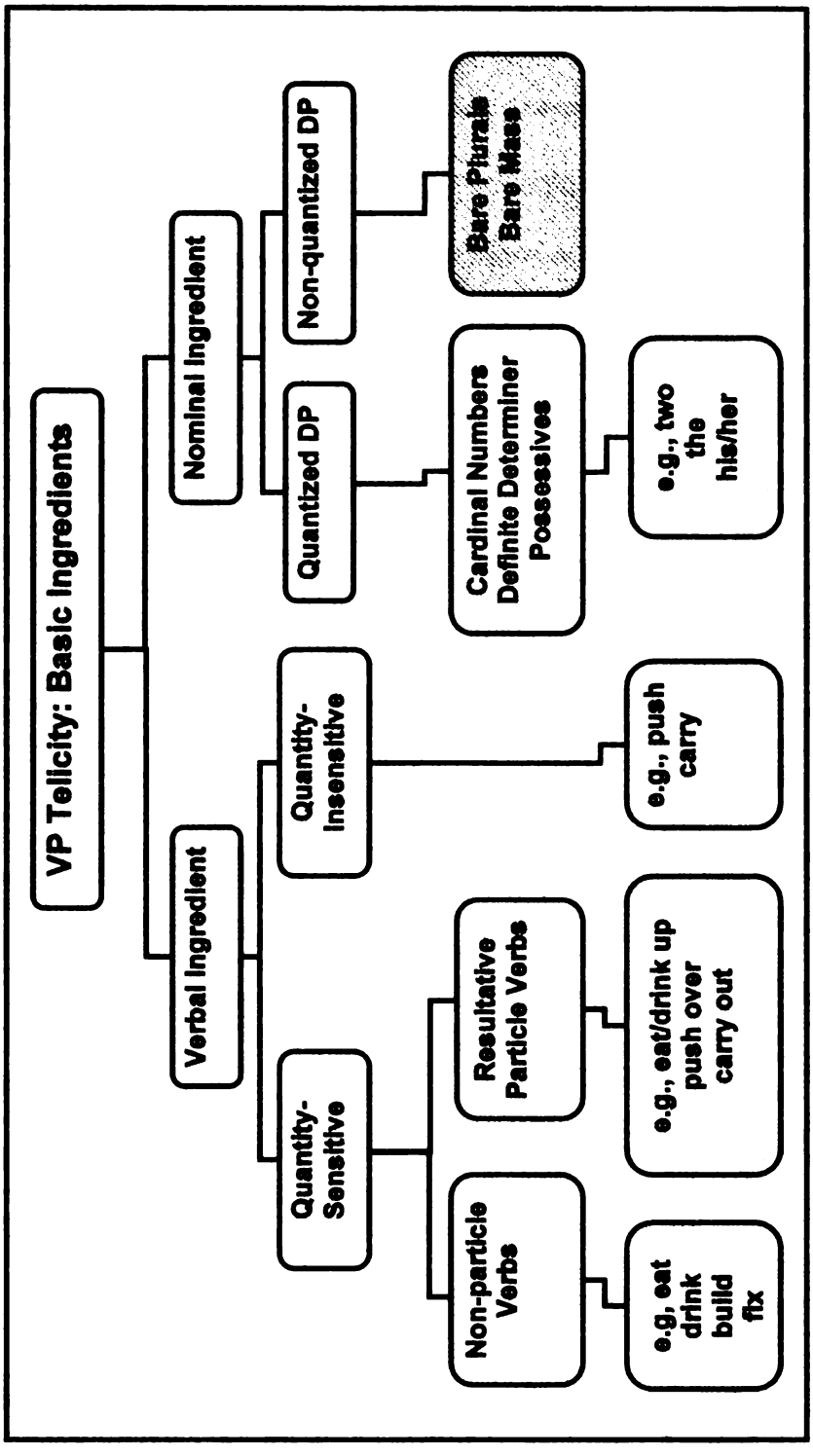

Figure 1. Schematic of basic telicity ingredients.

Theoretical Predictions for the Interpretation of Telicity

The basic ingredients of telicity are presented in Figure 1 above. The ways in which these ingredients combine are essentially responsible for determining whether a VP is telic or atelic. Although there may be differences in terminology, the following predictions follow largely from the seminal work of Verkuyl (1972) and its various implementations (Verkuyl, 1989, 1993), Krifka (1989) and others. The various combinations of quantity-sensitive vs. quantity-insensitive verb, quantized vs. non-quantized DP and presence vs. absence of resultative particle predict either a telic or atelic VP interpretation. The specific predictions are listed in (9) below.

(9) a. Quantity-sensitive V (intransitive) → Atelic VP
e.g., *She ate.*

b. Quantity-sensitive V + non-quantized object DP → Atelic VP
e.g., *She made birthday cards.*

c. Quantity-sensitive V + quantized object DP → Telic VP
e.g., *She made the/two/her birthday cards.*

d. Quantity-sensitive V + resultative particle + quantized object DP→ Telic VP
e.g., *She ate up the apples.*

e. Quantity-insensitive V + resultative particle + quantized object DP→ Telic VP

e.g., *She carried out the/her luggage.*

f. Quantity-insensitive V + quantized object DP → Atelic VP

e.g., *She carried her luggage.*

g. Quantity-insensitive V + non-quantized object DP → Atelic VP

e.g., *She carried luggage.*

An Experimental Test of Telicity Interpretation

van Hout (1998) points out that identifying telic vs. atelic VPs in languages such as English and Dutch presents a challenge for children because telicity is not overtly indicated. Rather, due to the compositional nature of telicity, it must be computed from the specific properties of the verb, the direct object DP, and particles. In her study, she specifically examined the role that the structure of direct object DPs and resultative particles have on adults' and children's interpretation of telicity in English and Dutch in the context of the quantity-sensitive verbs *eat* and *drink*. This study is particularly important because it provided the first behavioral test of some of the theoretical predictions listed in (9) above. In other words, it evaluated whether or not participants actually interpreted the telicity of VPs as theoretically predicted.

The participants in the study were adults, and 3-, 4-, and 5-year-old children who were monolingual speakers of either Dutch or English. The research participants were presented with a picture scene in which there were two distinct characters and the experimenter provided a narrative story to explain the scene. One character engaged in an eating or drinking event until it was completed, (i.e., culminated in a logical endpoint). The other character engaged in the same event but stopped before it culminated in its logical endpoint. For example, a scene was presented in which a red mouse ate an entire piece of cheese and a white mouse ate a few bites of a piece of cheese. In the case of the character that completed the event, the end of the accompanying narrative emphasized the completion: "*Look, here he's eating. The red mouse likes his cheese very much. You can see that here: his cheese is all gone*" (van Hout, 1998, p. 401). In the case of the character that stopped before the event reached its logical endpoint, the end of the accompanying narrative emphasized that the lack of completion: "*Look, there he's eating. He takes a couple of bites, but his cheese is too big for him for now. He leaves a piece for later*" (van Hout, 1998, p. 401).

Four different types of sentences were tested in a modified truth-value judgment task: (a) intransitive (e.g., *Did the white/red mouse eat?*); (b) transitive with a bare object DP (e.g., Did *the white/red mouse eat cheese?*); (c) transitive with a quantized direct object, indicated by a possessive pronoun in the object DP (e.g., *Did the red/white mouse eat his cheese?*); and (d) a resultative particle verb (e.g. *Did the white/red mouse eat up his cheese?*). These conditions

essentially correspond to the conditions listed in (9a) through (9d) above. The specific predictions of van Hout (1998) were: (a) resultative particles would be understood as telicity markers early on; (b) whether or not an object is present will not be recognized as a (a)telicity marker early on; (c) initially the (un)boundedness of the VP (i.e., a quantized or non-quantized DP), is not understood as a (a)telicity marker. The last of van Hout's (1998) predictions implies that adults will understand the boundedness of the VP (i.e., quantity-sensitive verb + quantized DP), as a telicity marker.

Sentence types (a) and (b) were atelic and their results were collapsed into one group called atelics because the participants' responses in these conditions were essentially identical. The results were analyzed in terms of the proportion of participant answers that indicated a telic interpretation of the question. For the convenience of discussion, van Hout's (1998) results are reproduced in Tables 1 and 2 below. The numbers indicate the proportion of respondents in each group that had a telic interpretation of the VP in the target question. That is, it is the proportion of the respondents who, consistent with the theory, answered *no* to the target questions for the character who did not completely consume the object. Given the theoretical predictions, the proportions in the Atelics columns were expected to be low and the proportions in the *His/her* object and Particle *up* columns were expected to be high.

For both English-speaking and Dutch-speaking adults, atelics were rarely interpreted as telic. For the particle sentences, the proportion of telic responses by the English-speaking adults was .81 and the proportion of telic responses by

Table 1: Results for English-Speaking Children and Adults: Mean Proportion of Telic Answers as a Function of Sentence Type

Group	Atelics	*His/her* object	Particle *up*
3-year-olds	.37	.45	.66
4-year-olds	.44	.56	.62
5-year-olds	.38	.56	.91
Adults	.03	.25	.81

Note. From "On the role of direct objects and particles in learning telicity in Dutch and English," by A. van Hout, 1998, *Proceedings of the Annual Boston University Conference on Lanuguage Development, 22*, p. 405. Copyright 1998 by Angeliek van Hout. Reprinted with permission.

Table 2: Results for Dutch-speaking Children and Adults: Mean Proportion of Telic Answers as a Function of Sentence Type

Group	Atelics	*His/her* object	Particle *up*
3-year-olds	.20	.17	.50
4-year-olds	.35	.50	.87
5-year-olds	.38	.47	.90
Adults	.14	.78	1.00

Note. From "On the role of direct objects and particles in learning telicity in Dutch and English," by A. van Hout, 1998, *Proceedings of the Annual Boston University Conference on Lanuguage Development, 22*, p. 404. Copyright 1998 by Angeliek van Hout. Reprinted with permission.

the Dutch-speaking adults was 1.0. Those results were largely expected. The results for the possessive DP sentences, which were used to test the influence of quantized NPs on telicity, did not meet the expectation for adults (i.e., telic response to questions with quantity-sensitive verb and quantized object DP), particularly for English-speaking adults. The proportion of telic responses by the English-speaking adults in the quantized DP sentences was only .25 and the proportion for the Dutch-speaking adults was .78.

Because the primary interest here is the English-speakers' results, the Dutch results will not be discussed in detail. For the English-speaking children, the 3- and 5-year-olds demonstrated a significant effect of sentence type, with the particle condition being distinguished from the atelic sentences even by the 3-year-olds, whereas the 4-year-olds seemed to treat all of the sentence types equally. The 5-year-old children appeared to be particularly adept at identifying the particle as a marker of a telic VP.

Statistically, none of the child groups distinguished the *his/her* object sentences from the atelic sentences. Although the adults only interpreted the *his/her* sentences as telic a quarter of the time, this was significantly different from their interpretations of the atelic sentences. However, it is interesting to note that the lack of difference in the children's interpretation of the atelic and his/her object sentences appears to not only be due to a relatively low proportion of telic interpretations of *his/her* object sentences, but also due to relatively high proportion of telic interpretations of the atelic sentences, as compared to the adults. In contrast, the adults had a very low proportion of telic interpretations of

atelic sentences. Furthermore, it is interesting to note that the children at all ages responded more closely to the prediction for the *his/her object* condition than did the adults.

The results for the English-speakers in van Hout's (1998) study are somewhat difficult to interpret, especially since the adults did not clearly interpret VPs containing the verbs *eat* and *drink* and a quantized NP as being telic, contrary to theoretical predictions (cf. Verkuyl, 1993), and the children did not demonstrate a clear developmental pattern in this condition. There are several methodological and design issues that may have contributed to these results.

One potential issue is the use of static pictures supplemented with a narrative description of the actions. First, using static pictures requires the participants to fill in and imagine the entirety of the event themselves and not all participants may imagine the event progressing in the exact same way. Second, there seems to be an assumption that the participants will correctly draw the conclusion that the picture they are looking at for the atelic event type depicts the end of the event that they are asked to judge. Third, the narrative may be distracting to subjects, making them think about the story that is being told about the circumstances of the event (e.g., "He takes a couple of bites, but his cheese is too big for him for now") and not necessarily about the event itself. Lastly, the narrative for the atelic event concludes with a line such as "He leaves a piece for later," which may be confusing to participants and they may answer the questions with regard to what was likely to occur later. These issues may be

controlled for by using videotaped stimuli, eliminating the need for narrative stories as the progression of the eventuality would be clear from the video.

Another issue is that possessive pronouns such as *his* and *her* may not be representative of quantizers as a whole. The possessive pronoun does not ensure a count reading of the determiner phrase and can allow for a mass reading of it. If one has a mass reading of the determiner phrase, it becomes atelic because it is non-quantized. For example, if two farmers, one male and one female, produce cheese, one can say *Her cheese is better than his cheese* and be referring to the cheese produced by each farmer in general, not some specific chunk of cheese that can be counted. The same can be said for a noun that is usually a count noun. If two bakers make cookies, one can say, *His cookies are better than her cookies*. In this example, cookies are referred to as a mass, and not a specific set of cookies. Therefore, the determiner phrases composed of a possessive pronoun and a noun are not necessarily quantized. Furthermore, questions such as "*Did he eat his cheese?*" can easily be interpreted as asking "*Did the mouse eat his own cheese as opposed to the other mouse's cheese?*" If this is the way a participant interprets the question, then *yes* is a reasonable answer in both the telic and atelic event conditions. This may mask the participants' true interpretations of the VP.

Finally, the study only examined two exemplars of one verb-type. The compositionality of aspect includes the interaction between the verb and the rest of the VP. Not all verb types would necessarily be expected to interact with a quantized NP in the same manner. Furthermore, cross-linguistically, the verbs

eat and *drink* behave in peculiar ways (Zribi-Hertz, 2003) which may limit the degree to which we would be able to generalize the results obtained with these verbs.

van Hout's (1998) study was particularly important for several reasons. First, it indicated that the general predictions for telic/atelic VPs may not be fine-grained enough to account for adults' true interpretations. Second, it introduced important questions that need to be addressed in order to further understand children's development of the interpretation of telicity. Given that the children did not interpret telicity in her study in the same manner as adults, it leads to yet another question; if children have difficulty calculating telicity, how is it that they appear to be matching the past tense and progressive morphemes to telic and atelic descriptions, respectively, in the studies that examine early child morpheme production (e.g., Antinucci & Miller, 1976; Bloom, Lifter & Hafitz, 1980; Bronckart & Sinclair; Harner, 1981; Johnson & Fey, 2006; Shirai & Andersen, 1995; Wagner, 2001; Weist, Wysocka, Witkowska-Stadnik, Buczowska & Konienczna, 1984)? (See page 1). Third, it established a useful framework for examining the interpretation of telicity experimentally. The studies presented in this dissertation build on this foundation by altering the methodology somewhat and by expanding some of the linguistic variables into more specific categories.

CHAPTER 2

Linguistic Variables, Hypotheses and Predictions

As discussed in chapter 1, the meaning of a sentence is more than the sum of its parts. In order to interpret a sentence, we not only need to know the meaning of its parts, but also how they interact with each other. Full aspectual interpretation of a sentence is determined by multiple semantic, syntactic and pragmatic properties. Understanding how people interpret and indicate aspectual information requires the examination of several semantic and syntactic properties including the lexical properties of verbs, verb-particle combinations, the internal structure of the internal arguments, and whether VPs include perfective or imperfective morphology. The focus of this project was limited to the examination of adults' and children's abilities to integrate the lexical properties of verbs and verb particle constructions with internal verb argument properties (i.e., object DP) in order to interpret the aspectual properties of the VP.

This project was comprised of two studies, one with adult participants and one with child participants at 4 age levels. They addressed adults' and children's abilities to integrate semantic and syntactic information in the VP in order to obtain telic or atelic interpretations of VPs.

Linguistic Variables

Because the telicity of a VP is dependent on a variety of factors, it is possible that different factors will influence interpretation at various stages of

linguistic development. The variables used here are representative of the ingredients involved in calculating telicity and include verb-type, determiner-type in the direct object DP, and the presence of a resultative particle. These have been selected to address specific questions and to provide a finer-grained analysis of telicity.

Verb-type

Quantity-insensitive verbs are expected to yield atelic interpretations of a VP regardless of whether the object DP is quantized or non-quantized (in the absence of certain types of prepositional phrases), because the VP is simply insensitive to amount. On the other hand, quantity-sensitive verbs (in the absence of certain types of prepositional phrases) are expected to yield a telic interpretation with a quantized object DP and an atelic interpretation with a non-quantized object DP. Note that various other combinations were outlined in (9) above.

Many examples of telicity and the compositionality of telicity employ the verbs *eat* and *drink*. This is reasonable because *eat* and *drink* are common verbs cross-linguistically, which allows for comparisons, and they are quantity-sensitive while also syntactically flexible. For example, these verbs can be transitive or intransitive; they can combine with non-quantized DPs for atelic readings or quantized DPs for telic readings; and they can take an aspectual particle such as *up* to obtain a telic reading. This flexibility of *eat* and *drink*, make them ideal for studying telicity across different syntactic conditions. However, it is challenging to

identify other verbs with the same range and type of flexibility. It is possible that this flexibility is an indication that verbs like *eat* and *drink* are different from other quantity-sensitive verbs. Zribi-Hertz (2003) notes that crosslinguistically, the consumption verbs *eat* and *drink* behave in peculiar ways. Consider other common quantity-sensitive verbs such as *build* and *fix*. Like *eat* and *drink*, *build* and *fix* can yield telic and atelic VPs when followed by a quantized and non-quantized DP, respectively, as in (10a) through (10d). Unlike *eat* and *drink*, they cannot be used in an intransitive frame, as seen in (11a) and (11b). Furthermore, when *build* or *fix* are combined with the particle *up*, the particle does not function as a resultative particle as it does with *eat* and *drink*. The sentence in (12a) is atelic. There is no logical endpoint, because the particle *up* with the verb *build* is an idiomatic verb-particle construction that means to make something bigger or stronger. Similarly, the sentence in (12b) does not mean that John finished fixing the room, it means that he made the room nicer.

(10). a. *John built the house.* (telic)

b. *John built houses.* (atelic)

c. *John fixed my car.* (telic)

d. *John fixed cars.* (atelic)

(11) a. **John built.*

b. **John fixed.*

(12). a. *John built up the wall.*

b. *John fixed up the room.*

This does not mean that all other quantity-sensitive verbs necessarily behave like *build* and *fix*. Verbs can be categorized in several different ways. The point is that it is difficult to identify other quantity-sensitive verbs that behave the same way as *eat* and *drink* in terms of transitivity, quantized/non–quantized DPs, and telic readings with the particle *up*. This suggests that *eat* and *drink* may have some special characteristics not common to all quantity-sensitive verbs, which may also be partially responsible for the unexpected adult results in van Hout's (1998) study.

Within the quantity-sensitive group, we can make the following distinction: There are quantity-sensitive verbs that allow partitive readings of the DP in the object position and those which cannot, as illustrated in (13) through (15) below. The former will be referred to as eat-type verbs and the latter as build-type verbs. As is seen in (13a) and (13b), *eat* and *drink* are quantity-sensitive verbs that can have partitive interpretations meaning that Logan ate pieces from the cake or took sips from the milk, without eating any specific amount of the cake or the whole cake or drinking any specific amount of the milk or the whole gallon of milk. To illustrate that the preposition *of* or *from* does not need to be present in order to get such and interpretation, consider a situation for (13b), in which I take the milk out of the refrigerator, open it and say "This smells funny. Do you think the milk is spoiled?" and someone responds, "Well, Logan drank the milk a little

while ago and he feels fine." Obviously, if there is still milk left that smells funny, the sentence could not have meant that Logan drank the entire gallon of milk, but that he drank *from the milk*. Furthermore, if the time adverbial test of telicity is applied to (13a) and (13b) as in (14a) and (14b), we see that the adverbial *for 2 hours* yields an atelic interpretation of the sentence, despite the presence of a quantized object DP.

(13) a. *Logan ate the cake* can be interpreted as *Logan ate of/from the cake.*

b. *Logan drank the milk* can be interpreted as *Logan drank of/from the milk.*

(14) a. *Logan ate from the cake for two hours/*in two hours.*

b. *Logan drank from the milk for two hours/*in two hours.*

In contrast, the sentences in (15a) and (15b) demonstrate that the partitive versions of the sentences with *build* and *fix* are ungrammatical and do not mean that partial building or partial fixing had taken place. The possible partitive behavior of *eat* and *drink* that was demonstrated above, is one of the cross-linguistic peculiarities of these consumption verbs, as noted by Zribi-Hertz (2003). For this reason, *eat* and *drink* may not be the best representation of a general category of quantity-sensitive verbs, although they may be very good representations of partitive quantity-sensitive verbs.

(15) a. *Logan built the house* cannot be interpreted as **Logan built off/from the house.*

b. Logan fixed the ladder cannot be interpreted as **Logan fixed off/from the ladder.*

The partitive interpretations that are possible with eat-type verbs and not with the others, is what causes us to treat them differently. If listeners have access to either a partitive or non-partitive interpretation for these verbs, we may expect variability in adults' responses to questions containing an eat-type verb and a quantized object DP. It may yield a telic or an atelic interpretation. This may help explain the adult's results in van Hout's (1998) study. The English-speaking adults interpreted VPs such as *eat his cheese* as telic only 25% of the time and the Dutch-speaking adults 78% of the time. The lower than expected levels of telic interpretations may be accounted for by partitive interpretations of *eat* and *drink.* There may be other verbs that will also allow partitive and non-partitive interpretations. However, this study limits the investigation to quantity-sensitive verbs subdivided into partitive eat-type verbs and non-partitive build-type verbs, and quantity-insensitive verbs.

Resultative particles

Not all verbs easily become particle verbs. As seen earlier, not all quantity-sensitive verbs can combine with a purely aspectual particle to obtain a resultative meaning. Verbs such as *build* and *fix*, do not obtain a resultative meaning with the particle *up*, whereas others, such as *eat* and *drink* do obtain a

resultative meaning with the *up*. See (12a) and (12b) above. For example, although one can say *build up* and *fix up*, these particle verbs are idiomatic, whereas *eat up* and *drink up* are aspectual and specifically force telic interpretations. With eat-type verbs, the aspectual particle *up* unambiguously indicates that all of the object DP must be affected by the verb. Why would we need an aspectual particle if eat-type verbs and a quantized NP should give us a telic interpretation in the first place? It seems reasonable that this is because of the accessibility of partitive interpretations for eat-type verbs. For some individuals, in certain circumstances, the presence of a quantized object DP after an eat-type verb may adequately do the work of creating a telic interpretation. If, however, *eat* and *drink* are interpreted as *eat unspecified quantities from,* and *drink unspecified quantities from,* the presence of a quantized object DP after an eat-type verb, may not necessarily force a telic interpretation of the VP. Consider the sentence in (16a). It could be interpreted as telic, meaning that the entire cupcake was consumed, as indicated by the acceptable addition of the adverbial *in 10 minutes.* It could also be interpreted as atelic if *eat* is interpreted partitively, as indicated by the acceptable addition of the adverbial *for 10 minutes.* In the latter case, the sentence would be interpreted as meaning that Marly ate some unspecified quantities from the cupcake over a 10 minute period. Now consider (16b) with the resultative particle *up* and the adverbials *in 10 minutes* (which is telic) and *for 10 minutes* (which is ungrammatical). The resultative particle *up* appears to block the partitive/atelic interpretation of the VP or at least

disambiguate the interpretation, and force the interpretation that all of the object DP must be affected for a sentence such as *Marly ate up the cupcake* to be true

(16) a. *Marly ate the cupcake in 10 minutes/ for 10 minutes.*

b. *Marly ate up the cupcake in 10 minutes/*for 10 minutes.*

Thus, the resultative particle *up* with eat-type verbs, may be an unambiguous marker of telicity, but because telic interpretations of VPs with eat-type verbs and quantized DPs can be obtained without it, it is not the only element of the VP responsible for the telicity. In other words, the resultative particle *up* is not responsible for creating the telic interpretation, rather, it may ensure that the partitive and subsequently atelic interpretation is avoided.

In contrast to the resultative particle *up* with eat-type verbs, compositional resultative particles with quantity-insensitive verbs appear to be completely responsible for telic interpretations. There is a marked contrast between (17a) and (17b). The first sentence is clearly atelic and the second is clearly telic. There is little room for other interpretations. There are no differences between the object DPs in the two sentences, and the only difference is the resultative particle in (17b) which apparently does all of the work of indicating that the VP is telic. Unlike the particle *up* above, the particle here creates the telic interpretation. To be clear, particle verbs such as *eat up* and *push over* are not equal counterparts to each other. In the case of *eat up X*, *up* indicates that there is a logical endpoint to the eating of X. In the case of *push over X*, *over* does not

indicate that there is a logical endpoint to the pushing of X. Rather, *over* indicates that there is a logical endpoint to the pushing over of X.

17. a) *Rob pushed the box.*

    b) *Rob pushed over the box.*

In order to compare the contribution of the resultative particle *up* to telic interpretations with partitive quantity-sensitive verbs and resultative particles such as *over* and *out* with quantity-insensitive verbs, eat-type verbs (i.e., *eat* and *drink*) will be compared to eat up-type verbs (i.e., *eat up* and *drink up*), and push-type verbs (i.e., *push* and *carry*) will be compared to push-over type verbs (i.e., *push over* and *carry out*).

Quantized DPs: Definite Determiner vs. Cardinal Number

There are various types of quantizers, such as definite and indefinite determiners, possessive pronouns (in certain contexts), quantifiers, and cardinal numbers. The present study will include the definite determiner *the*, and the cardinal number *two*. Although DPs headed by a cardinal number are similar to those headed by a definite determiner, in that they both provide quantity information, there are important differences in their potential interpretations. A cardinal number such as *two* asserts *at least two* and implies *exactly two* (see Horn, 2004). For example, if I ask someone to *give me three books* and they give me two books or four books then they have not done as I asked because I

specifically requested three books. If I ask someone to *give me the books*, they may give me two, three or four books, depending on the number of relevant books in the discourse context.

While the quantity of items associated with a definite description in English is determined, it is determined in the context. The definite determiner picks out the relevant maximal set in the discourse. Following Heim (1991), the definite determiner is associated with an existence and uniqueness presupposition. This is illustrated by Heim's example in (18) below. The sentence in (18) presupposes the existence of one unique cat in the domain of the discourse and is therefore true only if there is exactly one cat and that cat is asleep. If there is exactly one cat and it is not asleep, then (18) is false. If, however, there are no cats or if there are two or more cats, then (18) cannot be evaluated as to whether or not it is true according to the Fregean analysis of definite determiners with a singular noun (as cited in Heim, 1991). This analysis is summarized in (19) below (Heim, 1991, p. 9).

(18) *The cat is asleep.*

(19) A proposition in the form [the z] x is:

a) true at index i, if there is exactly one z at i , and it is x at i;

b) false, if there is exactly one z at i, and it is not x at i; and

c) truth-valueless at index i, if there isn't exactly one z at i.

This analysis can be extended to plural definites as well, although in the case of the plural as in (20), *cats* is the set of all cats, and *the cats* is the set of all possible groupings of more than one cat. The truth-value of *the cats* is evaluated by (21) below (Heim, 1991, p. 22).

(20) *The cats are asleep.*

(21) [the z] x is true if the extension of z contains the greatest element and this greatest element is in the extension of x.

In other words, (20) is true if *the cats*, extends to, and therefore refers to all the cats relevant to the discourse, and they are all asleep. In situations where the DP, [the z], is truth-valueless, as described in (19c) above, listeners can try to find a way to be able to judge the sentence as true via a process of pragmatic accommodation (Kadmon, 2001). This is because, depending on the context, what counts as the domain of the discourse may shift. The crux of the above discussion is that, although semantically the definite determiner picks out the maximal set in the discourse that fits a description, listeners are quick to reevaluate the context in such a that allows them to accept a non-maximal set as maximal via a process of pragmatic accommodation. Thus, if I say *I picked up the kids at the park*, I do not really mean that I picked up all the kids that were at the park. The listener will interpret this sentence as meaning that I picked up the kids that I am responsible for picking up. This is due to a knowledge and/or presupposition of to whom *the kids* refers. In other words, the definite determiner

is crucially dependent on the discourse context to be interpreted. Furthermore, when someone says *Mary built the houses*, in order for this sentence to be true, we need to see whether Mary built the houses referred to in the discourse or not. This may depend on some shared knowledge or reference between the speaker and the listener. The definite determiner picks a set of houses that is salient in the discourse; and that may be a subset of the houses built.

. In contrast to the definite determiner, a cardinal number asserts the quantity, rather than presupposes that there is a set in the context that fits the description of a particular DP. Therefore, it is not possible for one to accept the sentence in (22a) when only two cats are asleep. Furthermore, if a scenario included three sleeping cats, people are not likely to accept the sentence in (22b) as an adequate description of it because, if three cats are asleep, although it is also true that two cats are asleep, cardinal numbers in this context carry the implicature of exactly three cats. (See Horn, 2004.) Therefore, object DPs with cardinal numbers would not be expected to lend themselves to accommodation.

(22). a. *Three cats are asleep.*

b. *Two cats are asleep.*

In sum, the interpretation of a DP with a definite determiner is much more dependent on the discourse conditions than other determiners, and what counts as the relevant set in the domain of the discourse will vary from context to context (see Heim, 1991). On the other hand, interpretation of the cardinal

number *two* as *at least two* does not depend (necessarily) on the context, and does not vary. In other words, a definite DP may refer to two objects in one context and three objects in another context; a DP with the cardinal number *two* will always refer to a set of at least two objects. The comparison of definite determiners to cardinal numbers in the object DP could clarify the role of the object DP's syntactic properties on the interpretation of VP telicity, in the absence of the potential effects of pragmatic accommodation.

There is a second motivation for the comparison of object DPs with definite determiners to those with cardinal numbers that has to do with children's abilities in understanding these categories. It is well documented in the literature that children as old as 6 do not yet have a fully developed determiner system and have particular difficulties learning all of the subtleties of the definite determiner (Karmiloff-Smith, 1979; Maratsos, 1976; Munn, Miller and Schmitt, 2006; Perez-Leroux, Munn, Schmitt and Delrish, 2004; and others). Although children use the definite determiner early on, there is an extended period of development during which the system is fine-tuned before it reflects the adult system. One factor that impacts the difficulty of fully understanding the definite determiner is that its interpretation is fundamentally discourse-based, as described above. The listener must decide what constitutes the actual referent that is being talked about by the speaker within the context. For children, the definite determiner appears to have broader application than it does for adults (Karmiloff-Smith, 1979 and Perez-Leroux, et al., 2004). On the other hand, the cardinal number specifies the quantity of objects being referred to by the speaker, eliminating the need to make

a discourse-based decision. Children acquire the ability to count small quantities using one-to-one correspondence by age 2 and perhaps even earlier (Gelman & Gallistel, 1978). Wynn (1990) found that by about age 3½ children learn the cardinal word principle, which is that the last word used in a count indicates the number of items present. Given the differences in children's abilities with definite determiners and cardinal numbers, the present research also explores whether children would be better able to use cardinal numbers to understand a DP as quantized than the definite determiner. The cardinal number is predicted to have a more effective quantizing role than the definite determiner.

It is important to note that the rationale for the cardinal number yielding more telic interpretations than the definite number is slightly different for adults than for children. In both cases, the definite determiner requires reference to the discourse context. In the case of the adults, the rationale is that they may use pragmatic accommodation to shift what constitutes the set referred to by the DP with the definite determiner, and that cardinal numbers do not. In the case of children, they are anticipated to be less proficient with the definite determiner overall, specifically with identifying exactly what set the definite DP refers to; whereas the cardinal number provides a specific and predetermined referent.

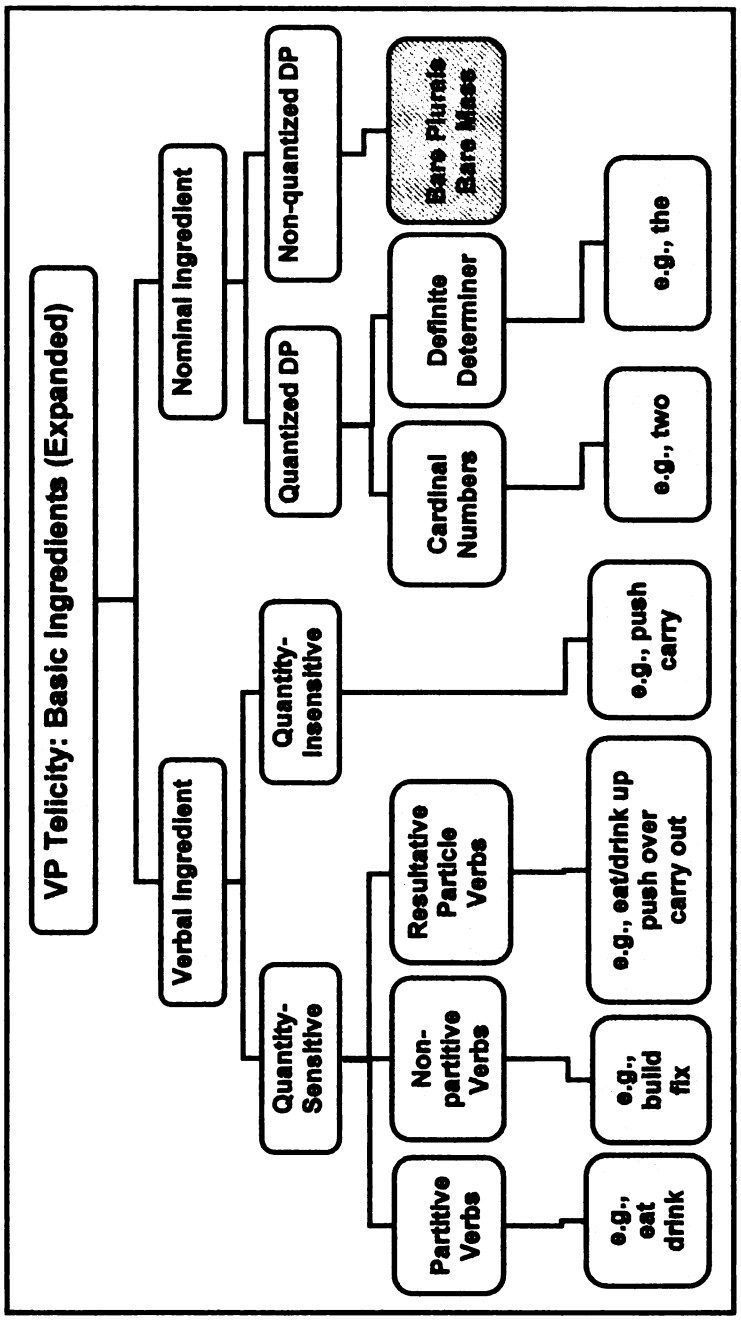

Figure 2. Expanded schematic of basic telicity distinguishing between partitive and non-partitive quantity sensitive verbs and between cardinal numbers and definite determiners serving as quantizers.

Specific Variables

Given the issues discussed above, the schematic of linguistic ingredients that are relevant to telicity can be expanded to include a distinction between partitive and non-partitive quantity-sensitive verbs and a distinction between cardinal numbers and the definite determiner as quantizing determiners, as seen in Figure 2. The two major independent linguistic variables in the study are verb-type and determiner-type. In order to investigate the potential impact of specific verb-subtypes on the interpretation of telicity, the verb types employed in the studies are quantity-sensitive verbs that do not allow partitive complements, referred to as *build-type* verbs (i.e., *build* and *fix*); quantity-sensitive verbs that do allow partitive complements, referred to as *eat-type* verbs (i.e., *eat* and *drink*); and quantity-insensitive verbs, referred to as *push-type* verbs (i.e., *push* and *carry*). In order to investigate the impact of resultative particles with partitive quantity-sensitive verbs and quantity-insensitive verbs, the studies include these verb types as well, referred to as *eat up-type* verbs (i.e., *eat up* and *drink up*) and *push over-type* verbs (i.e., *push over* and *carry out*), respectively. In order to investigate the potential impact of different quantizing determiners, the determiner types employed were the definite determiner *the* and the cardinal number *two*.

Hypotheses and Predictions

This dissertation had two major aims: (1) To establish the adult levels of performance in the interpretation of telicity in the contexts of particular verb-types/sub-types, object DP types (definite determiner vs. cardinal number), and resultative particles; and (2) To investigate the development of the interpretation of telicity as a function of verb-type, object DP determiner-type and resultative particles by comparing the performance of 3-, 4-,5-, and 6-year-old children.

Task Description

The following brief description of the task is presented here in order to provide a context for understanding the specific predictions tested. (See Methods below for details.) The participants viewed short video segments, depicting actors engaged in situations that either culminated to their logical endpoints, (i.e., culminating event; CE), or did not culminate to their logical endpoints, (i.e., non-culminating event; NCE). NCEs were non-culminating because the actor in the video discontinued the task prior to its completion. After each video segment, the participants were asked to respond to a yes/no question such as: *Did the man eat the/two brownies?* or *Did the man eat up the/two brownies?* The responses following video segments portraying NCEs were of primary interest and relevant for interpreting the results because these indicate whether the participant interpreted the verbal stimulus sentence as telic or atelic. If a participant responded *no* to a yes/no question following a NCE video segment it is taken to mean that the VP in the questions was interpreted as a telic VP.

Study I: Adults

All of the hypotheses and predictions below refer to responses to yes/no questions following non-culminating events (NCEs) presented visually. For clarity and simplicity, the response conditions of verb-type + definite determiner and verb-type + cardinal number will be referred to as verb-type + def. det. and verb-type + card. num.

Part A: build-type vs. eat-type verbs.

Hypothesis 1: Not all VPs containing quantity-sensitive verbs and quantized DPs will be interpreted as telic. Because build-type verbs cannot be interpreted as partitive and eat-type verbs can be interpreted as partitive, quantity-sensitive VPs with build-type verbs will be interpreted as telic, while quantity-sensitive VPs with eat-type verbs may be interpreted as telic or atelic.

Prediction 1 (Part A: Hyp. 1): Participants will respond *no*, more often to questions in build-type + quantized DP conditions than they will to those in eat-type + quantized DP conditions, regardless of the determiner-type (i.e., definite determiner vs. cardinal number).

Hypothesis 2: Quantity-sensitive VPs containing DPs quantized by a cardinal number (i.e., *two*), will be interpreted as telic, (with a *no* response)

more often than those containing DPs quantized by a definite determiner (i.e., *the*) because the cardinal number makes the quantity explicit whereas the definite determiner is discourse based and can be subject to pragmatic accommodation.

> Prediction 2 (Part A: Hyp 2): Participants will respond *no* to those questions in verb + card. num. conditions more than to questions in verb + def. det. conditions.

Hypothesis 3: Verb-type and determiner-type will interact to produce different response patterns to questions about NCEs with regard to telicity. VPs with build-type verbs, with a cardinal number in the object DP, will induce the most telic interpretations followed by build-type verbs with a definite determiner, eat-type verbs with a cardinal number, and finally, eat-type verbs with a definite determiner. This hierarchy is predicted because of the partitivity of eat-type verbs and pragmatic accommodation of the definite determiner.

> Prediction 3 (Part A: Hyp.3): Participants will respond *no* to questions in the build-type + def. det. condition more often than they will to questions in the eat-type + def. det. condition.

Prediction 4 (Part A: Hyp.3): Participants will respond *no* to questions in the build-type + card. num. condition more often than they will to questions in the eat-type + card. num. condition.

Prediction 5 (Part A: Hyp.3:): Participants will respond *no* to questions in the build-type + card. num. condition more often than they will in the build-type + def. det. condition.

Prediction 6 (Part A: Hyp.3): Participants will respond *no* to questions in the eat-type + card. num. condition more often than they will in the eat-type + def. det. condition.

Part B: Eat-type vs. eat up-type verbs and push-type vs. push over-type verbs.

Hypothesis: With quantity-insensitive verbs, resultative particles are solely responsible for the telic interpretation of the VP, whereas with quantity-sensitive verbs that allow a partitive reading, the resultative particle *up* serves to disambiguate the partitive vs. non-partitive readings of the verb, resulting in an unambiguously telic interpretation of the VP. Thus, for push-type verbs, only the resultative particle, and not the determiner, contributes to a telic interpretation, while for eat-type verbs, the determiner

does contribute to the telicity, while the resultative particle serves to eliminate the possibility of a partitive interpretation of the verb.

Prediction 1 (Part B): Participants will respond *no* to questions in the eat-type + card. num. condition more often than in the eat-type + def. det. condition, but not at ceiling levels (N.B. This prediction is the same as prediction 5 for hypothesis 3 above and is repeated here because of its relevance to this hypothesis).

Prediction 2 (Part B): Participants will respond *no* to questions in the eat up-type + def. det. condition more often than in the eat-type + def. det. condition.

Prediction 3 (Part B): Participants will respond *no* to questions in the eat up-type + card. num. condition more often than in the eat-type + card. num. condition.

Prediction 4 (Part B): Participants will respond *yes* to questions in the push-type + def. det. and push-type + card. num. conditions equally, indicating an atelic interpretation in both conditions.

Prediction 5 (Part B): Participants will respond *no* to questions in the push over-type + def. det. condition more often than in the push-type + def. det. condition.

Prediction 6: Participants will respond *no* to questions in the push over-type + card. num. condition more often than in the push-type + card. num. condition.

Study II: Children

Part A: Build-type vs. eat-type verbs. Most of the hypotheses and predictions for Study II-Part A are the same as those for the Study I-Part A. Given the developmental dimension of the child study, the specific hypotheses and predictions for children are re-stated, re-numbered and expanded here.

Hypothesis 1: Not all VPs containing quantity-sensitive verbs and quantized DPs will be interpreted as telic. Because build-type verbs cannot be interpreted as partitive and eat-type verbs can be interpreted as partitive, quantity-sensitive VPs with build-type verbs will be interpreted as telic, while quantity-sensitive VPs with eat-type verbs may be interpreted as telic or atelic.

Prediction 1 (Hyp. 1 for Part A): Participants will respond *no* more often to questions in the build-type +quantized DP conditions than to those in the eat-type + quantized DP conditions, regardless of the determiner-type (i.e., definite vs. cardinal).

Hypothesis 2: Quantity-sensitive VPs containing DPs quantized by a cardinal number (i.e., *two*) will be interpreted as telic more often than those containing DPs quantized by a definite determiner (i.e., *the*) because children have difficulties with the definite determiner, which is discourse-based, whereas cardinal numbers are explicit and not discourse-based.

Prediction 2 (Hyp. 2 for Part A): Participants will respond *no* to those questions in verb + card. num. conditions more often than to questions in verb + def. det. conditions.

Hypothesis 3: Older children will demonstrate greater sensitivity to verb-type and determiner-type with regard to telicity than younger children.

Prediction 3 (Hyp.3 for Part A): Older children will respond *no* to questions about NCEs more often than younger children.

Hypothesis 4: Verb-type and determiner-type will interact to produce different response patterns to questions about NCEs with regard to telicity. VPs with build-type verbs, with a cardinal number in the object DP, will induce the most telic interpretations followed by build-type verbs with a definite determiner, eat-type verbs with a cardinal number, and finally, eat-type verbs with a definite determiner. This hierarchy is predicted because of the partitivity of eat-type verbs and children's difficulties with the definite determiner.

Prediction 4 (Hyp. 4 for Part A): At each age level, participants will respond *no* to questions in the build-type + def. det. condition more often than to questions in the eat-type + def. det. condition.

Prediction 5 (Hyp. 4 for Part A): At each age level, participants will respond no to questions in the build-type + card. num. condition more often than to questions in the eat-type + card. num. condition.

Prediction 6 (Hyp 4 for Part A): At each age level, participants will respond *no* to questions in the build-type + card. num. condition more often than in the build-type + def. det. condition.

Prediction 7 (Hyp. 4 for Part A): At each age level, participants will respond *no* to questions in the eat-type + card. num. condition more often than in the eat-type + def. det. condition.

Part B: Eat-type vs. eat up-type verbs and push-type vs. push over-type verbs.

Hypothesis 1: Resultative particles entail an endpoint, which is compatible with telic interpretations of VPs, whereas determiners have multiple functions and do not necessarily entail telic interpretations. Therefore, when presented with eat-type VPs, children will be more sensitive to the presence of resultative particles for the interpretation of VPs as telic, than they will to the presence of a definite determiner or a cardinal number in the object DP. This hypothesis is addressed by predictions 2 and 3 of Hypothesis 2 below.

Hypothesis 2 and its predictions are essentially the same as the hypothesis and predictions for the Adult Study B, but also include a provision to examine the predictions at each age level.

Hypothesis 2: With quantity-insensitive verbs, resultative particles are solely responsible for the telic interpretation of the VP, whereas with quantity- sensitive verbs that allow partitive readings, the resultative

particle up serves to disambiguate the partitive vs. non-partitive readings of the verb, resulting in an unambiguously telic interpretation of the VP. Thus, for push-type verbs, only the resultative particle, and not the determiner, contributes to a telic interpretation, while for eat-type verbs, the determiner does contribute to the interpretation, while the resultative particle eliminates the possibility of a partitive interpretation of the verb.

Prediction 1 (Hyp.2 for Part B): At each age level, the participants will respond *no* to questions in the eat-type + card. num. condition more often than in the eat-type + def. det. condition, but not at ceiling levels (N.B. This prediction is the same as prediction 6 in Child Study A presented earlier; it is repeated here because of its relevance to this hypothesis).

Prediction 2 (Hyp. 1 and 2 for Part B): At each age level, the participants will respond *no* to questions in the eat-up type + def. det. condition more often than in the eat-type + def. det. condition.

Prediction 3 (Hyp.1 and 2 for Part B): At each age level, the participants will respond *no* to questions in the eat up-type + card. num. condition more often than in the eat-type + card. num. condition.

Prediction 4 (Hyp. 2 for Part B): At each age level, the participants will respond *no* to questions in the push-type + def. det. and push-type + card. num. conditions with similarly low frequencies.

Prediction 5 (Hyp 2 for Part B): Participants will respond *no* to questions in the push over-type + def. det condition more often than in the push-type + def. det condition.

Prediction 6 (Hyp. 2 for Part B): Participants will respond *no* to questions in the push over-type + card. num. condition than in the push-type + card. num. condition.

CHAPTER 3

Methods

This project was comprised of two studies. The first study examined the interpretation of telicity by adults and the second one used similar materials and methods to examine the interpretation of telicity by children. Prior to all pilot studies and data collection this project was approved by the Michigan State University Committee on Research Involving Human Subjects (UCRIHS, currently referred to as the Institutional Review Board or IRB), as project number 04-825. Each of the adult participants signed an informed consent form. A parent or legal guardian of each of the child participants signed an informed consent form and all of the children for whom data was collected also gave their verbal assent for participating in the research activities.

Study I: Adult Interpretations of Telic and Atelic VPs

Participants

The participants were 48 college-age monolingual speakers of mainstream American English who were students in undergraduate introductory speech-language pathology or linguistics courses and did not have any reported history of speech, language, or hearing impairments. The students were compensated for their participation with extra–credit points in their course. Thirty-eight of the participants were female and 10 were male.

Materials

Linguistic stimuli. Three verb-types were examined in the study: a) quantity-sensitive verbs, referred to as build-type verbs (*build/fix*); b) partitive quantity-sensitive verbs, referred to as eat-type verbs (*eat/drink*); c) and quantity-insensitive verbs, referred to as push-type verbs (*push/carry*). The partitive quantity-sensitive verbs and the quantity-insensitive verbs were also examined within a resultative particle verb condition and were referred to as eat up-type verbs and push over-type verbs (*eat up/drink up* and *push over/carry out*), respectively. The verbs selected for the study were chosen because they met the semantic and syntactic requirements of the study, are short (1 or 2 syllables), are common and familiar to both adults and young children, their meanings can easily be portrayed in video, and they could be acted out relatively quickly and unambiguously. All of the verbs selected had been identified as being understood and/or used by over 75% of 30-month-old children (Dale & Fenson, 1996).

Two types of determiners were examined in this study: the definite determiner *the* and the cardinal number *two*. These were selected because the definite determiner requires that the DP's referent be identified in the discourse by the listener, whereas the cardinal number specifies an exact amount.

The target linguistic stimuli were presented to the participants in a modified truth-value judgment task consisting of yes/no questions composed of a particular verb-type and a particular determiner-type. Each specific verb and determiner-type combination had two video segment types associated with it. One was a non-culminating event (NCE) video and the other was a culminating

event (CE) video. All 20 NCE videos were shown to the participants and 10 of the CE videos, which served as controls, were shown. By design, this resulted in half of the target questions being asked twice, but in a different video event condition each time. The questions took the form of: *Did the man/woman* (verb) *the/two* (objects). See Table 3 for a synopsis of all of the verb + object DP combinations used.

Filler items were also included in order to decrease the participants' ability to discern the specific purposes of the task. The target-question-to- filler-question ratio 1:3. The filler questions were either about the action portrayed in the video segment or about the actors' appearance. In sum, there were a total of 30 experimental questions (20 target questions and 10 controls) and 90 filler questions, for a total of 120 questions. For a complete list of the target questions, see Appendix A.

Visual Stimuli. The visual stimuli consisted of video segments in which actors engaged in particular activities involving two identical objects. Each video represented the VPs in the target linguistic stimuli or similar but unrelated VPs (video segments that served as fillers). The use of video segments rather than static pictures was particularly important for representing the actions associated with verbs, thereby decreasing any speculation on the participants' parts as to exactly how the event proceeded. The video segments were not be accompanied by any narrative as particular semantic or syntactic content of a narrative could

Table 3: Verbs and Object DPs Included in the Experimental Task, by Verb-type and Determiner-type

Verb-Type	Verb	Definite Determiner	Cardinal Number
Non-partitive quantity-sensitive	*build*	*the houses*	*two houses*
	fix	*the dolls*	*two dolls*
Partitive quantity-sensitive	*eat*	*the brownies*	*two brownies*
	drink	*the sodas*	*two sodas*
Quantity-insensitive	*push*	*the dogs*	*two dogs*
	carry	*the bags*	*two bags*
Partitive quantity-sensitive with resultative particle	*eat up*	*the brownies*	*two brownies*
	drink up	*the sodas*	*two sodas*
Quantity-insensitive with resultative particle	*push over*	*the dogs*	*two dogs*
	carry out	*the bags*	*two bags*

Note. Although *soda* is generally considered to be a mass noun, pilot testing indicated that, overall, speakers in Michigan accept *soda* as a count noun.

potentially alter participants perceptions of the events they observed. These methodological considerations helped to ensure that the participants' responses to the experimental linguistic stimuli would be based only on their interpretation of the scene and the semantic and syntactic characteristics of the experimental linguistic stimuli.

There were two video segments created for each verb in each syntactic condition. In the CE video segment, the actor engaged in an action until it culminated in its logical endpoint with both objects (e.g, both houses were completely built; both brownies were completely consumed). In the NCE video segment, the actor engaged in the same action but completed it with only one object. He/she began the action with the second object but abandoned it before it culminated in its logical endpoint (e.g., one house was completely built and the other was left with only 2 walls completed; one brownie was completely consumed and the other had only one bite taken out of it).

Each video segment ended after the actor had left the scene and the screen showed the result of the events. For example, the final scene for the videos depicting 'house building' events was either two completed houses on a table or one completed house and two connected walls and the remaining parts of the second house. The final scene for the 'brownie eating' events was either an empty plate or a plate with a partially eaten brownie on it. The final scene for 'dog pushing' events was either two dogs laying on the table or one dog laying on the table and one dog standing on the table. The description of a sample set of

video segments is presented in (14a) and (14 b) below. Videos segments that were longer than 35 seconds were edited to less than 35 seconds in duration.

(14). a. Video Segment 1: Culminating Event
An actor is sitting at a table with two brownies on a plate in front of him/her (opening). S/he eats both brownies in their entirety (middle). The actor gets up and leaves, leaving the empty plate on the table (close).

b. Video Segment 2:
An actor is sitting at a table with two brownies on a plate in front of him/her. (opening). S/he eats one of the brownies in its entirety. S/he then eats one bite of the second brownie and puts the remainder of it on the plate (middle). The actor gets up and leaves, leaving the plate and the remainder of the second brownie on the plate (close).

There were a total of 60 video segments, 20 target videos depicting NCE events, 10 control videos depicting CE events, and 30 filler video segments depicting similar actions. The presentation order of the videos was quasi-randomized such that the participants never viewed the representations of the same verb in the different conditions with fewer than two intervening video segments, and they never viewed the same actor in two consecutive segments. To further control for potential order effects there were 3 stimulus presentation orders.

Procedures

General. The adult research participants were seen in small groups of no more than 6 participants during a given session. The participants completed the experimental task in one session. They were seated in a quiet and well-lit

classroom setting and viewed the videos on a large projection screen at the front of the room. The videos were projected from a computer data display unit, using Windows Media Player. The size of the video projection area was approximately 7 feet by 5 feet. The participants were seated directly in front of the screen, in two rows of three student desks, at a distance between 10 to 16 feet from the screen. Participants were asked to remove all items from their desks except a pencil and a provided scantron response form on which they were to record their responses.

Experimental task. The experimental task employed was yes/no question version of the truth-value judgment (TVJ) task, in which the participants watched video segments depicting either an NCE or a CE video segment. This task was selected because, in general, the participants' responses of *yes* or *no* would indicate whether their interpretation of the VP was telic or atelic. Further, it can be easily used with both adults and children, it has relatively low task demands, and it is administered quickly. More detailed considerations for choosing this task will be discussed in more detail below, with reference to Study II.

The participants viewed each video segment. At the end of each one, the experimenter paused the presentation so that the projection on the screen was the closing portion of the segment, (i.e., the actor was no longer present and the scene portrayed the result of the event). After viewing each video segment, participants were asked 2 yes/no questions about it. One of the questions was about the scenario depicted (a target question/control or a filler), and one was about the actors appearance (filler; e.g., *Did the man wear a hat?*). The order of

target/control and filler questions per video was counter-balanced. The participants were instructed to decide whether their answer to the question was *yes* or *no*, and to completely fill in the corresponding circle on their response form. The top row of each column of the scantron response form indicated that the number 1 was *yes* and number 2 was *no*. Additionally, *1 = YES* and *2 = NO*, was written on the board as a reminder. After all of the participants responded, the experimenter resumed the task. Prior to each new video segment, the screen was solid green for two seconds in order to indicate that a new video was about to begin. The instructions that were read to the participants by the experimenter are in (15) below.

(15) Instructions for Adults

> You will view short video segments of people acting out simple tasks. Please watch each one carefully. Each video segment is less than 35 seconds long. I will pause the video after each segment and ask you two yes/no questions about it. One of the yes/no questions will be about the actor's appearance and the other yes/no question will be about what the actor did. If you think that the best answer is *yes*, indicate *yes* by completely filling in the number 1 bubble on your response form. If you think that the best answer is *no*, then indicate *no* by completely filling in the number 2 bubble. Remember that 1 is *yes* and 2 is *no*.
>
> If you are not sure how to best answer the questions, please give the response that seems most natural to you. Do not leave any items blank. Before each new video segment, the screen will be green for 2 seconds.
>
> Some of the items are very similar to each other but are not necessarily identical, so please watch each of the videos in its entirety.

Data Analysis

Preliminary analysis of the verb stimuli. The specific verbs categorized as belonging to a verb-type, that is eat-type (*eat, drink*), build-type (*build, fix*), and push-type (*push, carry*), were categorized as such based on their semantic and syntactic similarities to each other. In addition to their semantic and syntactic properties, the specific verbs were selected because of their familiarity to children ages 3 and up (Dale & Fenson, 1996). However, in order to ensure that the verb pairs could be categorized as a verb-type in the adult language, paired t-tests were conducted comparing the adults' responses to the NCE descriptions for each pair of verbs within a type for each DP syntax condition. For example, the number of *no* responses to *Did X build the houses?* were compared to the number of *no* responses to *Did X fix the dolls?* This was repeated for each verb pair within a verb type for each of the determiner conditions. There were no significant differences between any of the verbs that were paired within a verb type ($p<.05$; see Appendix B for additional information), which supported the decision to conduct the subsequent analyses on verb types, rather than on individual verbs.

Recording, coding, and scoring the responses. As noted previously, the adult participants recorded their own responses by completing a scantron form during the experimental task. The response forms were scored by computer at the Michigan State University Scoring Office and the data were imported into the SPSS 12.0 statistical package. The data of interest, specifically the responses to video segments portraying non-

culminating events (NCE), were isolated. The data were re-coded so that all *yes* responses were coded as 0 and all *no* responses were coded as 1.

Because there were two verb tokens within each verb-type, it was possible that a participant could respond one way to one verb token and another way to the other verb token, even though they were of the same verb-type. The use of overall proportion scores across subjects would therefore violate the assumption of independence of responses for the statistical tests used. Therefore, a *count score* was calculated for each participant in each sentence condition. The count scores were based on the number of *no* responses to the questions for the two particular verb-type and determiner-type combinations for each sentence condition. The possible count scores for each verb-type and determiner-type combination were as follows: a) a score of 0, which is 0 *no* responses; b) a score of 1, which is 1 *no* response and 1 *yes* response; or c) a score of 2, which is 2 *no* responses. This is illustrated in the following example. A participant who responded *yes* to "Did the man eat the brownies?" and *yes* to "Did the man drink the sodas?" will have a count of 0. A participant who responded *yes* to "Did the man eat the brownies?" but *no* to "Did the man drink the sodas?" will have a count of 1. A participant who responded *no* to "Did the man eat the brownies?" and *no* to "Did the man drink the sodas?" will have a count of 2. The purpose of using a count score was to control for the possibility that an individual may respond differently to questions with different verbs within the same verb type. Using the count score for each participant accounted for the possible variation

within each subject and therefore controlled against violating the independence assumption for the statistical tests.

Specific analyses. The data that were relevant to the research questions were responses to questions regarding the video segments that depicted a non-culminating event (NCE). These events were considered non-culminating because the person in the video has brought the action on one object to its logical endpoint, but has not brought the action on the second object to its logical endpoint. When participants responded *no* to the target question, their interpretation of the question was taken to be unambiguously *telic* and when they responded *yes*, their interpretation of the question is taken to be *atelic*. Therefore, the statistical analyses were executed on the number of *no* responses per relevant stimulus condition. However, when interpreting the results, it is important to keep in mind that in the case of partitive verbs, a *yes* response may be a telic response if the participant interprets the verb, in the present case, *eat* or *drink,* as taking a partitive object complement.

All of the analyses were conducted using repeated-measures analysis of variance (ANOVA) on the mean counts of *no* responses across subjects. The within-subjects factors were: (a) verb-type, and (b) determiner-type. An a priori decision of $\alpha = .05$, with two-tailed tests was used for all statistical tests, except where otherwise noted.

In Part A, the responses to questions with build-type verbs were compared to those with eat-type verbs, in both determiner-type conditions (i.e., definite

determiner and cardinal number). Part B consisted of 2 separate ANOVAs. In the first, the responses to questions with eat-type verbs were compared to those with eat up-type verbs, in both determiner-type conditions and in the second, the responses to questions with push-type verbs were compared to those with push over-type verbs, in both determiner-type conditions. Planned comparisons were conducted to address the specific predictions listed above, and the alpha-levels for those comparisons were adjusted accordingly.

Study II: Children's Interpretations of Telic and Atelic VPs

Participants

There were 80 typically developing children who participated in the study. They were grouped into four groups on the basis of age: a group of 3-year-olds (n = 15), ranging in age from 3;2 to 3;9, with a mean age of 3;6; a group of 4-year-olds (n = 24), ranging in age from 3;10 to 4; 7, with a mean age of 4;4; a group of 5-year-olds (n = 18), ranging in age from 4;11 to 5;9, with a mean age of 5;4; and a group of 6-year-olds (n = 23), ranging in age from 5;10 to 6;10, with a mean age of 6;2. The children were recruited for participation in the study from day care centers, preschools and elementary schools in the Greater Flint, and Greater Lansing, Michigan areas.

All of the child participants were monolingual speakers of mainstream American English. Children who were speakers of non-mainstream dialects of English were excluded from the study due to the fact that some minority dialects make distinctions of aspect and telicity that do not occur in mainstream American

English. For example, African-American English indicates aspect/telicity through the copula and auxiliary system (e.g., Green, 2002). Different aspectual features of this ethnic dialect would present a confound for the present research. Children were identified as speakers of a non-mainstream dialect of American English either by parent/guardian report or by the judgment of the primary investigator. There were four children who were ethnically African American and for whom the primary investigator was unable to make a judgment regarding their dialect status. In these cases, the Diagnostic Evaluation of Language Variation Screening Test (DELV – Screening Test; Seymour, Roeper and de Villiers, 2003) was administered. These children were not included in the study because their screening score indicated "Strong" or "Some Variation from Mainstream American English."

Background and case history information was obtained through parent questionnaire and interview, when necessary. Based on pre-testing, parent questionnaire, and/or parent interview, the child participants met the following criteria: (a) no parental or teacher concerns regarding their development; (b) passed a pure-tone hearing screening at 25 dB HL for the frequencies of 1000 Hz, 2000 Hz and 4000 Hz; (c) no history of hearing impairment, (d) did not have otitis media at the time of the study; (e) passed a basic oral mechanism screening; (f) passed a speech articulation screening; and (g) had no reported history of neurological impairment, emotional problems, autism spectrum disorders, or other developmental disabilities. The Pure-tone hearing screening was conducted using play audiometry and either a DSP Puretone Audiometer by

Micro Audiometrics Corp. or a 120 Portable Audiometer by Beltone Special Instruments. Further, all of the children demonstrated scores that were not more than 1.00 SD below the mean on the Sentence Structure and Word Structure subtests of the Clinical Evaluation of Language Fundamentals – Preschool (CELF – P; Wiig, Secord, and Semel, 1992). For future matching purposes, most of the children were administered the Peabody Picture Vocabulary Test – Third Edition (PPVT-III; Dunn and Dunn, 1997). All of those children who qualified for the study and who were given the PPVT-III scored no more than 1.00 SD below the mean. The PPVT-III scores were not used in the inclusion criteria. For detailed participant information see Appendix C. All pre-testing and data collection sessions were conducted by a certified speech-language pathologist or a trained speech-language pathology student under the supervision of a certified speech-language pathologist.

Materials: Linguistic and Visual Stimuli

The linguistic and visual stimuli for the children were essentially the same as those used for the adults in Study I, except that the children's task was made shorter by excluding most of the filler items and one-half of the CE videos and their corresponding linguistic stimuli. Pilot testing indicated that longer versions of the task, including those with filler videos and questions or only filler questions were too taxing on young children's attention skills.

The children's linguistic and visual stimuli consisted of 4 pre-test/training items, 20 NCE video segments and corresponding questions, 10 CE video

segments and corresponding questions, and 6 filler videos and questions that were included in order to check that the children were attending to the videos and questions. The CE video segments and corresponding linguistic stimuli were decreased in number but still included so that not all of the videos that the children saw were of NCEs. As in the adult study there were 3 orders of presentation used in order to control for possible order effects.

Procedures

General. The children participated in between 3 to 5 sessions of 20 to 45 minutes in length to complete the pre-testing and experimental tasks. Children were given short breaks on an as-needed basis. Most children completed the experimental task in 2 sessions. All of the experimental sessions took place at a child-sized table in a room separate from other school activities. Measures were taken to make sure that the room was as quiet as possible. All pre-testing took place prior to the experimental task. This gave each child the opportunity to become familiar with the experimenter before engaging in the experimental task. The experimental task was administered via a laptop computer with either a 14 or 15 inch monitor using Microsoft Windows Media Player. The child was seated directly in front of the computer, approximately 24 inches away from the screen, for the duration of the task. At the completion of each session, the children selected a small prize to take with them. All of the experimental sessions were audio recorded and approximately one-third of them were video recorded as well.

Pre-test training Items. Prior to the experimental task there was a training period for the children during which they watched four training video segments with content similar to that in the experimental task. After viewing each video, they were asked a yes/no question (2 with *yes* answers and 2 with *no* answers.) that was unrelated to the experimental items but that is of similar length and form. The training items were administered to ensure that the children understood the task and to reduce the likelihood that the children would be influenced by the *yes* response bias (Fritzley & Lee, 2003; Wason, 1961) by making it clear that both *yes* and *no* are acceptable responses. Once a child responded correctly to 4 out of 4 training items, the experimental task was presented. If a child did not immediately respond correctly to 4 out of 4 training items, s/he told by the experimenter that *yes* and *no* are both acceptable responses, the correct response(s) to the training question, as well as a models of appropriate *yes* and *no* response were provided. The experimenter had multiple yes/no questions that could be used for each training video segment if it was necessary. If a child did not pass with 4 out of 4 correct training items after presentation of instruction/models three times, the child did not continue in the study. This training period also allowed the experimenter to confirm that each child was able to respond to yes/no questions of an appropriate length and form prior to the experimental task.

Experimental task. The experimental task that was employed was the yes/no question version of the truth-value judgment (TVJ) task, in which the participants watched video segments depicting either a CE or an NCE video

segment. One reason for having chosen this task is that it can yield information regarding a child's knowledge about complex syntactic structures without placing high task demands on children (Gordon, 1996). This task has been used successfully to test a wide range of syntactic knowledge in children (e.g., Avrutin & Wexler, 1999; Crain, 1985, 1991). Other considerations for selecting the TVJ task include: 1) unlike picture-pointing tasks, it does not require the child to consciously match a particular grammatical form to a picture, 2) the response required from the child is made pragmatically appropriate through careful construction of the visual stimuli, 3) it is amenable to using video segments, which can portray the dynamic course of events, 4) the response required from the child is simple and, with only two choices, largely unambiguous, allowing relatively young children to participate in the task, and 5) the simple response also facilitates accuracy in data recording.

The children were told that they would watch movies with a puppet named Henry the Hippo, but that Henry often fell asleep when he watched movies. Therefore, he would need the child's help to answer questions about the movies. Given the fairly large number of experimental items, in order to maintain the child's attention to the task a sticker-game was devised to go along with the experimental task. The questions were written in a small notebook, one per page. The page was turned after the puppet was awakened, the question was read and the child responded. If the child found a star sticker after turning the page, he/she won a sticker to fill in items on a sheet of paper that was given to them. The stickers were arranged in such a way that the filling up their sticker sheet

corresponded with completion of the task. Most children completed the experimental task in two sessions. If a child did not need a break sooner, the task was always stopped at the halfway point and continued during the next session. Occasionally, if a child wanted to continue the task and time permitted, the child would be given an extended break at the halfway point, such as playing a board game or reading a book, and then continue the task during the same session.

The child viewed each video segment. At the end of each one, the experimenter paused the presentation so that the screen displayed the closing portion of the video segment, (i.e., the actor was no longer present and the scene portrayed the result of the event). During the segment the experimenter made the puppet fall asleep. After viewing each video segment, the child and/or the experimenter woke up the puppet and the puppet read a question from the notebook and the child responded. Throughout the task the child was frequently reminded to answer *yes* or *no* to the puppet's questions. After the child responded, the experimenter resumed the task. Prior to each new video segment, the screen was solid green for two seconds in order to indicate that a new video was about to begin. The instructions that were read to the children by the experimenter are in (16) below.

(16) Instructions for Children

> You will watch some short movies on my computer with my friend, Henry the Hippo. He really needs to watch these movies, but he has a problem. Henry is always tired and he falls asleep whenever he watches movies, so he is going to need your help. If he falls asleep while you are watching a movie, we'll wake him up when it is over and he will ask you

a question about the movie. Watch the movies carefully and after Henry asks you a question, you answer *yes* or *no*. He will ask you a question about what the person did and you will tell him *yes* or *no*. Can you do that? (Pause for response/check for understanding).

We are going to play a game too. See all these doghouses/kitty baskets? There aren't any doggies/kitties there. In the game you can win doggie/kitty stickers to put in the dog houses/kitty baskets. Do you think you can win enough stickers to fill up all of the houses/baskets? I think you can. Here is how we play. I wrote down the questions for Henry to ask you about the movies. If he misses a movie because he fell asleep, he can read the questions from this little book. After you answer the question, we will flip the page and see if there is a star sticker on the back. If there is a star there then you get a doggie/kitty sticker to put in one of the doghouses/kitty baskets. When you fill up the all of the doghouses/baskets, we will be all done. We will do some today and some next time. Are you ready? (Pause for response).

Okay, here we go. You and Henry will watch the movies. If Henry falls asleep during the movie, he will have to ask you a question about it when he wakes up. When he asks you a question, you answer *yes* or *no*. Hmm, what are you going to answer when Henry the Hippo asks you a question? (Pause for response to check understanding). Okay good. He will ask you a question about what the person did in the movie. Before each new movie, the screen will be green. That means get ready for a new movie. Are you ready to play?

Data Analysis

Recording, coding and scoring the responses. The experimenter recorded the child's oral response on a response form during the task, whenever possible. When the response could not be fully written out during the task, the experimenter checked the audio tape and recorded the child's response verbatim. After the session the experimenter recorded the child's responses on a scantron form.

Most of the time the children gave simple yes/no responses or some or a response of a similar form such as *yeah* and *nope*. However, some children sometimes provided qualified *yes* responses, such as *yes, but only one* and *yes, but not that one*. Some responses were descriptive responses that essentially indicated a *no* response, but did not include the word *no*, such as one, *only one,* and *not both of them.* In order to preserve as much information as possible in the coding of the data, the data were initially coded using the following scheme: *yes* = 1, *no* = 2, qualified-*yes* = 3, and descriptive *no* = 4. Coding of responses as qualified-*yes* responses was operationalized as a response in which the word yes is followed by additional comments from the child that contains an element that contradicts the *yes* response. All of the qualified-yes responses that were produced during the task are listed in Appendix D.

The scantron forms were scored by computer at the Michigan State University Scoring Office and the data were imported into the SPSS 12.0 statistical package. The data of interest, specifically the responses to video segments portraying non-culminating events, were isolated. As in the adult study, the data were re-coded so that all *yes* responses were coded as 0 and all *no* responses were coded as 1. The responses originally coded as 1 were recoded as 0 (yes). The responses originally coded as 2, 3, or 4 were recoded as 1 (no). The descriptive *no* responses (e.g., *only one*) essentially explained why the answer was not *yes*. Clearly such responses could not be counted as *yes* responses. The qualified *yes*

responses, presented a problem in that it was not clear whether the child's underlying interpretation was *yes* or *no*. For the primary data analyses, responses were coded as *no* because the qualifying phrases indicate that the child was not satisfied with his/her *yes* response as adequately answering the question and their qualifying comment contained a contradiction to the word *yes*. However, it must be acknowledged that in such cases the children were ambivalent about their response and although *yes* may not have been an adequate response, neither was *no*. It could be argued that the child was dissatisfied with both a *yes* or a *no* response, but because they answered with a *yes*, their interpretation was "closer to yes" and the qualified responses should have been counted as *yes* responses. Therefore, the data were re-coded a second time with original *no* and descriptive-*no* responses coded as 1 and *yes* and qualified-*yes* responses coded as 0. The same count scores were calculated for the children as were calculated for the adults. All of the subsequent analyses were conducted on the count scores.

Specific Analyses. The data that were relevant to the research questions were responses to questions regarding the video segments that depicted a non-culminating event (NCE). These events are considered non-culminating because the person in the video has brought the action on one object to its logical endpoint, but has not brought the action on the second object to its logical endpoint. When children responded *no* to the target question, their interpretation of the question was taken to be *telic*,

i.e., they interpreted the VP in the question as an event VP and when they responded *yes*, their interpretation of the question was taken to be *atelic,* i.e., they interpreted the VP in the question as an activity VP. Therefore, the statistical analyses were executed on the number of *no* responses per relevant stimulus condition.

All of the analyses were conducted using repeated-measures analysis of variance (ANOVA) on the mean counts of *no* responses across subjects. The within-subjects factors were verb-type and determiner-type. The between-subjects factor was age group. An a priori decision of $\alpha = .05$, with two-tailed tests, was used for all statistical tests, except where otherwise noted.

In Part A the responses to questions with build-type verbs were compared to those with eat-type verbs, in both determiner-type conditions (i.e., definite determiner and cardinal number). Part B consisted of 2 separate ANOVAs. In the first, the responses to questions with eat-type verbs were compared to those with eat up-type verbs, in both determiner-type conditions and in the second, the responses to questions with push-type verbs were compared to those with push over-type verbs, in both determiner-type conditions. Planned comparisons were conducted to address the specific predictions listed above, and the alpha-levels for those comparisons were adjusted accordingly. Two additional sets of analyses were conducted that were not originally planned. First, in order to compare all three verb types in the non-resultative particle conditions, a mixed model 4 (age) x 3 (verb-type) x 2 (determiner-type) mixed model ANOVA was conducted. Secondly, because arguments can be made for both methods of

coding qualified-*yes* responses, all of the primary ANOVAs were conducted a second time using the re-coding scheme in which all original *no* and descriptive-*no* responses were coded as 1 and *yes* and qualified-*yes* responses were coded as 0.

Reliability

Inter-judge reliability. The level of inter-judge reliability was determined by having a second trained individual, who was a graduate student or senior undergraduate student in speech-language pathology, listen to the audiotapes of the experimental sessions for two participants in each group and transcribe and score their responses. The two judges' scores were then compared item by item. The inter-judge reliability was 97% agreement.

Test-retest reliability. The level of test-retest reliability was determined by having 2 children in each age group repeat the experimental task within 2 weeks of completing the task the first time. Their responses to the questions were compared item by item. For some of the children, determining agreement was somewhat complicated by cases of the presence of qualified-*yes* response at one time and a clear *yes* or *no* response at another time. The same operationalization was used for determining agreement as was used in the primary data coding. A score of 1 counted as a *yes* response and a score of 2, 3, or 4 was counted as a *no* response. Therefore, if a child responded to a question as *no* on the first occasion and as *yes, but only one* on the second occasion, then the responses were counted as being in agreement because both

responses would have been recoded as a 1 for the primary data analysis. On the other hand, if a child responded to a question as *yes* on first occasion and as *yes*, but only one on the second occasion, then the responses were counted as being in disagreement because the first would have been coded as a 0 for primary data analysis and the second would have been coded as a 1. Another example is that if a child answered *no* on the first occasion and *yes, but only one* on the second occasion, it was counted as an agreement. This resulted in a more conservative estimate of test-retest reliability than the alternative. The item by item test-retest reliability was calculated at 88% agreement, demonstrating that the children's responses were rather stable from one time to the next.

CHAPTER 4

Results

Study I: Adults' Interpretation of Telicity

Part A: Verb-type and Determiner-type

Study IA compared the roles of two quantity-sensitive verb subtypes, (i.e., build-type and eat-type verbs) and determiner-type (i.e., definite determiner and cardinal number) on the interpretation of telicity. Eat-type verbs can be interpreted partitively, whereas build-type verbs cannot. Definite determiners refer to a specific set in the discourse, but what constitutes a set may be determined pragmatically, whereas cardinal numbers require the counting of the number of items referred to by the DP.

The first analysis addressed whether the verb-type and the determiner-type influenced the participants' interpretation of the telicity of the VPs. The data were analyzed using a repeated-measures 2 (verb-type) X 2 (determiner-type) analysis of variance (ANOVA). The within-subjects factors were verb-type (i.e., build-type and eat-type verbs) and determiner-type (i.e., definite determiner and cardinal number). Table 4 presents the means and standard deviations per condition for Study IA and Table 5 presents the statistical summary of the results.

An alpha level of .05 was used for all statistical tests, unless otherwise indicated. Partial Eta squared (η_p^2) is presented as a measure of effect size[7]. As shown in Table 5, there was a significant main effect for verb-type, $F(1, 47) = 70.68$, $p < .001$, $\eta_p^2 = .60$. This result supports hypothesis 1 because, as

[7] η_p^2 describes the amount of variance accounted for in the sample by a particular independent variable. It should be noted that η_p^2 values for the independent variables may not sum to 1.0.

predicted, questions with build-type verbs were interpreted as telic more often than those with eat-type verbs, as seen in Figure 3. The main effect of determiner-type was also significant, $F(1, 47) = 18.65$, $p < .001$, $\eta_p^2 = .28$. This result supports hypothesis 2 because, as predicted, the quantity-sensitive VPs containing DPs quantized by *two*, were be interpreted as telic more often than those containing DPs quantized by *the*, as seen in Figure 4. There was also a significant interaction between verb-type and determiner-type, $F(1, 47) = 14.84$, $p<.001$, $\eta_p^2 =.24$ (see Figure 5). In questions containing build-type verbs, the determiner-type did not have significant impact on the interpretation, but with eat-type verbs, the cardinal number condition yielded more telic interpretations than the definite determiner condition.

Table 4: Means and Standard Deviations of the Counts of Telic Interpretations per VP Condition for Build-type and Eat-type Verbs for Adults

VP Condition	Mean (SD)
Build-type verb + definite determiner	1.94 (.24)
Build-type verb+ cardinal number	2.00 (.00)
Eat-type verb+ definite determiner	.85 (.85)
Eat-type verb+ cardinal number	1.42 (.82)

Table 5: Summary of ANOVA Results for Adults: Verb-type by Determiner-type for Eat-Type and Build-Type Conditions

Source	F	Hypothesis df	Error df	p	η_p^2	Observed Power
Verb-type	70.68	1	47	<.001	.60	1.00
Determiner-type	18.65	1	47	<.001	.28	.99
Verb-type x Determiner-type	14.84	1	47	<.001	.24	.96

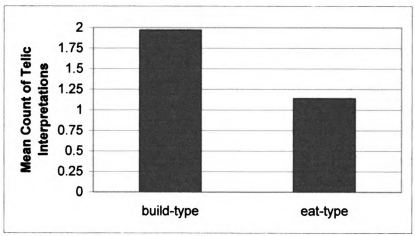

Figure 3. Mean counts of telic interpretations by verb-type for adults in build-type and eat-type conditions.

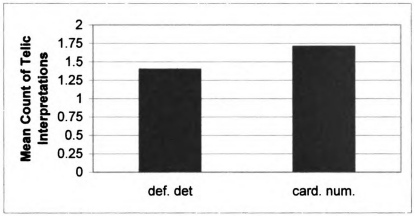

Figure 4. Mean counts of telic interpretations by determiner-type for adults in build-type and eat-type conditions.

Hypothesis 3 stated that verb-type and determiner-type would interact to produce different response patterns to questions about non-culminating events (NCEs) with regard to telicity. It was hypothesized that VPs with build-type verbs and a cardinal number in the object DP would induce the most telic interpretations, followed by build-type verbs and a definite determiner, eat-type verbs and a cardinal number and finally, eat-type verbs and a definite determiner. A series of planned comparisons for particular interactions was employed to evaluate this hypothesis and its predictions. The adjusted alpha level for these comparisons is $\alpha = .012$. (See Figure 5.) Predictions 1 and 2 respectively, were that participants would respond *no* to questions in the build-type + def. det. condition more often than to questions in the eat-type +def. det. condition and that participants would respond *no* to questions in the build-type + card. num. condition more often than to questions in the eat-type +card. num. condition.

Participants interpreted questions in the build-type + def. det. condition as telic significantly more often than those in the eat-type + def. det. condition $F(1, 47) = 83.61$, $p < .001$, $\eta_p^2 = .64$. They also interpreted questions in the build-type + card. num. condition as telic significantly more often than those in the eat-type + card. num. condition $F(1, 47) = 24.24$, $p < .001$, $\eta_p^2 = .34$. (See Figure 5.) Predictions 3 and 4 respectively, were that participants would respond *no* to questions in the build-type + card. num. condition more often than in the build-type + def. det. condition, and that they would respond *no* to questions in the eat-type + card. num. condition more often than in the eat-type + def. det. condition. Participants did not interpret questions in the build-type + card. num. condition as telic more often than build-type + def. det. condition, $F(1,47) = 3.133$, $p = .083$. Participants interpreted questions in the eat-type + card. num. condition as telic more often than in the eat-type + def. det. condition, $F(1,47) = 17.929$, $p < .001$, $\eta_p^2 = .28$.

In summary, all of the hypotheses and predictions for Study IA were supported by the results with the exception of the prediction that build-type + card. num. condition would yield more telic interpretations than the build-type + def. det. condition. The lack of statistical significance here appears to be due to ceiling levels of telic interpretations for both of the build-type questions, suggesting that when the verb is a quantity-sensitive verb that does not allow partitive readings, the telic interpretation is so strong that any possible contribution of the determiner may be masked.

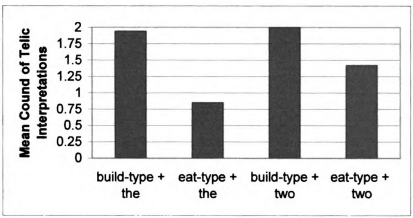

Figure 5. Mean counts of telic interpretations for verb-type by determiner-type for adults in eat-type and build-type conditions.

Part B: Resultative Particles

Study IB examined the role of resultative particles on the interpretation of telicity with quantity-sensitive verbs that allow partitive interpretations and with quantity-insensitive verbs. In brief, the hypothesis for Study 1B, states that for push-type verbs, only the resultative particle, and not the determiner, contributes to a telic interpretation, while for eat-type verbs, the determiner does contribute to the interpretation, and the resultative particle serves to eliminate the possibility of a partitive interpretation of the verb. (See Table 6 for the means and standard deviations per condition.) The data were analyzed using two repeated-measures 2 (verb-type) X 2 (determiner-type) ANOVAs. The data for eat-type vs. eat up-type and push-type vs. push over-type verbs were analyzed separately because the relevant comparisons are between each basic verb-type and its resultative

particle counterpart in the different determiner-type conditions. In both analyses the within subjects factors were verb-type (eat-type vs. eat up-type and push-type vs. push-over type, respectively) and determiner-type (definite determiner vs. cardinal number). Planned comparisons were performed for each analyses to test the specific predictions for eat-type vs. eat up-type questions and push-type vs. push over-type questions. The adjusted alpha level for these comparisons is $\alpha = .016$.

Table 6: Means and Standard Deviations of the Counts of Telic Interpretations per VP Condition for Eat-type, Eat up-type, Push-type and Push over-type Verbs for Adults

VP condition	Mean (SD)
Eat-type verb+ definite determiner	.85 (.85)
Eat-type verb + cardinal number	1.42 (.82)
Eat up-type verb + definite determiner	1.96 (.20)
Eat up-type verb + cardinal number	1.96 (.20)
Push-type verb + definite determiner	.06 (.24)
Push-type verb + cardinal number	.15 (.35)
Push up-type verb + definite determiner	1.79 (.41)
Push over-type verb + cardinal number	1.88 (.33)

Eat-type vs. eat up-type. The comparison of conditions containing eat-type and eat up-type verbs demonstrated a significant main effect for verb-type, $F(1,47) = 73.65$, $p < .001$, $\eta_p^2 = .61$. (See Table 7 below for a summary of the results). Questions with eat up-type verbs were interpreted as telic more often than those with eat-type verbs (see Figure 6). There was also a significant main effect for determiner-type, $F(1,47) = 17.07$, $p < .001$,. $\eta_p^2 = .27$. Questions with cardinal numbers were interpreted as telic more often than those with the definite determiner (see Figure 7). A statistically significant interaction between verb-type and determiner-type was also found, $F(1,47) = 17.07$, $p < .001$, $\eta_p^2 = .27$. The interaction between verb-type and determiner-type type is accounted for by eat-type verbs and the determiner-type condition. VPs containing eat-type verbs + card. num. were interpreted as telic more often than VPs containing eat-type verbs + def. det., whereas there was no statistically significant difference between eat up-type verbs + def. det. and eat up-type verbs + card. num. (See Figure 8.) The values for these two conditions were identical, which is likely due to the very near-ceiling level of telic interpretation of *eat up* VPs, regardless of the determiner type.

Table 7: Summary of ANOVA Results for Adults: Verb-type by Determiner-Type for Eat-Type and Eat up-Type Conditions

Source	F	Hypothesis df	Error df	p	η_p^2	Observed Power
Verb-type	73.65	1	47	<.001	.61	1.00
Determiner-type	17.07	1	47	<.001	.27	.98
Verb-type x Determiner-type	17.07	1	47	<.001	.27	.98

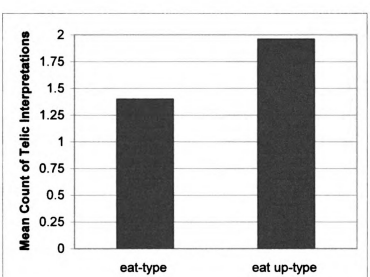

Figure 6. Mean counts of telic interpretations for verb-type for adults in eat-type and eat up-type conditions.

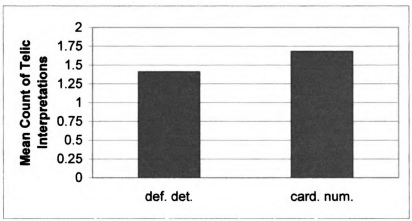

Figure 7. Mean count of telic interpretations by determiner-type for adults in eat-type and eat up-type conditions.

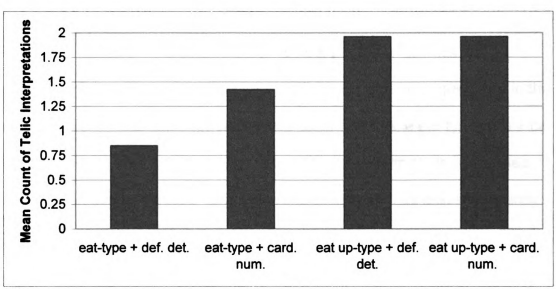

Figure 8. Mean counts of telic interpretations by verb-type and determiner-type for adults in eat-type and eat up-type conditions.

Three of the predictions are relevant to exploring the role of the resultative particle with quantity-sensitive verbs that can have a partitive interpretation. See Figure 8 for a graphic display of the means across the relevant experimental conditions. Prediction 1 was that participants would respond *no* to questions in the eat-type verb + card. num. condition more often than in the eat-type verb +def. det. condition, but not at ceiling levels. This prediction, which was also in Study IA was supported with a significantly more questions in the eat-type verb + card. num. condition interpreted as telic than in the eat-type + def. det. condition,

Prediction 2 was that participants would respond *no* to questions in the eat up-type verb + def. det. condition more often than in the eat-type verb+ def. det. condition. The results support this prediction. Participants interpreted questions in the eat-type + card. num. condition as telic significantly more often than in the eat-type + def. det. condition, $F(1,47) = 84.68$, $p < .001$, $\eta_p^2 = .64$.

Prediction 3 was that participants would respond *no* to questions in the eat up-type verb + card. num. condition more often than in the eat-type verb + card. num. condition. The results support this prediction. Participants interpreted questions in the eat up-type verb + card. num. condition as telic significantly more often than in the eat-type verb + card. num. condition, $F(1,47) = 22.13$, $p < .001$, $\eta_p^2 = .32$.

Push-type vs. Push over-type. The second analysis in Study IB was the comparison between conditions containing push-type and push over-type verbs in the two determiner-type conditions. (See Table 8 for a summary of the results.) There was a main effect for verb-type $F(1, 47) = 845.39$, $p < .001$, $\eta_p^2 = .95$.

Questions with push-type verbs were nearly always interpreted as atelic, and questions with push over-type verbs were nearly always interpreted as telic (see Figure 9). There was also a main effect for determiner-type, $F(1, 47) = 7.23$, $p = .01$, $\eta_p^2 = .13$. Questions with the cardinal number *two* were interpreted as telic more often than those with the definite determiner *the* (see Figure 10). However, the low effect size and the co-occurrence of the determiners in questions that were otherwise overwhelmingly interpreted as telic on the one hand and atelic on the other, because of the verb-types, suggest that this result may be spurious. (See Figures 9 and 10 below.) There was no interaction effect between verb-type and determiner-type. The verb-type appears to be essentially responsible for the interpretation of telicity in this case (see Figure 11).

Table 8: Summary of ANOVA Results for Adults: Push-Type vs. Push over-Type

Source	F	Hypothesis df	Error df	p	η_p^2	Observed Power
Verb-type	845.39	1	47	<.001	.95	1.00
Determiner-type	7.23	1	47	.010	.13	.75
Verb-type x Determiner-type	.00	1	47	1.00	.00	.05

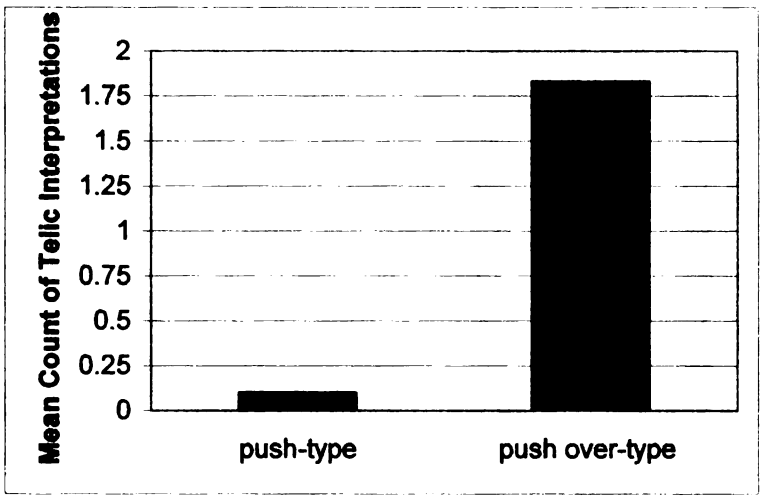

Figure 9. Mean counts of telic interpretations by verb-type for adults in push-type and push over-type conditions.

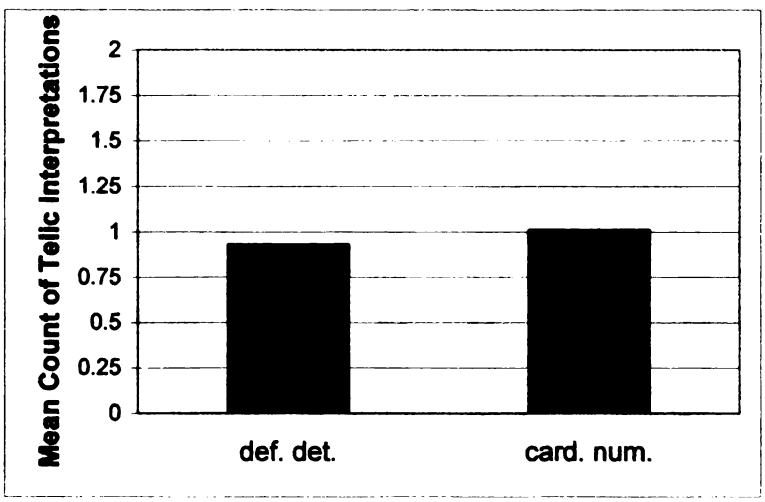

Figure 10. Mean counts of telic interpretations by determiner-type for adults in push-type and push over-type conditions.

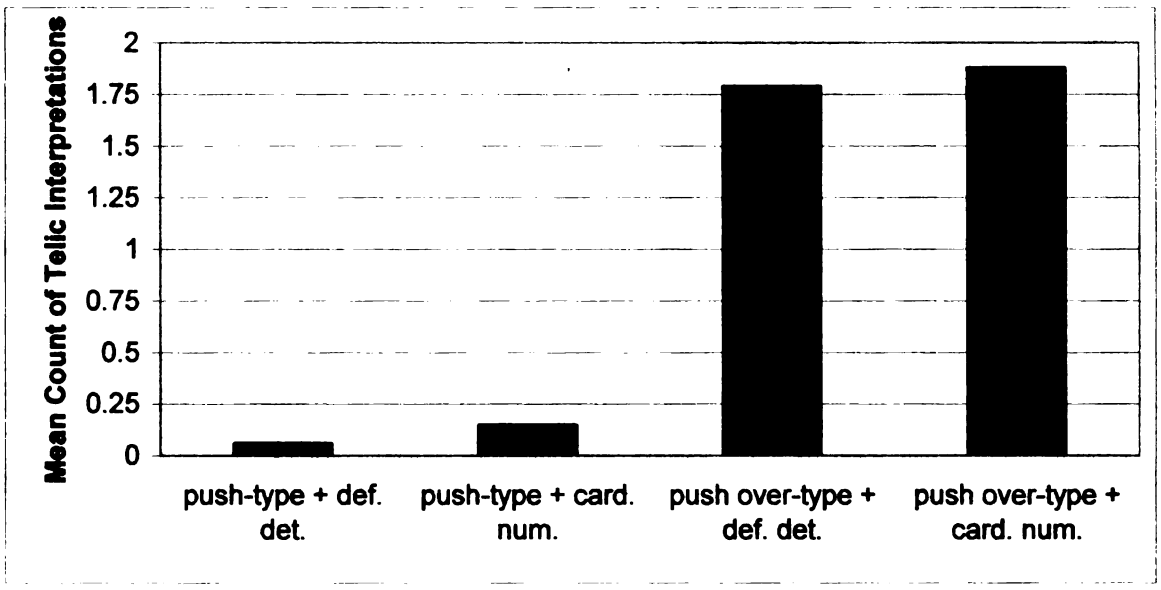

Figure 11. Mean counts of telic interpretations by verb-type and determiner-type for adults in push-type and push over-type conditions.

Taken together, predictions 4, 5, and 6 explore the role of the resultative particle with quantity-insensitive verbs and its independence in establishing a telic interpretation regardless of the type of determiner. (Refer to Figure 11 above to graphically compare the conditions.) Planned comparisons were used to test these predictions. Prediction 4 was that participants would respond *yes* to questions in the push-type + def. det. and push-type + card. num. conditions equally, indicating an atelic interpretation in both conditions. The result supports this prediction as the difference between responses to push-type + def. det. and push-type + card. num., were non-significant. $F(1, 47) = 4.27$, $p = .04$, $\eta_p^2 = .08$. Prediction 5 was that participants will respond *no* to questions in the push over-type + def. det. condition more often than in the push-type + def. det. condition. The result supports this prediction as the difference between the two was

statistically significant, $F(1, 47) = 711.61$, $p < .001$, $\eta_p^2 = .94$. Prediction 6 was that participants would respond *no* to questions in the push over-type + card. num. condition more often than in the push-type + card. num. condition. As predicted, the difference between the two conditions was statistically significant, $F(1, 47) = 500.44$, $p < .001$, $\eta_p^2 = .94$.

The purpose of Study 1B was to see whether resultative particles would behave differently in VPs with partitive quantity-sensitive verbs than in VPs with quantity-insensitive verbs. When comparing the differences, especially the degree of differences in telic interpretations, between eat-type verbs with and without a particle and push-type verbs with and without a particle, we see that there are qualitative differences. (See Figure 12 which combines the information from Figures 8 and 11). For the comparison of eat-type vs. eat up-type verbs we see that the mean number of telic interpretations increases with the card. num. as compared to the def. det. condition and increases to near-ceiling levels with the addition of the resultative particle. Although there are differences, the differences are graded. For the comparison of push-type vs. push over type verbs we see that the mean number of telic interpretations are at the extremes, based primarily on the presence or absence of the resultative particle, as expected.

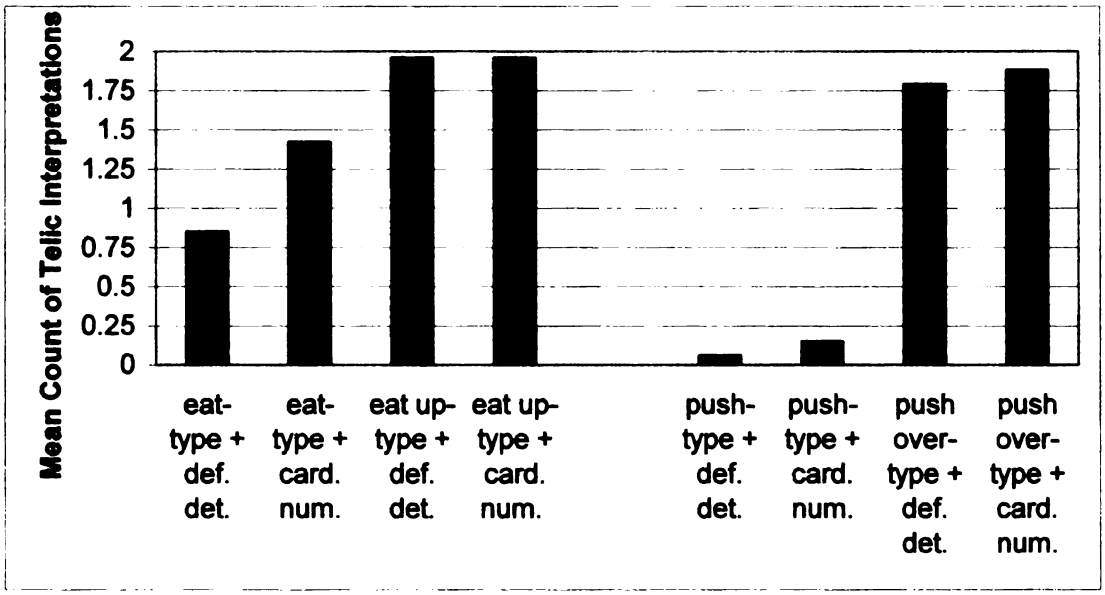

Figure 12. Mean counts of telic interpretations by verb-type and determiner-type for adults in eat/eat up-type and push/ push over-type conditions.

Study II: Children's Interpretation of Telicity

Part A: Verb-type and Determiner-type

Study IIA compared the roles of 2 quantity-sensitive verb subtypes, one that allows partitive interpretations (eat-type) and one that does not (build-type) and determiner-type (definite determiner and cardinal number) on the interpretation of telicity by children ages 3, 4, 5 and 6. The data were analyzed using a repeated-measures 4 (age) x 2 (verb-type) x 2 (determiner-type) mixed-model ANOVA. The between-subjects factor was age. The within-subjects factors were verb-type (i.e., build-type and eat-type verbs) and determiner-type (i.e., def. det. and card. num.). See Table 9 for the means and standard

deviations per condition for build- and eat-type verbs and Table 10 for a statistical summary of the results.

Table 9: Means and Standard Deviations of the Counts of Telic Interpretations per VP Condition for Build-type and Eat-type Verbs for Children

	Mean (SD)			
VP Condition	3-year-olds	4-year-olds	5-year-olds	6-year-olds
Build-type + definite determiner	0.93 (.70)	1.29 (.75)	1.33 (.77)	1.35 (.71)
Build-type + cardinal number	0.73 (.96)	1.42 (.77)	1.44 (.70)	1.52 (.73)
Eat-type + definite determiner	0.33 (.62)	0.92 (.88)	1.33 (.84)	1.04 (.71)
Eat-type + cardinal number	1 (.85)	1.42 (.78)	1.5 (.62)	1.57 (.66)

Table 10. Summary of ANOVA Results for Children: Eat-Type vs. Build-Type

Source	F	Hypothesis df	Error df	p	η_p^2	Observed Power
Age	4.34	3	76	.007	.15	.85
Verb-type	2.18	1	76	.114	.03	.31
Verb-type x Age	.39	3	76	.762	.02	.12
Determiner-type	18.21	1	76	.000	.19	.99
Determiner-type x Age	.61	3	76	.614	.02	.17
Verb-type x Determiner-type	18.53	1	76	.000	.20	.99
Verb-type x Determiner-type x Age	2.6	3	76	.059	.09	.62

There was no main effect for verb-type, $F(1, 76) = 2.18$, $p = .14$, $\eta_p^2 = .03$. This result does not support hypothesis 1. It was predicted that questions with build-type verbs would be interpreted as telic more often than those with eat-type verbs. The children did not make a statistically significant distinction between build-type verbs and eat-type verbs with respect to telicity (see Figure 13). There was a main effect for determiner-type, $F(1, 76) = 18.21$, $p<.001$, $\eta_p^2 = .19$. This result supports hypothesis 2 because, as predicted, the quantity-sensitive VPs containing DPs quantized by a the cardinal number were interpreted as telic more often than those containing DPs quantized by the definite determiner, as seen in Figure 14. There was also a statistically significant interaction between verb-type and determiner-type, $F(1, 76) = 18.53$, $p < .001$, $\eta_p^2 = .20$. In questions containing build-type verbs, the determiner-type did not have significant impact on the interpretation, but with eat-type verbs, the cardinal number yielded more telic interpretations than in the definite determiner condition (see Figure 15). There was also a between-subjects effect for age, $F(3, 76) = 4.339$, $p = .007$, $\eta_p^2 = .15$. A post hoc Bonferroni analysis indicated that the 3-year-olds had statistically significantly fewer telic interpretations than the 5-year-olds ($p = .012$) and the 6-year-olds ($p = .012$). This supports hypothesis 3 which predicted that older children would respond *no* to questions about NCEs more often than younger children.

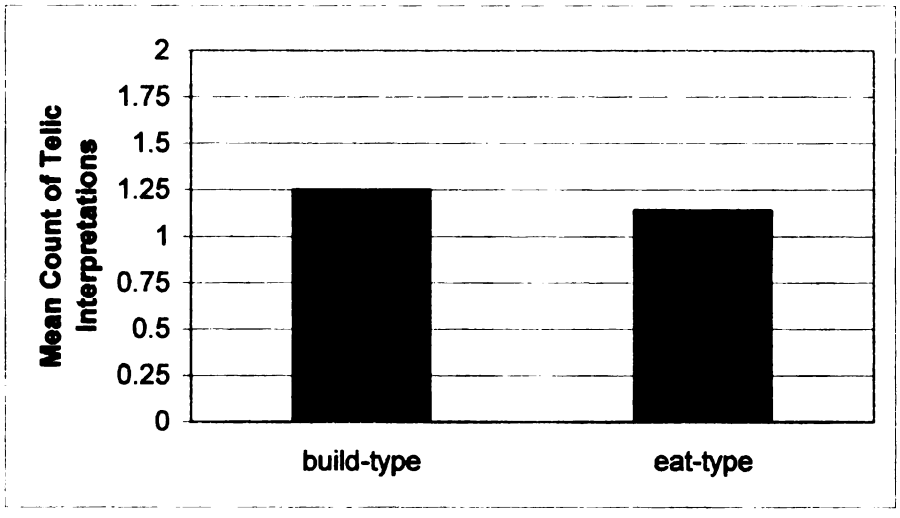

Figure 13. Mean count of telic interpretations by verb-type for children in build-type and eat-type conditions.

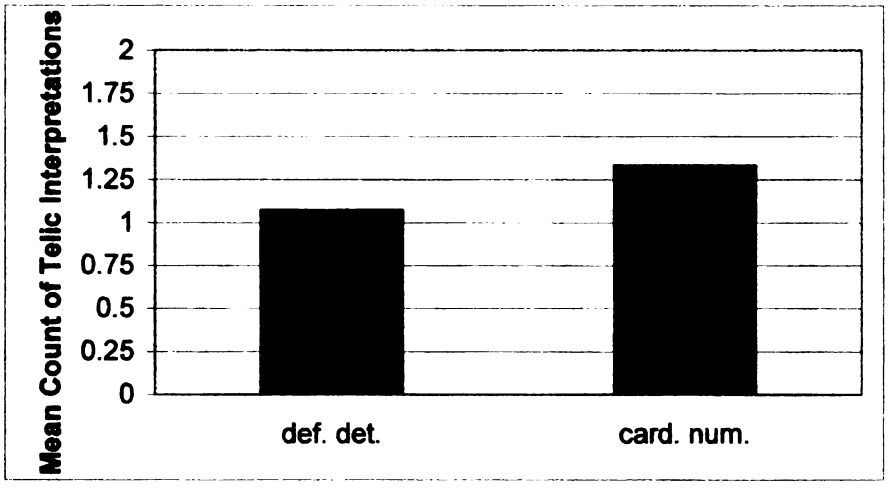

Figure 14. Mean count of telic interpretations by determiner-type for children in build-type and eat-type conditions.

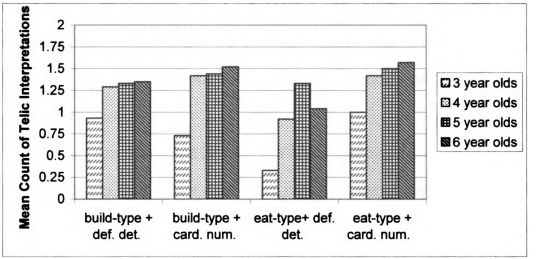

Figure 15. Mean count of telic interpretations by verb-type and determiner-type for children in build-type and eat-type conditions by age group.

Hypothesis 4 states that verb-type and determiner-type will interact to produce different response patterns to questions about NCEs with regard to telicity. VPs with build-type verbs with a cardinal number in the object DP will induce the most telic interpretations followed by: build-type verbs with a definite determiner, eat-type verbs with a cardinal number, and finally, eat-type verbs with a definite determiner. In order to test this hypothesis a series of planned comparisons were conducted for the specific predictions for each age group. The adjusted alpha level for each age group is .013. (See Figure.15.)

Prediction 4 was that at each age level, participants would respond *no* to questions in the build-type + def. det. condition more often than to questions in the eat-type + def. det. condition. The results for each of the age groups were as

follows: non-significant for 6-year-olds, $F(1, 22) = 2.48$, $p = .13$, $\eta_p^2 = .10$; non-significant for 5-year-olds, $F(1, 17) = .00$, $p = 1.00$, $\eta_p^2 = .00$; non-significant for 4-year-olds $F(1, 23) = 4.97$, $p = .04$, $\eta_p^2 = .18$; and significant for 3-year-olds, $F(1, 14) = 9.95$, $p = .007$, $\eta_p^2 = .42$. The prediction was supported only for the youngest children.

Prediction 5 was that at each age level, participants would respond *no* to questions in the build-type + card. num. condition more often than to questions in the eat-type + card. num. condition. The results for each of the age groups were as follows: non-significant for 6-year-olds, $F(1, 22) = .14$, $p = .71$, $\eta_p^2 = .01$; non-significant for 5-year-olds, $F(1, 17) = .14$, $p = .72$, $\eta_p^2 = .01$; non-significant for 4-year-olds $F(1, 23) = .00$, $p = 1.00$, $\eta_p^2 = .00$; and non-significant for 3-year-olds, $F(1, 14) = 1.67$, $p = .22$, $\eta_p^2 = .11$. The prediction was not supported any of the age groups.

Prediction 6 was that at each age level, participants will respond *no* to questions in the build-type + card. num. condition more often than in the build-type + def. det. condition. The results for each of the age groups were as follows: non-significant for 6-year-olds, $F(1, 22) = 1.65$, $p = .21$, $\eta_p^2 = .07$; non-significant for 5-year-olds, $F(1, 17) = 1.00$, $p = .33$, $\eta_p^2 = .06$; non-significant for 4-year-olds $F(1, 23) = .68$, $p = .48$, $\eta_p^2 = .03$; and non-significant for 3-year-olds, $F(1, 14) = .81$, $p = .38$, $\eta_p^2 = .06$. The prediction was not supported for any of the age groups.

Prediction 7 was that at each age level, participants would respond *no* to questions in the eat-type + card. num. condition more often than in the eat-type +

def. det. condition. The results for each of the age groups were as follows: significant for 6-year-olds, $F(1, 22) = 14.14$, $p = .001$, $\eta_p^2 = .39$; non-significant for 5-year-olds, $F(1, 17) = 1.00$, $p = .33$, $\eta_p^2 = .06$; significant for 4-year-olds $F(1, 23) = 13.80$, $p = .001$, $\eta_p^2 = .38$; and significant for 3-year-olds, $F(1, 14) = 17.50$, $p = .001$, $\eta_p^2 = .56$. The prediction was supported for all of the age groups except the 5-year-olds.

Overall, the analyses addressing hypothesis 4 found that for 3-, 4-, and 6-year-olds, VPs with eat-type verbs + card. num. were interpreted as telic more often than VPs with eat-type verbs + def. det. and for 3-year-olds, VPs with build-type verbs + def. det. were interpreted as telic more often than VPs with eat-type verbs + def. det.

Part B: Resultative Particles

Study IIB examined the role of resultative particles on the interpretation of telicity with quantity-sensitive verbs that allow partitive interpretations (eat- and eat up-type verbs) and with quantity-insensitive verbs (push- and push over-type verbs) in children ages 3, 4, 5, and 6. Hypothesis 1 for Study B essentially states that for push-type verbs, only the resultative particle, and not the determiner, contributes to a telic interpretation, while for eat-type verbs, the determiner does contribute to the interpretation, and the resultative particle serves to eliminate the possibility of a partitive interpretation of the verb. (See Table 11 for the means and standard deviations per condition for each age group.) The data were analyzed using two repeated-measures 4 (age) X 2 (verb-type) X 2 (determiner-

type) mixed-model ANOVAs. The data for eat-type vs. eat up-type and push-type vs. push over-type were analyzed separately because the relevant comparisons are between each basic verb-type and its resultative particle counterpart in the different determiner-type conditions. In both analyses the between subjects factor was age and the within subjects factors were verb-type (eat-type vs. eat up-type and push-type vs. push-over type, respectively) and determiner-type (definite determiner vs. cardinal number). Planned comparisons were performed for each analysis to test the specific predictions for eat-type vs. eat up-type questions and push-type vs. push over-type questions. For the eat-type vs. eat up-type conditions, the adjusted alpha level for multiple tests per age group is .01 and for the push-type vs. push up-type analysis it is .02 (.016 unrounded).

Eat-type vs. eat up-type. The results for the analysis comparing the conditions containing eat-type and eat up-type verbs are summarized in Table 12 below. There was a main effect for verb-type, $F(1,76) = 10.33$, $p = .002$, $\eta_p^2 = .12$. Questions with eat up-type verbs were interpreted as telic more often than those with eat-type verbs (see Figure 16). There was also a main effect for determiner-type, $F(1,76) = 40.03$, $p<.001$,. $\eta_p^2 = .35$. Questions with cardinal numbers were interpreted as telic more often than those with the definite determiner (see Figure 17). There was also a between-subjects effect for age, $F(3, 76) = 6.34$, $p=.001$. A post hoc Bonferroni analysis indicated that the

Table 11: Means and Standard Deviations of the Counts of Telic Interpretations per VP Condition for Eat-type, Eat up-type, Push-type and Push over-type Verbs for Children

	Means (SD)			
VP Condition	3-year-olds	4-year-olds	5-year-olds	6-year-olds
Eat-type verb + definite determiner	0.33 (.62)	.91 (.88)	1.33 (.84)	1.04 (.71)
Eat-type verb + cardinal number	1 (.85)	1.42 (.78)	1.5 (.62)	1.57 (.66)
Eat up-type verb + definite determiner	.53 (.83)	1.29 (.86)	1.44 (.78)	1.65 (.71)
Eat up-type verb + cardinal number	1.00 (.85)	1.54 (.66)	1.67 (.69)	1.74 (.62)
Push-type verb + definite determiner	.53 (.74)	.79 (.78)	.83 (.79)	.70 (.63)
Push-type verb + cardinal number	1.13 (.83)	1.21 (.88)	1.00 (.84)	1.13 (.87)
Push up-type verb + definite determiner	.80 (.86)	1.38 (.71)	1.22 (.73)	1.39 (.78)
Push over-type verb + cardinal number	.80 (.86)	1.33 (.82)	1.39 (.70)	1.52 (.73)

responses of 3-year-olds were significantly different than those of the 4-year-olds ($p = .03$), 5-year-olds ($p = .002$) and 6-year-olds ($p = .001$). There was no statistically significant interaction between verb-type and determiner-type or between age and the within subjects factors.

Table 12: Summary of ANOVA Results for Children in Eat-type and Eat up-type Conditions

Source	F	Hypothesis df	Error df	p	η_p^2	Observed Power
Age	6.34	3	76	.001	.20	.96
Verb-type	10.33	1	76	.002	.12	.89
Verb-type x Age	.93	3	76	.432	.04	.25
Determiner-type	40.03	1	76	.000	.35	1.0
Determiner-type x Age	1.60	3	76	.196	.06	.41
Verb-type x Determiner-type	3.43	1	76	.068	.04	.44
Verb-type x Determiner-type x Age	.85	3	76	.473	.03	.23

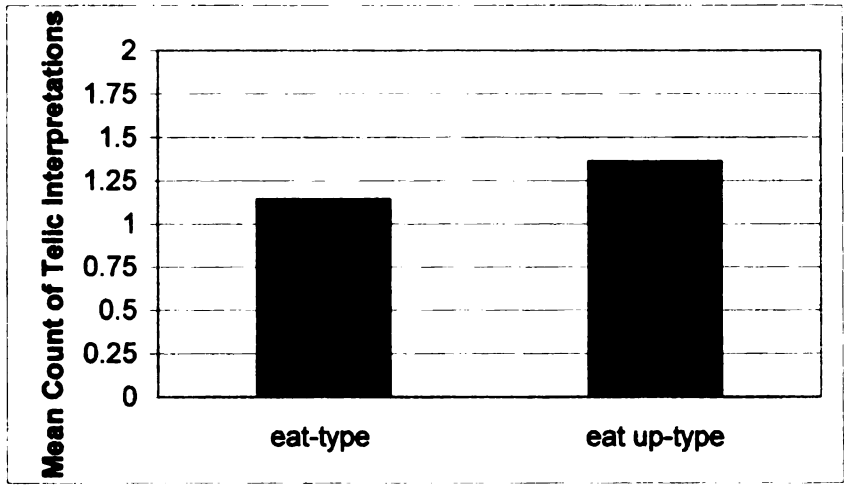

Figure 16. Mean counts of telic interpretations by verb-type for children in eat-type and eat up-type conditions.

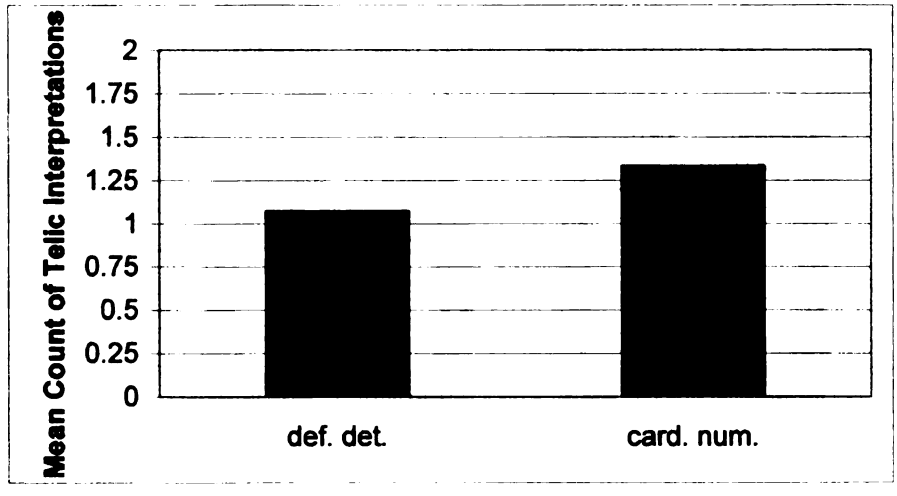

Figure 17. Mean counts of telic interpretations by determiner-type for children in eat-type and eat up-type conditions.

Three of the predictions are relevant to exploring the role of the resultative particle with quantity-sensitive verbs that can have a partitive interpretation. See Figure 18 for a graphic display of the means across the experimental conditions by age. Planned comparisons were used to evaluate the predictions. The adjusted alpha level for multiple tests per age group is .01 (Three tests for Hypothesis 1 and one for Hypothesis 2).

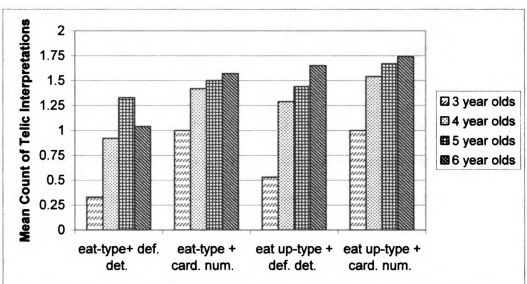

Figure 18. Mean count of telic interpretations by verb-type and determiner-type for children in eat-type and eat up-type conditions by age group.

Prediction 1 was that at each age level, participants would respond *no* to questions in the eat-type verb + card. num. condition more often than in the eat-type verb + def. det. condition, but not at ceiling levels. This prediction was also in Study A above and it is repeated here because of its relevance to evaluating the relative contributions of the determiners as compared to the resultative

particle. The results for each of the age groups were as follows: significant for 6-year-olds, $F(1, 22) = 14.14$, $p = .001$, $\eta_p^2 = .39$; non-significant for 5-year-olds, $F(1, 17) = 1.00$, $p = .33$, $\eta_p^2 = .06$; significant for 4-year-olds $F(1, 23) = 13.80$, $p = .001$, $\eta_p^2 = .38$; and significant for 3-year-olds, $F(1, 14) = 17.50$, $p = .001$, $\eta_p^2 = .56$. The prediction was supported for all of the age groups except the 5-year-olds.

Prediction 2 was that at each age level, participants would respond *no* to questions in the eat up-type verb + def. det. condition more often than in the eat-type verb + def. det. condition. The results for each of the age groups were as follows: significant for 6-year-olds, $F(1, 22) = 16.33$, $p = .001$, $\eta_p^2 = .43$; non-significant for 5-year-olds, $F(1, 17) = .21$, $p = .65$, $\eta_p^2 = .012$; significant for 4-year-olds $F(1, 23) = 8.07$, $p = .009$, $\eta_p^2 = .26$; and non-significant for 3-year-olds, $F(1, 14) = .81$, $p = .38$, $\eta_p^2 = .06$. The prediction was supported for 6-year-olds and 4-year-olds, but not for the 3-year-olds and 5-year-olds.

Prediction 3 was that at each age level, participants would respond *no* to questions in the eat up-type verb + card. num. condition more often than in the eat-type verb + card. num. condition. The results for each of the age groups were as follows: non-significant for 6-year-olds, $F(1, 22) = 1.65$, $p = .213$, $\eta_p^2 = .07$; non-significant for 5-year-olds, $F(1, 17) = 1.00$, $p = .33$, $\eta_p^2 = .06$; non-significant for 4-year-olds $F(1, 23) = .52$, $p = .48$, $\eta_p^2 = .02$; and non-significant for 3-year-olds, $F(1, 14) = .00$, $p = 1.00.$, $\eta_p^2 = .00$. The prediction was not supported for any of the age groups.

These two last predictions also address the second hypothesis for Study IIB, which was that children would be more sensitive to the presence of resultative particles for the interpretation of VPs as telic, than they would to the presence of a cardinal number or definite determiner in the object DP. The results for predictions 2 and 3 above indicate that this is not the case. Although the 4- and 6-year olds had more telic interpretations in the particle condition than in the def. det. condition alone, none of the groups had an advantage in the resultative particle condition over its corresponding card. num. condition. Although the difference was non-significant for the 3-year-olds is it noteworthy that the numerical difference in the means was in the opposite direction than predicted. Overall, the results indicate that the resultative particle may have an advantage over the definite determiner alone for obtaining telic responses; there is no evidence that it has an advantage over the cardinal number. The resultative particle did not appear to be an earlier or better indicator of telicity than the cardinal number, although it may be better than the def. det.

Push-type vs. push over-type. The second analysis in Study B was the comparison between push-type and push over-type verbs in the two determiner-type conditions. The results for this analysis are in Table 13 below. There was a main effect for verb-type $F(1,76) = 28.48$, $p < .001$, $\eta_p^2 = .27$. Questions with push over-type verbs were interpreted as telic significantly more often than questions with push-type verbs (see Figure 19). There was also a main effect for determiner-type, $F(1, 76) = 14.48$, $p < .001$, $\eta_p^2 = .16$. Questions with the cardinal number *two* were interpreted as telic more often than those with the definite

Table 13: Summary of ANOVA Results for Children for Push-type vs. Push over-type Verb conditions

Source	F	Hypothesis df	Error df	p	η_p^2	Observed Power
Age	1.174	3	76	.325	.044	.304
Verb-type	28.484	1	76	.000	.273	1.00
Verb-type x Age	3.873	3	76	.012	.133	.805
Determiner-type	14.475	1	76	.000	.160	.964
Determiner-type x Age	.288	3	76	.834	.011	.103
Verb-type x Determiner-type	11.648	1	76	.001	.133	.921
Verb-type x Determiner-type x Age	1.5	3	76	.221	.056	.381

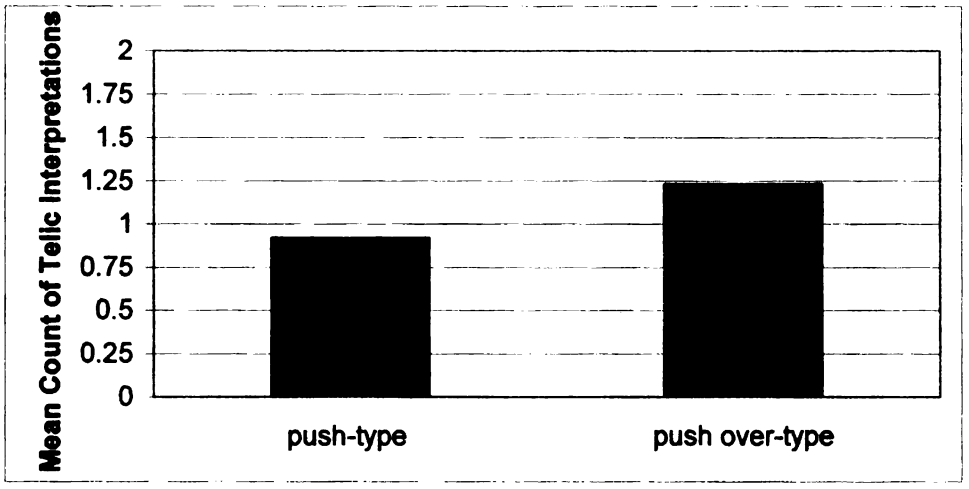

Figure 19: Mean count of telic interpretations by verb-type for children in push-type and push over-type conditions.

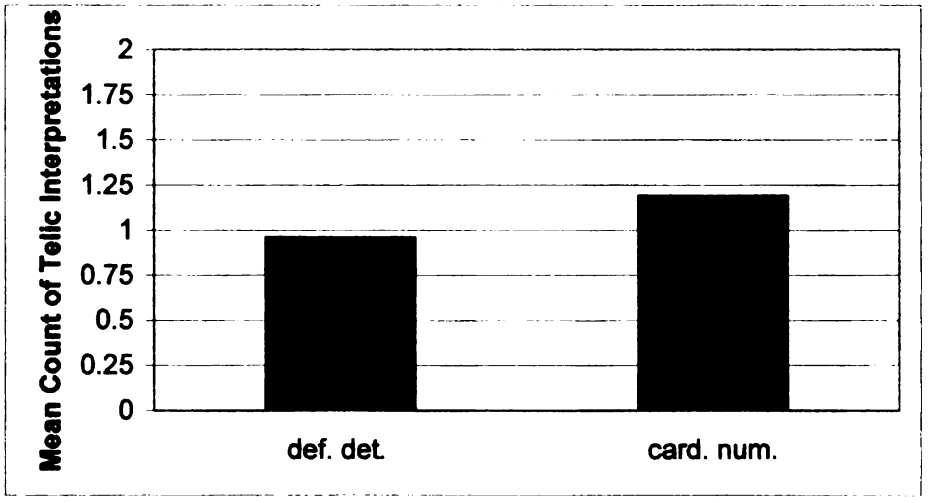

Figure 20. Mean counts of telic interpretations by determiner-type for children in push-type and push over-type conditions.

determiner *the*. (See Figure 20.) There was interaction effect between verb-type and determiner-type, $F(1, 76)$, $p = .001$, $\eta_p^2 = .13$. For questions with push-type verbs, there are more telic interpretations in the card. num. condition than in the def. det. condition, whereas for questions with push-over type verbs, the number of telic interpretations are similar regardless of the determiner-type condition. This result is particularly interesting because few telic interpretations were expected for push-type questions regardless of the determiner-type, but this expectation was not realized (see Figure 21). For further exploration of this result see the discussion. There was no between-subjects effect for age, but there was and interaction effect for verb-type x age, $F(3, 76) = 3.873$, $p = .012$, $\eta_p^2 = .13$. Children ages 4, 5, and 6 had more telic interpretations for all questions with push over-type verbs than for questions with push-type verbs, whereas 3-year-old children did not.

Predictions 4, 5, and 6 of Hypothesis 1 are relevant to exploring the role of the resultative particle with quantity-insensitive verbs and its independence in establishing a telic interpretation regardless of the type of determiner. (See Figure 21.) Planned comparisons were used to test these predictions. Recall that the adjusted alpha level for multiple tests was $\alpha = .016$.

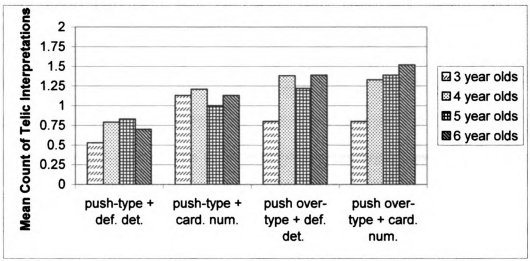

Figure 21. Mean count of telic interpretations by verb-type and determiner-type for children in push-type and push over-type conditions by age group.

Prediction 4 was that at each age level, participants would respond *yes* to questions in the push-type + def. det. and push-type + card. num. conditions equally, indicating an atelic interpretation in both conditions. The results for each of the age groups were as follows: non-significant for 6-year-olds, $F(1, 22) = 4.87$, $p = .04$, $\eta_p^2 = .18$; non-significant for 5-year-olds, $F(1,17) = 1.89$, $p = .19$, $\eta_p^2 = .10$; significant for 4-year-olds, $F(1,23) = 4.17$, $p = .015$, $\eta_p^2 = .23$; significant for 3-year-olds, $F(1, 14) = 13.50$, $p = .003$, $\eta_p^2 = .49$. In the Adult Study part B, the results for this prediction were easy to understand, because there were very few telic interpretations in both of these two conditions. However, that is not the case in the children's data. The statistical analyses indicate that for 3-

and 4-year-olds there were significant differences between the push-type + def. det. and the push + card. num. conditions. The push-type + def. det. condition yielded more atelic responses than the push-type + card. num. responses. The analyses indicate that for the 5- and 6-year-olds there were not statistically significant differences between the two conditions. However, it does not address the issue of whether the responses indicated telic or atelic interpretations. In fact, for the 5- and 6-year-old, no more than half of the responses indicated an atelic interpretation in either determiner-type condition. (See Figure 21.)

Prediction 5 was that at each age level, participants will respond *no* to questions in the push over-type + def. det. condition more often than in the push-type + def. det. condition. Although all groups responded to the push over-type + def. det. condition more often, the difference only reached significance for the 4 and 6-year-olds, given the adjusted alpha level. The results for each of the age groups were as follows: significant for 6-year-olds, $F(1, 22) = 22.52$, $p < .001$, $\eta_p^2 = .51$; non-significant for 5-year-olds, $F(1,17) = 4.50$, $p = .05$, $\eta_p^2 = .21$; significant for 4-year-olds, $F(1,23) = 32.20$, $p < .001$, $\eta_p^2 = .58$; non-significant for 3-year-olds, $F(1, 14) = 5.09$, $p = .04$, $\eta_p^2 = .27$. The lack of significance for the 3- and 5-year olds seems to be due to the surprisingly relatively high levels of telic responses to the push-type + def. det. condition. The prediction was supported for the 4- and the 6-year-old groups.

Prediction 6 was that at each age level, the participants would respond *no* to questions in the push over-type + card. num. condition more often than in the push-type + card. num. condition. The results for each of the age groups were as

follows: significant for 6-year-olds, $F(1, 22) = 8.17$, $p < .009$, $\eta_p^2 = .27$; significant for 5-year-olds, $F(1, 17) = 7.37$, $p = .015$, $\eta_p^2 = .30$; non-significant for 4-year-olds, $F(1, 23) = .52$, $p < .48$, $\eta_p^2 = .02$; and non-significant for 3-year-olds, $F(1, 14) = 3.18$, $p = .10$, $\eta_p^2 = .19$. In terms of the mean number of telic interpretations, the 3-year-olds, answered *no* more often in the push-type + card. num. condition than in the push over-type + card. num. In general the prediction was supported for the 5- and the 6-year-old groups, but not for the 3- and 4-year-old age groups.

Follow-up Data Analyses

Build-type vs. push-type verbs.

In the adult studies, it is obvious from comparing the mean counts of telic interpretations for the quantity-sensitive build-type verbs (Figure 3) and those for the quantity insensitive push-type verbs (Figure 9), that the adult participants treated these two verb-types very differently with respect to telicity. VPs with build-type verbs received telic interpretations and push-type verbs received atelic interpretations. In the children's studies, this is not obvious (see Figures 13 and 19). In order to determine whether the children treated the three main verb types as different types, a post hoc 3 (verb-type) x 2 (determiner-type) x 4 (age) mixed-model ANOVA was performed on the stimuli containing build-type, eat-type and push-type verbs. (See Table 14 for a statistical summary of the results.)

Table 14: Summary of Results for Children for Build-type vs. Eat-type vs. Push-type Verb Conditions.

Source	F	Hypothesis df	Error df	p	η_p^2	Observed Power
Age	2.43	3	76	.072	.089	.585
Verb-type	10.918	2	75	.000	.225	.989
Verb-type x Age	1.666	6	152	.133	.062	.622
Determiner-type	39.793	1	76	.000	.344	1.000
Determiner-type x Age	1.164	3	76	.329	.044	.301
Verb-type x Determiner-type	9.168	2	75	.000	.196	.972
Verb-type x Determiner-type x Age	1.264	6	152	.277	.048	.486

There was a main effect for verb-type, $F(2, 75) = 10.918$, $p < .001$, $\eta_p^2 = .23$. Earlier analysis indicated no difference for children between build-type verbs and eat-type verbs. Comparison between build-type and push-type verbs indicated a significant difference between these two verb-types, $F(1,76) = 22.05$, $p < .001$, $\eta_p^2 = .23$. Comparison between eat-type and push-type verbs also indicated a significant difference, $F(1, 76) = 7.076$, $p = .01$, $\eta_p^2 = .085$. Thus, as a group, the children did not make a distinction between the two quantity-sensitive verb types, but did make a distinction between the quantity-insensitive verb-type and the two quantity-sensitive verb types. See Figure 22.

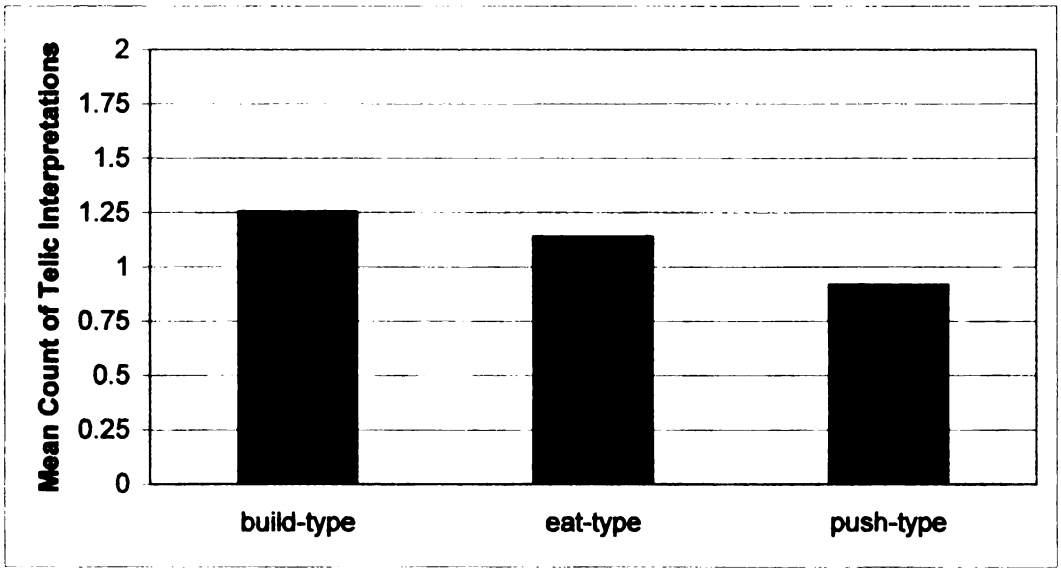

Figure 22. Mean counts of telic interpretations by verb-type for children in build-type, eat-type, and push-type conditions.

Analyses of Recoded Data

As indicated in the methods section, the primary data analyses above were performed on the data coded with the following data scheme: Responses of *yes* were counted as atelic interpretations, responses of *no* were counted as telic interpretations, qualified *yes* responses, such as *yes, but only one* and descriptive responses such as *only one* or *not that one* were also counted as telic interpretations of the questions (i.e., *no*), for reasons outlined previously. However, it must be acknowledged that a response such as "yes, but only one," is not unequivocal. One could argue that the interpretation of a given question is something between a *yes* and a *no.* A participant's choice to say *yes,* although qualified, may indicate that they are ambivalent, but that their interpretation is more atelic than telic. Therefore, the data were recoded so that that all *yes* and qualified *yes, but only* one types of responses were counted as atelic and all *no* and *only one* types of responses were counted as telic. Using the recoded data, the three age x verb-type x determiner-type mixed-model ANOVAs were repeated. There were no differences with respect to whether a factor or interaction was statistically significant or non-significant, with one exception. With the recoded data, the ANOVA examining stimuli with eat-type verbs vs. eat up-type verbs indicated a statistically significant 3-way verb-type x determiner-type x age interaction, $F(3, 76)$, = 2.99, p = .036, η_p^2 = .11. The 3-year-old group did not demonstrate any differences. This interaction appears to be due to the 3-year old group having more atelic interpretations for the definite determiner conditions than the other age groups and unlike other age groups, not exhibiting differences

between eat-type and eat up-type verbs across the same determiner-type conditions. Overall, however, the two coding schemes had very similar results. Therefore, the results presented above are not simply due to the specific coding scheme that was used.

CHAPTER 5

Discussion

Study I: Adults' Interpretation of Telicity

The major aim of the Adult Study I was to examine the roles of particular verb types (i.e., non-partitive quantity-sensitive, partitive quantity-sensitive and quantity-insensitive), particular determiners in the object DP (i.e., definite determiner and cardinal number), and the presence of resultative particles on the interpretation of telicity by adults. Overall, the results indicate that all of these factors play a role in the interpretation of telicity to varying degrees and that verb-type and determiner-type interact with each other to produce particular interpretations of sentences with regard to telicity.

Part A: Verb-type and Determiner-type

Study IA focused on the comparison of sentences that contained either of two types of quantity-sensitive verbs. The critical difference between the two verb types was that eat-type verbs allow a partitive interpretation of the object/complement, whereas build-type verbs do not. For example, one can *eat off/from the cake* but cannot *build off/from the house*. Partial eating of a cake could satisfy the description *He ate the cake.* On the other hand, partial/initial steps in the building of a house cannot satisfy the description *He built the house.*

The first hypothesis was that VPs containing build-type verbs and quantized object DPs require a telic interpretation, whereas VPs containing eat-

type verbs and quantized object DPs allow for either a telic or an atelic interpretation. The hypothesis was strongly supported by the results. Nearly all of the adult responses to questions with build-type verbs indicated telic interpretations, while for eat-type verbs only about half of the responses indicated telic interpretations.

The findings reported above also serves as a potential explanation for the results in van Hout's (1998) study. In her experiment, adults were expected to interpret questions with the quantity-sensitive verbs *eat* and *drink* and quantized DPs as telic, but they only did so 25% of the time in English and 78% of the time in Dutch. It is possible that certain task variables such as static pictures, the use of the possessive pronoun as a quantizer, or the presentation of a narrative story may also have had undue influence on the results in the earlier study (van Hout, 1998). Given the present results and the proposed explanation, one may conclude that participants' reduced level of interpretation of VPs with eat-type verbs does not indicate a lack of recognition of *eat* and *drink* as being quantity-sensitive. Rather, it may indicate that many adults interpret VPs with eat-type verbs as partitive and which allows them to interpret the VP *eat the/two brownies* as *eat from the/two brownies*, an Activity VP which is therefore atelic even when followed by a quantized DP.

There is another way in which one might consider partitivity influencing the interpretation of the questions. It could be that partitivity allows an implicit *some of* reading, as in *eat (some of) the brownies.* In this case, the partitive would actually yield a telic interpretation. Here, a *yes* response to the relevant target

questions would indicate a telic interpretation (eating of *some of the brownies* culminated in a logical endpoint). However, recall that for the adults, the presence of the resultative particle *up* in questions such as *Did the woman eat up the/two brownies?* resulted in ceiling levels of telic interpretations. The resultative particle *up* blocks the atelic interpretation (e.g., **She ate up from the cake*) but does not block the telic interpretation (e.g., *She ate up some of the cake*). If the partitive interpretation was due to an implicit *some of* the presence of *up* would not be expected to result in such a large increase in telic interpretations. Therefore, I the former explanation is preferred.

The second hypothesis dealt with the relative contribution of two target determiners, the definite determiner *the* and the cardinal number *two,* to the interpretation of telicity. Because both of these determiners serve to quantize the object DP, theoretically, they should both equally result in telic interpretations when they follow a quantity-sensitive verb. The hypothesis that the definite determiner would have less influence than a cardinal number on creating a telic interpretation is based on the premise that the definite determiner, and not the cardinal number, would allow for pragmatic accommodation of the sentence as true (i.e., allow a *yes* response). Although the cardinal and definite behave differently, the differences are predictable. In other words, in the quantity-sensitive VPs following NCE videos, the definite determiner may allow a different construction of the relevant set and therefore allow adults to conclude that the event has culminated with respect to a portion of the set and consider this portion to be the relevant set. This flexibility in the construction of the set is not available

for the cardinal number. The cardinal number *two* requires a counting/matching of at least two objects. The number *two* asserts that the relevant DP object involves at least two of a kind. In contrast, the referent of a definite determiner is not fixed; it is dependent on the discourse. In sentences with a definite determiner in the object DP, the listener must decide on what constitutes the set being referred to in the discourse context. The listener has some latitude in deciding what constitutes the discourse-relevant set.

In order to pragmatically accommodate a stimulus sentence as being true in the discourse context, a listener may decide that the set, *the* X*s,* can be satisfied by any number of objects present to which some threshold amount of the verb applies, without requiring that the action be completed with all of the objects in order to be true. Thus, in the cases such as *build the houses* or *eat the brownies*, where a quantity-sensitive verb is followed by a definite object DP, a listener can decide that the sentence is true if the action is completed on both objects or that it is true if the action involves a certain threshold amount of each object. For example, one may decide that that biting off a piece of a cookie, chewing it, and swallowing it, may be enough to allow the phrase, *eat the cookie* to be true, whereas just biting into it may not be. Another individual may require that at least half of the cookie be consumed to allow it to be true.

The hypothesis regarding the definite determiner and cardinal number was supported. Overall, there were significantly more telic responses to questions with the cardinal number in the DP than those with the definite determiner. It was predicted that this would be the case for questions with both verb types, but to a

greater extent with eat-type verbs, because atelic interpretations could also be obtained due to the partitivity of eat-type verbs. However, this was not the case with both verb types. When the interaction between verb-type and determiner-type is examined closely (see Figure 5), we see that it was only evident in the case of eat-type verbs. The lack of an observable determiner effect with build-type verbs appears to be due to the strong telic interpretation that is elicited by the quantity-sensitive and non-partitive characteristics of build-type verbs. The number of telic responses in both build-type verb conditions was at or very near ceiling level showing that adults did use the set as provided in the video.

With eat-type verbs, both determiner conditions present listeners with an option to interpret the questions as atelic due to the option of interpreting eat-type verbs as partitive. Furthermore, even if the verb is not interpreted as partitive, listeners can answer *yes* (with a telic interpretation) by pragmatically accommodating DPs with definite determiners as referring to whatever portion of the object was acted upon. On the other hand, if the verb is not interpreted as partitive, the cardinal number specifies the amount, i.e., *two*, and accommodation is not possible.

Hypothesis 3 specifically addressed the potential interactions between verb-type and determiner-type by proposing a hierarchy of telic responses based on combinations of verb-type and determiner-type. It was hypothesized that in response to yes/no questions following non-culminating events, VPs containing build-type verbs with a cardinal number would induce the most telic responses, followed by build-type verbs with a definite determiner, eat-type verbs with a

cardinal number, and finally eat-type verbs with a definite determiner. With the exception of VPs containing build-type verbs with a cardinal number and those with a definite determiner inducing equally high levels of telic interpretations, the hierarchy was evidenced in the results.

Overall, Study 1A demonstrated that subtypes of quantity-sensitive verbs and different determiners have an impact on the interpretation of VPs as telic or atelic and that the relative impact of each could be predicted based on the semantic, syntactic and pragmatic characteristics of the verbs and determiners.

Part B: Resultative Particles

Study IB focused on the role of resultative particles on the interpretation of telicity in VPs with quantity-sensitive verbs that allow partitive interpretations (i.e., eat-type) and those with quantity-insensitive verbs (i.e., push-type). It was hypothesized that for push-type verbs, the presence of a resultative particle would *result* in a telic interpretation, whereas for eat-type verbs the presence of a resultative particle would *confirm* a telic interpretation by disambiguating between an otherwise possible telic or atelic interpretation. For push-type verbs, which are quantity-insensitive, the presence of a resultative particle as in *push over the X*, creates a telic interpretation and also adds another layer of semantic meaning to the VP. The specific type of determiner that may be present does not influence the interpretation of telicity. For VPs containing eat-type verbs, the role of the resultative particle is not to create a telic interpretation, but to eliminate the possibility of a partitive, and therefore atelic, interpretation of the VP. Meanwhile,

the presence of a determiner that quantizes the DP will contribute to a telic interpretation. In other words, for quantity-insensitive verbs, it is the resultative particle alone that creates a telic VP and for partitive quantity-sensitive verbs the determiner in the object DP makes a contribution to a telic interpretation of the VP, while the resultative particle serves to overtly mark the VP as telic and thereby remove the possibility of a partitive/atelic interpretation.

The comparison between eat-type and push-type verbs with particles was done indirectly because opposite responses are expected for eat-type and push-type verbs, which would create a confound in direct comparison. Responses to stimuli with push-type verbs in the various conditions were evaluated separately from those with eat-type verbs in the various conditions and those results will be qualitatively examined here.

For eat-type verbs, there was a significant difference between the def. det. and card. num. conditions, with the cardinal number making a greater contribution than the definite to the number of telic interpretations. The addition of the resultative particle *up* significantly increased the mean number of telic interpretations in both the def. det. and the card. num. conditions. These results demonstrate that the determiner-type made a relative contribution to the interpretation of the questions as telic, but that the resultative particle *up*, made an additional contribution, which judging from the near-ceiling level of telic interpretations, essentially eliminated atelic interpretations (see Table 6 and Figure 8).

For push-type verbs, there was no significant difference between telic interpretations in the def. det. and card. num. conditions, suggesting that the determiner type in object DPs of quantity-insensitive verbs does not contribute to the interpretation of telicity, as predicted. In fact, the overall levels of telic interpretations were very low (see Table 6). Given the semantics of push-type verbs, specifically that they are quantity-insensitive, this result was expected. In both determiner conditions, the addition of the resultative particle *over* or *out* significantly increased the mean number of telic interpretations in both the def. det. and the card. num. conditions. As illustrated by Figure 11, the difference in telic interpretations between the non-particle and particle conditions is drastic for push-type verbs; the telic interpretation appears to be wholly accounted for by the resultative particle (occurring with a quantity-insensitive verb). By contrast, the differences between the non-particle and particle conditions with eat-type verbs, is more gradual (see Figure 8). The quantity-sensitive semantics of eat-type verbs makes a contribution when combined with a quantized object DP, presumably when the verb is interpreted non-paritively. The determiner type makes an additional contribution, with object DPs containing the cardinal number resulting in more telic responses. Finally, the contribution of the resultative particle *up* appears to be to establish the VP as telic, without ambiguity. When the resultative particle is present, adults seem to ignore the determiner.

The finding that resultative particles function differently indicates that the resultative particle *up* with eat-type verbs functions to clarify the meaning of a VP whose telicity is potentially ambiguous, while resultative particles with quantity-

insensitive verbs create telicity and add substantial semantic meaning (overt change of position/state of the object). It also serves to support the premise that build-type and eat-type verbs, although both quantity-sensitive, have different characteristics that impact telicity. If eat-type verbs functioned the same way as build-type verbs, then we would expect that the telic effect of the particle *up* would be present for both verb types, but this is not the case. When the particle *up* occurs with build-type verbs, as in *build up* or *fix up*, it does not function as a resultative particle. *Build up* essentially means to make something larger and *fix up* means make something nicer. In these cases, the particle *up* is not resultative. Furthermore, if build-type and eat-type verbs did behave identically, and an eat-type verb with a quantized object DP always resulted in a telic interpretation, we would have to attribute the occurrence of the particle *up* in utterances such as, *George, eat up your broccoli,* to some other purpose. What this other purpose could be is not clear. In other words, the partitive characteristic of eat-type verbs, and the subsequent possibility of atelic interpretations of sentences such as *Did he eat the/two brownies*, appears to be the reason why the resultative particle is needed when a speaker's intended description of an event specifically includes, and focuses on, the endpoint of that event. With build-type verbs there is no partitivity. Essentially, there is no reason for the listener to think that the description may not include the endpoint, and therefore there is no need for a resultative particle to establish telicity unambiguously; the verb and the syntax of the object DP have already done so.

The compositional particles as in *push over the/two dogs* and *carry out the/two bags* do not seem to have a primary function of indicating an endpoint, although they do so obligatorily without influence of the determiner-type in the object DP. These particle verbs provide additional semantic meaning by indicating a location or goal, and their telicity may be considered a by-product of the location or goal. When *eat* and *eat up* are compared, there is no substantial difference in meaning except the overt indication of completion. *Eat* and *eat up* are both quantity-sensitive and the particle *up* does not appear to add any new dimension of meaning. On the other hand, when *push* and *push over* are compared, there is a substantial difference in meaning. First, *push* is quantity-insensitive, while *push over* is quantity-sensitive. Second, *over* adds the semantic dimension of a goal. In the case of verbs such as *push/push over*, the addition of the particle seems to create a new verb; in a way that for *eat/eat up* it perhaps does not.

The findings of Study I lead to the conclusion that understanding the telicity calculus for English-speaking adults requires consideration of subtypes of quantity-sensitive verbs, subtypes of determiners and the roles of different types of resultative particles. The present study examined and found differences between partitive and non-partitive quantity-sensitive verbs and between the definite determiner and cardinal numbers that have not been previously formally examined. It also found that resultative particles play a different role with different verb types.

Study II: Children's Interpretation of Telicity

The major aim of Study 2 was to investigate the development of the interpretation of telicity as a function of: a) particular verb types (i.e., non-partitive quantity-sensitive, partitive quantity-sensitive and quantity-insensitive), b) particular determiners in the object DP (i.e., definite determiner and cardinal number), and c) the presence of resultative particles, using adult performance levels of the adults in Study I as a reference.

Part A: Verb-type and Determiner-type

Study IIA examined children's responses to stimuli containing eat-type and build-type verbs in the two determiner-type conditions (i.e., definite determiner and cardinal number) across 3-, 4-, 5- and 6-year-old age groups. There was a main effect of age. The responses of the 3-year-old group were quantitatively different than those of the 5- and 6-year old groups. Specifically, the 3-year-old responses indicated fewer overall telic interpretations of the target stimuli than the oldest two groups. The 4-year-old group did not differ from either the 3 year-olds or the 5- and 6-year olds. In general, there was a developmental trajectory that emerged, with the 4-year-olds generally appearing to be at an intermediate stage. However, the results also indicated that the oldest children in the study had not yet reached adult levels of performance, at least with respect to verb-type and resultative particles. Although the children's and the adults' results were not statistically compared due to differences in group-size and in the procedures,

their results have been placed side by side and clustered by age group in Figures 23 through 25 to facilitate the discussion.

Build-type vs. eat-type verbs. Although numerically the responses to questions with build-type verbs suggested more telic interpretations than to those with eat-type verbs (see Figure 13), the difference was not statistically significant. This suggests that, across the four age groups, there was no distinction between the two verb-types (but see below for comparisons within each age group). For both verb-types just over half of the responses indicated a telic interpretation. Therefore, the hypothesis that build-type verbs would yield more telic responses was not supported for the children as a single group.

The difference between the adults' and children's results suggests that the children have not yet acquired an adult level of understanding of the specific verb-type characteristics of build- and eat-type verbs (see Figure 23). Some of the children did not seem to appreciate that build-type verbs with quantized DPs require that an endpoint be reached for the VP to be true, whereas essentially all of the adults clearly did. Those children who did not have a telic interpretation for such sentences appear to be treating the VPs *build the/two houses* as if it were an activity VP, and any amount of building a house is good enough to say that *building a house* took place. Alternatively, they just assume that the event will be completed at some point in the future and that is good enough to consider it to have happened.

Some of the children's spontaneous comments suggested that they may have been answering the questions with a focus on the verb alone, with little

influence from the DP on their interpretations. During data collection, some of the child participants were noted to occasionally answer questions such as *Did the man build the houses?* with responses such as "Yep, he was building", or questions such as *Did the woman drink the sodas?* with "Yeah, she drank." Although, such responses were identified across age groups, they seemed to be more frequent among the younger children. Notably the youngest children also had the fewest telic responses with either verb-type. (See Figure 23 for a comparison between ages.)

The proposal that the children are initially treating build-type VPs as activity VPs is reasonable, but tentative, as information about the interpretations of individual children, and the pattern of responses within an individual child is lost in the course of averaging across children. At all age levels, some children indicated a telic interpretation for both tokens of a given verb type + determiner type condition, others indicated an atelic interpretation for both tokens and others still gave one of each, suggesting ambivalence. It seems clear that the children, as a group, did not interpret the verb-types, especially the build-type verbs, in the same manner as adults.

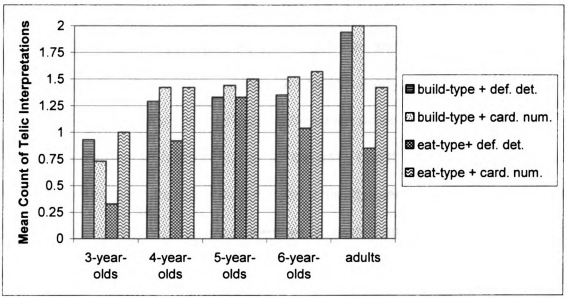

Figure 23. Mean counts of telic interpretations by verb-type and determiner-type presented by age group for children and adults for build-type and eat-type conditions[8].

The effects of various combinations of verb-type and determiner-type were analyzed by age group. Although there was no overall effect of verb-type across the age groups, the 3-year-olds did exhibit a significant difference between the build-type + def. det. condition and the eat-type + def. det. condition. The difference for the 4-year olds approached, but did not reach statistical significance. This result is somewhat odd because at first glance it implies that the younger children make some distinction between the verb-types that is later lost. However, when we carefully examine the results, we see that this is not

[8] The data for children and adults are presented side-by-side here for qualitative comparison. Statistical comparisons between the adults and children were not conducted.

necessarily the case (see Figure 15 or 23). For the 3-year-olds, there is a significant difference between build-type + def. det. and eat-type + def. det., where there are very few telic interpretations with eat-type. It appears that the 3-year-olds treat VPs such as *eat the/two brownies* as activity VPs more than VPs such as *build the/two houses*. It may be the case that this is related to transitivity. Build-type verbs are transitive and require a direct object, whereas eat-type verbs can be detransitivized. and consequently not require an object. The fact that eat-type verbs can be detransitivized may make it easier for the 3-year-olds to interpret questions with *eat* or *drink* as being just about the verb and not specifically about the direct object[9].

Another reason that we must be careful not to interpret the verb-type distinction made by the 3-year olds as the 3-year-olds having some knowledge of verb-type distinction that the older children do not, is that theoretically, when partitivity is not considered, both verb-types should yield telic interpretations when followed by a quantized DP. In Figures 15 and 23 it is clear that the older children demonstrate a better knowledge of both eat-type and build-type verbs as it relates to telicity, as indicated by overall higher levels of telic interpretations in the older age groups. Although the 3-year-olds have a statistically significant

[9] This is somewhat consistent with Wagner's (2006) finding that 2-year-olds have a bias for interpreting transitive sentences as telic. In her study, 3-year-olds did not demonstrate the bias. However, given task differences, verb differences and the range of variation in language development, it is still possible that some of the 3-year-olds are exhibiting a transitivity bias in the case of build-type verbs that is not present with the eat-type verbs, because eat-type verbs can be detransitivized.

difference between build- and eat-type verbs, it seems to be qualitatively different from the build- and eat-type difference exhibited by the adults.

Push-type verbs. It is fairly reasonable to have a lack of overall differences between build- and eat-type verbs because they are both quantity-sensitive and are both capable, if not required, to allow telic interpretations when followed by a quantized DP. In terms of telicity however, push-type verbs should yield an atelic interpretation regardless of the composition of the object DP. For example, following an NCE video, we would expect the answer to *Did the woman push the/two dogs?* to be *yes*. Whether or not the dogs were pushed over, should not matter, if any amount of pushing took place, the answer is expected to be *yes*. There was not a formal hypothesis that this would be the case for children, because the primary purpose of including push-type verbs in the study was to examine the role of resultative particles. However, because the children's results for questions with push-type verbs indicated a relatively high frequency (nearly half) of *no* responses, i.e., (telic interpretations) which was unexpected, a follow up analysis comparing push-type to build- and eat-type verbs was conducted.

If children had some notion of the quantity-sensitive/quantity-insensitive distinction, we would expect that there would be differences between push-type verbs and both build- and eat-type verbs with regard to telicity, despite the relatively frequent telic interpretations of questions with push-type verbs. Statistically significant differences between push-type and the quantity-sensitive verbs were found, indicating that at least some, if not most, of the children had an appreciation of this distinction. This is important because it shows that children

are not treating all of the verbs as the same. Although, there were no significant differences between the two quantity sensitive verb-types (i.e, build-type and eat-type), there are differences between both quantity-sensitive verb-types and the quantity-insensitive verbs. Thus, the children do seem to be aware of the broader distinction between quantity-sensitive verbs and quantity-insensitive verbs, although they are still refining their knowledge of verb-type characteristics.

However, the fact that approximately half of the responses to push-type VPs were telic, calls for some explanation, especially since in the adult data, the percentage of telic interpretations of push-type verbs was very small. As was mentioned earlier, young children have been found to exhibit a telic bias for transitive sentences (Wagner, 2006). Perhaps some of the children continue to have a telic bias for transitive sentences. Despite the quantity-insensitive characteristic of push-type verbs, the fact that the sentences are transitive may serve as a more salient, albeit incorrect, cue for a telic interpretation. Alternatively, some of the children may have treated *push* as *push over* and *carry as carry out.* For adults, one could argue that *push* and *push over* are lexically distinct from each other, but perhaps some of the children have not reached that conclusion yet or the verb *push* is ambiguous for them. Another possibility is that *push* and/or *carry* are not the words that some of the children would choose for descriptions of the scenes that they viewed. Their *no* responses may have been denials that pushing or carrying took place. They may have characterized the action they viewed for the verb *push* as *shoving* or *sliding*, etc. and for the verb carry as *taking*.

Learning verbs. Verbs are difficult to learn. They are much more than simply labels for actions. Consider what it means to know a verb. Consider the verb *build*, in the sense of *build a house* (vs. *build an argument*). Semantically, this verb refers to the physical process of constructing an object by putting pieces or parts together. It is durative and quantity-sensitive. It is transitive and requires an animate subject and a direct object. There are multiple pieces of semantic and syntactic information that are needed to 'know' a verb. Knowing a verb also means having an understanding of how it interacts with the rest of the VP and sentence. All of the verbs selected for this task were identified as being understood and/or used by over 75% of 30 month old children (Dale & Fenson, 1996). However, the depth of understanding of each of those verbs is unknown. Given the amount of information that is involved in verb learning, it is not surprising that even by age 6 the children do not demonstrate fully adult-like knowledge of the verb-types examined here. Despite their apparently incomplete knowledge of all of the aspects of the verbs, it is important to observe that at least for the quantity-sensitive verbs, the children are not qualitatively very different from the adults. Although they may not have responded *no* to the target questions with the same frequency as adults, it is noteworthy that the response patterns across conditions for the 4-, 5-, and 6- year old children are remarkably similar to that of adults (see Figure 23). The most notable difference between the children and the adults is that the adults have very high levels of telic interpretations of build-type verbs with quantized DPs and the children do not yet reach such levels by age 6. This suggests that there is some bit of information

about this type of verb and/or its relationship to the DP that not all of the children have acquired yet.

The literature on syntactic bootstrapping (e.g., Gleitman, 1990; Naigles, 1990) has demonstrated that children use information about the syntactic frames in which verbs appear to learn aspects of their characteristics. In the case of telicity, the specific meaning of a verb plays a crucial role in how it will be interpreted within the syntax of the rest of the VP. There appears to be an relationship through which the syntax of a VP informs the child's knowledge of the semantics of the VP and conversely, the semantics informs the child's knowledge and interpretation of the syntax of the VP (Pinker, 1989). Since children at 6 years of age do not yet have the adult levels of performance, but appear to be approaching adult levels, indicates that the acquisition of telicity, as well as acquisition of verb knowledge in general, is a process that occurs over an extended period of time.

Determiner-types. It is well documented in the literature that children as old as six do not yet have a fully developed determiner system and have particular difficulties learning all of the subtleties of the definite determiner (Karmiloff-Smith, 1979; Maratsos, 1976; Munn, et al., 2006; Perez-Leroux, et al., 2004). Although they acquire and use the definite determiner early on, there is an extended period of development during which the system has to be fine-tuned and reflects the adult system. One factor that impacts the difficulty of fully understanding the definite determiner is that its interpretation is fundamentally discourse-based. The listener must decide what constitutes the actual referent

that is being talked about by the speaker. For children, the definite determiner appears to have a broader/different application than it does for adults (Karmiloff-Smith, 1979 and Perez-Leroux, et al., 2004). On the other hand, the cardinal number specifies the quantity of objects being referred to by the speaker, eliminating the need to make a discourse-based decision in contexts such as the one used in this experiment. Children acquire the ability to count/match small quantities by age two and perhaps even earlier (Gelman & Gallistel, 1978). Given the difference in children's abilities with definite determiners and cardinal numbers, it was hypothesized that they would be better able to use cardinal numbers to understand a DP as quantized than the definite determiner. To be clear, the claim was not that children could not understand or use the definite, just that the understanding of its multiple functions and discourse-based interpretation has not reached the adult state. In other words, the cardinal number would be more effective as a quantizer than the definite determiner. The children in the study did indicate telic interpretations more often when the cardinal number was used to quantize the DP than when the definite determiner was used.

There was an interaction between verb-type and determiner-type. The difference between the determiner types was only present for eat-type verbs (see Figures 15). With the exception of the 5-year-old group, this interaction was found at all age levels. The lack of a difference for the 5-year-olds was due to their greater frequency of telic interpretations in the eat-type + def. det. condition, than any of the other age groups.

The same kind of verb-type by determiner-type interaction was found for adults. In the adult case, the lack of difference between the determiner types in the build-type verb conditions could not be further examined due to the ceiling effect. VPs with build-type verbs were interpreted as telic nearly 100% of the time regardless of the determiner. Thus, the children's interpretations of questions with build-type verbs do not appear to have depended on the determiner-type in the object NP. Rather, it seems to have rested on their knowledge, or perhaps lack of knowledge, about the verb types/subtypes.

In order to address the hypothesis regarding the role of the resultative particle with different verb types, the push-type + def. det. condition was compared to the push-type + card. num. condition. It was anticipated that push-type verbs would equally yield atelic interpretations in both the def. det. and card. num. conditions. As discussed earlier, although there were significantly more atelic than telic interpretations, the levels of telic interpretations were surprisingly high overall, particularly by comparison to the adult results. However, there were significant differences between the two determiner conditions in the number of telic interpretations for the 3- and 4-year-olds. These younger age groups had a significantly higher mean count of telic interpretations in the cardinal number condition than in the definite determiner condition, suggesting that for them, the cardinal number made some independent contribution to a telic interpretation. More than half of the 3- and 4-year-old responses to push-type verbs + card. num. (i.e., *Did the man push two dogs* and *Did the woman carry two bags*) were telic. It seems that for at least some of the youngest children, despite the

presence of a quantity-insensitive verb, the presence of the cardinal number in the object DP was a stronger, albeit incorrect indicator of a telic VP.

There are at least two ways to explain children's larger number of telic interpretations with object DPs quantized by *two* than those quantized by *the*. Both are based on children's ability to count and their simultaneous limitations in understanding the range of functions of the definite determiner. The pragmatic accommodation explanation, which was used to account for the adult results, may not be available for the children's results. Accommodation of the definite determiner is largely dependent on a complete understanding of the definite determiner as defining a maximal set and the adults' ability to construct a new relevant set, different from that in the context. Children may have difficulties with this aspect of the definite determiner to begin with (Karmiloff-Smith, 1979; Maratsos, 1976). Unless they have an adult-like knowledge of the definite determiner, they would be unlikely to engage in pragmatic accommodations in the same manner as adults.

The first possibility is that children interpret the plural definite as a reference to a *kind* (or category). For example, in a sentence such as *The lion is the king of the jungle*, the DP, *the lion*, refers to a kind of animal and not to a specific animal. Although the plural definite does not yield a kind reading for adults, Perez-Leroux, et al. (2004) found that some children do interpret the plural definite as referring to a kind. In the context of the present study, it is possible that a kind interpretation of the object DP would result in an atelic interpretation. For example, with a kind reading of the plural definite, it is feasible

that a child could interpret the question *Did the man eat the brownies*? as asking *Did the man do brownie eating?* regardless of whether or not the man completely consumed something that belongs to the category of *brownie*. Given the visual stimuli that preceded the question, this interpretation would yield a *yes* response which is atelic because the entirety of the brownies was not consumed. The second possibility is that the cardinal number in questions such as *Did the man eat two brownies?* would trigger counting and be interpreted as asking whether or not the man consumed two separate objects that were both brownies. Given the visual stimuli of NCE video segments, this interpretation would be more likely to yield a *no* response, which is telic because the entirety of the brownies was not consumed. Furthermore, children's ability to understand and use cardinal numbers to count *wholes*, may facilitate their use of cardinal numbers as an indicator of telicity even, as we have seen, when the adults would not, as in the case of push-type verbs.

The finding that the cardinal number facilitated telic interpretations by children is also interesting in regard to a study by Wagner and Carey (2003). In one portion of their study, they investigated children's ability to use linguistic information, in the form of telic vs. atelic sentences, to count events. The participants in their study were 3-, 4-, and 5-year old children and a group of adults. The participants viewed animated movies that depicted one or two instances of an event with a clear goal, such as building a house. Each instance of an event took place in two to three steps, with a temporal pause between the steps. For example, in one of the movies a girl is shown painting two flowers.

Based on the task description, the girl in the movie presumably paints half of the flower with one stroke, pauses, paints the rest of the flower with a second stroke, and proceeds to the next flower in the same manner with a pause between strokes. After each movie the children were asked how many times X happened. The X referred either to a goal-oriented event or to temporally discrete process actions. Using the flower-painting example, the verbal stimuli may have been given a telic description as in *How many times did the girl paint the flower?* or it may have been given an atelic description as in *How many times did the girl paint?* The children counted goal-oriented events when the stimulus questions were telic descriptions, approximately 60% of the time for all three age groups (adults did so essentially all of the time) while they only did so approximately 20% of the time when the stimulus questions were atelic. Although the children's performance was significantly different than that of the adults, Wagner and Carey (2003) concluded that the children's decision of whether to count whole events or temporal units was influenced by whether the linguistic description was telic or atelic.

It is possible that, if children can use the cardinality of the object to determine that they should count whole events, then it should also be possible that they can use count information as an indicator of a telic description (in combination with verb information). For the present study, this account would mean that at least some children take the presence of the cardinal number *two* to quantify the number of whole events that are to be counted, rather than just the number of objects. With this understanding of the function of the cardinal

number, *Did the man eat two brownies?* would be construed as *Were there two unique events in which a brownie was eaten* (in each). In response to NCE videos, the answer would be *no*. In this case, the number of full events that can be counted is important to the interpretation. For VPs with the definite determiner, the question *Did the man eat the brownies?* would be construed as *Was there an event of brownie-eating?* In response to NCE videos the answer could be *yes*. . Thus, children's broad view of the applicability of the definite determiner may lead to more atelic responses. This is a plausible explanation but further research is needed in order to determine whether listeners allow the cardinal number to quantify the number of whole events or just the number of objects.

Both accounts considered here are probable. The present experiments did not allow for further examination of the difference between the two determiner types in the eat-type verb conditions. What is rather clear however, is that the cardinal number is significantly associated with telic interpretations. Consistent with the findings of Wagner & Carey (2003), the present study suggests that there is a link between the ability to count out discrete units of a stimulus, be they objects or events, and telic linguistic descriptions. In other words, with quantity-sensitive verbs, a discrete quantity facilitates a telic interpretation.

The preceding discussion focused on the difference in children's interpretations of telicity with the definite determiner vs. the cardinal number. One of the striking things about the results however, was that although the children interpreted VPs in the cardinal number condition as telic more often than in the

definite determiner condition, the older children did not have fewer telic responses in the determiner condition than adults (based on visual inspection of Figure 23). If there were any differences between the 4-, 5-, 6-year olds and the adults, they would be in the direction opposite of what would have been expected. The children had numerically higher rates of telic responses in the eat-type + def. det. condition than the adults.

Part B: Resultative Particles

Study IIB examined how well a resultative particle serves as a cue for telic interpretations with partitive quantity-sensitive eat-type verbs and quantity-insensitive verbs. (To facilitate reference to the data, Figure 24 below graphically presents the results from the child study as well as the adult study. Note that direct statistical comparisons between the child and adult results were not conducted.) Overall, children had more telic interpretations of VPs in the resultative particle conditions than in the non-particle conditions in the analyses for both the eat- and push-type verbs. This result was expected because the resultative particle should be an unambiguous indicator of a telic VP. Unlike verb-type and determiner-type, the resultative particle does not have multiple interpretations or functions. However, not all age groups exhibited a statistically significant advantage for the resultative particle over the determiner-only conditions for telic interpretations. In van Hout's (1998) study of the 3- and 5-year-olds distinguished the particle sentences from the atelic sentences, and the-5-year-olds had a high proportion of telic responses (.91) in the particle condition,

not unlike that of the 5- and 6- year olds in this study. The 3-year-olds in this study had fewer telic interpretations of the particle *up* than in van Hout (1998). Perhaps methodological differences may account for the different results. The present study compared the particle conditions to the quantized DP conditions and not to atelic conditions.

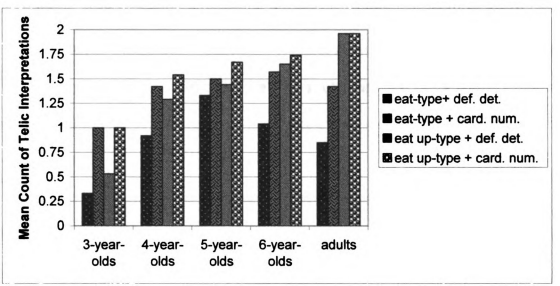

Figure 24. Mean counts of telic interpretations by verb-type and determiner-type presented by age group for children and adults for eat-type and eat up-type conditions.

In the comparison of the eat-type + def. det. condition and the eat up-type + def. det. condition, the differences were significant only in the 4- and the 6-year-old groups. The lack of differences in the 3-and 5-year-old groups, appeared to be for different reasons. As seen in Figure 24, the mean counts of

telic responses for 3-year-olds in both the eat-type + def. det. condition and the eat up-type + def. det. cond. are quite low, .33 and .53 (on a scale of 2.0) respectively, and the difference is non-significant. The 3-year-olds rarely used the resultative particle *up* as an indicator of telicity with eat-type verbs. The situation appears to be different for the 5-year-olds. Looking at Figure 24, one can see that, although there is little difference between the two conditions for the 5-year-olds, the frequency of telic responses for both conditions is higher. The resultative particle does not appear to be a better indicator of telicity for them. At the same time, the definite determiner is not a particularly poor indicator either. Interestingly, at least numerically, the 5-year-olds had the highest count of telic interpretations in the eat-type + def. det. condition, even in informal comparison to the adults.

The results for the comparison of the eat-type + card. num. condition and the eat up-type + card. num. condition, were surprisingly non-significant for all of the groups. Based on these results, it can be concluded that, with partitive quantity-sensitive verbs, the cardinal number alone, is essentially as good of a telicity marker for children as the resultative particle *up*. It may even be better for the youngest of the children. Although it was not tested statistically, in the eat-type + card. num. condition, the mean count of telic interpretations by 3-year-olds was numerically higher than in the eat up-type + def. det. condition. The youngest children seem to be able to make better use of the cardinal number as an indicator for a telic interpretation than the resultative particle *up*.

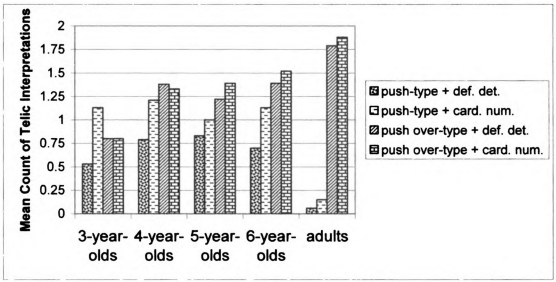

Figure 25. Mean counts of telic interpretations by verb-type and determiner-type presented by age group for children and adults for push-type and push over-type conditions.

When comparing quantity-insensitive verbs with and without the resultative particle, the children had overall higher levels of telic interpretations in the conditions with the resultative particle than in those without it, despite higher than expected number of telic responses to the push-type verb conditions. (See Figure 25.) However, this was not the case for all age groups. In the comparison of the push-type + def. det. condition and the push over-type + def. det. condition, the particles, *over* and *out*, did not significantly increase the number of telic interpretations for the 3- and the 5- year-olds. In the comparison of the push-type + card. num. condition and the push over-type + card. num. condition, the differences were only significant for the oldest two groups. The youngest children

showed no significant advantage of the resultative particle over the cardinal number *two* as an indicator of telicity.

It appears that although there are overall differences in the interpretation of both partitive quantity-sensitive and quantity-insensitive verbs with and without a resultative particle, the older children generally exhibited a better grasp of these differences than the younger children. Perhaps the most interesting thing discovered in the data concerning resultative particles was that for all age groups with eat-type verbs and for the 3- and 4-year-olds with push-type verbs, the cardinal number was at least just as strong of an indicator of a telic interpretation as the resultative particles. (Compare the verb-type + cardinal number conditions to the resultative particle verb-type + definite determiner conditions.) This is in marked contrast to the adults, for whom, in both verb types, the resultative particle served as a largely unambiguous indicator of telicity.

Indirect and Qualified Responses

During their introduction to the experimental task, children were told that after each movie, the puppet would ask him/her a question about the movie and that they should answer *yes* or *no*. Most of the time children followed the instructions and gave *yes* or *no* responses. However, some of the children sometimes gave responses that were less direct. Some children, rather than saying *no*, gave indirect *no* responses that explained why the answer was not *yes*. The most common forms of this type of response were "one", "just one", and "only one." Table 15 below provides examples of the range of such responses.

These responses were counted as *no* responses because it was clear by their explanation that they we denying that the events occurred as described in the stimulus questions. In other words, they were saying *no* indirectly.

Table 15: Examples of Children's Indirect *No* Responses

Child ID	Age	Question	Response
33	5;2	Did the woman eat up the brownies?	*Just one.*
12	3;8	Did the man fix the dolls?	*One.*
12	3;8	Did the woman build two houses?	*One and a half of one.*
37	3;9	Did the man fix the dolls?	*He fixed this one, but he didn't know how to fix her legs.*
136	5;4	Did the man fix two dolls?	*Almost.*
12	3;8	Did the man drink the sodas?	*A whole one and a half of one.*
58	3;2	Did the woman drink two sodas?	*Not that soda, this soda.*
74	4;2	Did the woman eat up the brownies?	*She ate up one but not the other one.*
87	5;4	Did the man eat two brownies?	*Not both of them.*
58	3;2	Did the woman carry the bags?	*Not that bag, the other bag.*
89	4;1	Did the man carry out the two bags?	*He left one.*

Some children gave qualified responses to questions. In such situations, they answered *yes*, but followed up with a qualification for their response that conflicted with the *yes* response. Examples of this type of response include "yes, but only one though;" "yeah, but he not eat one brownie;" "yes, but one is still left;" and "yes, well she pushed one down." Table 16 below provides examples of the range of such responses; a complete list of the children's qualified responses is in Appendix D. Such qualified responses were counted as *no* responses because the qualifying phrases indicate that the child was not satisfied with his/her *yes* response as adequately answering the question. In other words, there is a contradiction between the qualifying phrase and *yes*, effectively negating the *yes* response. It could be argued however, that in such cases the child was ambivalent about the response and although *yes* may not have been an adequate response, neither was *no*. Further, it could be argued that the child was dissatisfied with both a *yes* or *no* response, but because they answered with a *yes*, the qualified responses should have been counted as *yes* responses. Both are valid arguments. As noted earlier, the data were reanalyzed with qualified responses being counted as *yes* responses and there was very little difference in the results. This makes it clear that the results were not simply a by-product of the coding procedures.

Some children gave qualified responses rather consistently and others just occasionally. The fact that there were qualified responses is very interesting. Such responses seemed to indicate that at least for some of the children the

Table 16: Examples of Children's Qualified Responses

Child ID	Age	Question	Response
3	6;0	Did the woman build the houses?	*Yes, but only one though.*
12	3;8	Did the woman eat up the brownies?	*Yes, one.*
13	4;3	Did the woman build the houses?	*Yeah, just one house again.*
60	4;5	Did the woman build two houses?	*Yeah, didn't finish the rest of it.*
89	4;1	Did the man fix the dolls?	*Yep, but not that one.*
10	4;2	Did the woman eat up the brownies?	*Yeah but he not eat one brownie.*
14	3;5	Did the woman eat up two brownies?	*Yes, she didn't eat the last one.*
107	5;8	Did the man drink up two sodas?	*Yep but ones left.*
87	5;4	Did the woman drink two sodas?	*Yeah, but not both of 'em.*
13	4;3	Did he woman push over the dogs?	*Yeah, she pushed over one dog.*
10	4;2	Did the woman carry the bags?	*Yes one bag just not two bags.*
80	4;7	Did the woman carry the bags?	*Yeah, but her carried only one.*

decision to answer *yes* or *no* was not always a simple one. It is possible that the *yes* portion of their responses referred to whether or not the verb was represented in the video and that the qualifying phrase referred to the amount of the objects that was affected. This could be interpreted as meaning that the children knew that there was something about the DP that did not make a *yes* response adequate, but if they considered the question to be about the verb, they were unwilling to say that the action represented by the verb did not occur by answering *no*. It is possible that other children had inclinations to respond in this manner as well, but that they simply made a choice between the two options presented in order to comply with the instructions. The ambivalence about the questions that is represented by the qualified responses may be an indication that the children who responded in this manner are a point at which they are discovering the contribution of a quantized DP, particle or verb-type to telicity.

Clinical Implications and Future Research

As discussed in the introduction, past research has indicated a relationship between verb morphology and VP aspect in the language of young typically developing (TD) children (e.g., Antinucci & Miller, 1976; Bloom, Lifter & Hafitz, 1980; Harner, 1981; Johnson & Fey, 2006; Shirai & Andersen, 1995; Weist, Wysocka, Witkowska-Stadnik, Buczowska & Konienczna, 1984). In their early used of verb morphology, children tend to use the progressive *–ing* morpheme earlier and more frequently with activity VPs and the past tense (regular *–ed* and irregular) with event VPs. The distinction between these two

types of VPs is that activity VPs are atelic descriptions of eventualities and event VPs are telic descriptions of eventualities. Specifically, it has been shown that TD children exhibit sensitivity to VP aspect in their early differential use of verb morphology. It is well attested that during the preschool and early school-age years children with SLI have significant difficulty with verbal morphology, particularly verbal morphology that marks tense/agreement (e.g., Leonard, Bortolini, Caselli, McGregor, & et al., 1992; Leonard, Eyer, Bedore, & Grela, 1997; Rice & Wexler, 1996; Rice, Wexler, & Cleave, 1995). A better understanding of the relationship between verb morphology and VP aspect in children with SLI may lead us to more focused intervention strategies, particularly with the past tense, by guiding the selection of treatment stimuli.

If the distributional biases in child language are associated with the way verbal morphology combines semantically with VPs in the most optimal way, then we might expect that patterns of interpretation of VP aspect and the use of tense/aspect morphemes by SLI children will be similar to that of TD children. There is some evidence for this in that Leonard, Deevy, Miller, Charest, et al., (2003) have shown children with SLI to use the aspectual progressive *–ing* morpheme in the same manner as TD children. In a previous study, Ogiela, Casby and Schmitt, (2005) examined the relationship between verb morpheme use and VP aspect in the Leonard corpus of SLI language transcripts in the CHILDES database (MacWhinney, 2000). They found a similar distribution pattern of verb morphology and VP aspect in children with SLI as others have found with TD children. However, the SLI children were older than most of the TD

children in earlier studies. Conversely, using an elicitation probe task, Leonard, Deevy, Kurtz, Krantz, et al., (in press) did not find similar patterns in children with SLI compared to TD age-matched and TD MLU-matched children.

The relationship between VP aspect and the use of verb morphology appears to implicitly rely on the ability to determine the telicity of a VP. It is important to make it clear that the ability to calculate telicity is not being posited as a requirement for the acquisition of verb morphology. As discussed earlier, VP aspect and grammatical tense/aspect marking are related, but also function independently. As evidenced by the present study, the calculation of telicity itself, which involves interactions between parts of the VP semantics and syntax, is a rather formidable task that TD children have not mastered by age 6. It is possible that children with SLI, in addition to difficulties with verb morphology, may independently have difficulty with the calculation of telicity.

One might predict that because telicity is determined by an interaction between the verb and the rest of the VP that children with SLI would have difficultly with the interpretation of telicity, given that they tend to have difficulties related to verbs, verb use, and VP development (e.g., Hadley, 1998; Kelly & Rice 1994; Rice & Bode, 1993; Watkins, Rice & Moltz, 1993). In a recent study, Schulz and Wenzel (2005) examined the interpretation of telicity of VPs comprised of eat-type verbs and object NPs quantized by a definite determiner (i.e., *eat* and *drink*) in German-speaking adults, TD children 4- to 6-years old and children with SLI. The methodology of the study was very similar to that of van Hout (1998). They found no statistically significant differences between the

groups. Although statistical comparisons between the adults and children were not completed for the present study, visual inspection on the results for eat-type verbs in Figure 23 suggests that there may also not be much difference between the 4-6-year-olds and the adults in English for eat-type verbs. In the present study, excluding the 3-year-olds, approximately half of the responses in the eat-type + def. det. condition were telic interpretations (mean counts ranging from .85 for the adults to 1.33 for 5-year-olds on a scale of 2.0). If there were significant differences, they would be in the direction of the children having more telic responses in the eat-type + def. det. condition than the adults. In Schulz & Wenzel's (2005) study, the adults, TD children and SLI children had a telic interpretations in the eat-type + def. det. condition only 27%, 21%, and 19% of the time, respectively. Additionally, there were substantially fewer atelic responses by 4-6 year old children in the resultative particle condition (4%) than in the present study, (mean counts of 0.71, 0.56, 0.26 on a scale of 2.0 for the 4-, 5-, and 6-, year olds, respectively). (See Figure 23.) Although direct comparisons cannot be made, there seems to be a substantial difference between the findings of the two studies, specifically pertaining to the overall frequency for atelic responses for eat-type VPs and the greater number of atelic responses in the particle condition in the present study. Language-specific differences between German and English, such as the transparency of verb particle meanings, may be one source of the discrepancies. Secondly, methodological differences such as the use of pictures vs. video and the presence vs. absence of narrative stories accompanying the visual stimuli may also play a role. Further, Schulz & Wenzel's

(2005) study addressed only one verb type, the eat-type verbs, for which we find variable results which are likely due to multiple permissible interpretations of *eat* and *drink* (partitive or non-partitive). On these verbs, however, they found that the SLI children performed similarly to the adults and TD children. Conducting the present study with SLI children using the multiple verb types examined here may add to our understanding of SLI children's abilities to use and integrate semantic and syntactic VP characteristics in interpreting telicity.

Conclusions

In sum, the present study identified a finer-grained framework within which to examine the interpretation of telicity in adults and children. Further, consideration of verb subtypes and the impact of different determiner types on the calculation of telicity is necessary. Future research can further refine the framework presented here. With regard to the development of telicity interpretation, children appear to be making some distinctions between verb subtypes, but these have not been mastered by age 6. Although the children did benefit from resultative particles as a cue to telicity, for the children in this study, their impact was not great as was expected. However, the cardinal number *two* was found to be at least as good of a cue for telicity as the resultative particles, even with verbs that were not expected to yield a telic interpretation. Using age as a gross measure of development, there appear to be important changes in the fourth year in the development of telicity, as 3-year-olds were significantly poorer at interpreting telic VPs than 5- and 6-year olds, while 4-year olds were not

different from either the younger or the older children. It is natural to expect that older children will be more proficient than younger children in their language skills. Therefore, age is a reasonable variable by which to group participants. However, given the well-known variability in the rate of language acquisition among TD children, such grouping can be somewhat artificial (although at times necessary). During data collection it was clear that at all age levels there were some children whose responses patterned closely with the predictions for adults, and some whose responses were quite variable or perhaps would exhibited some other pattern. Future analyses of the data that examines the patterns of responses of individual children and sub-groups of children may yield further information about the development of telicity.

Expansion of the present study to other verbs, verb-types and determiner-types will further add to our understanding of telicity and possibly allow for more focused selection of materials and stimuli for examining interactions between telicity and other areas such as verb morphology. Extension of this study to children with SLI could potentially lead to a better understanding of their difficulties with particular characteristics of verbs and verb phrases, specifically as they may relate to telicity. Further, it may help us to better understand the relationship or lack of relationship between VP aspect and verb morphology in children with SLI.

APPENDIX A

Linguistic Stimuli

Table A1: Linguistic Stimuli that Served as Target Questions for Analyses

Item Number	Question
1	Did the woman build the houses?
2	Did the woman build two houses?
3	Did the man fix the dolls?
4	Did the man fix two dolls?
5	Did the man eat the brownies?
6	Did the man eat two brownies?
7	Did the woman eat up the brownies?
8	Did the woman eat up two brownies?
9	Did the man drink the sodas?
10	Did the woman drink two sodas?
11	Did the woman drink up the sodas?
12	Did the man drink up two sodas?
13	Did the man push the dogs?
14	Did the man push two dogs?
15	Did the woman push over the dogs?

16	Did the woman push over two dogs?
17	Did the woman carry the bags?
18	Did the woman carry two bags?
19	Did the man carry out the bags?
20	Did the man carry out two bags?

APPENDIX B

Results of t-tests Comparing Token Verbs of Each Verb-type

Table B1: Results of t-Tests Comparing Responses to Questions with the Token Verbs of Each Verb-Type within Each Experimental Condition

Verb + Determiner Comparison Pairs	t	df	p (2-tailed)
build the vs. fix the	-1.77	46	.083
build two vs. fix two	.00	46	1.0
eat the vs. drink the	1.40	46	.168
eat two vs. drink two	1.43	46	.160
push the vs. carry the	-1.77	46	.083
push two vs. carry two	.37	46	.710
eat up the vs. drink up the	-1.43	46	.160
eat up two vs. drink up two	1.43	46	.160
push over the vs. carry out the	-.33	46	.743
push over two vs. carry out two	-1.66	46	.103

Note. Given the Bonferroni correction for multiple tests, $\alpha = .005$; No significant differences found between verb tokens within a verb-type.

APPENDIX C

Characteristics of Child Participants

Table C1: Test Scores and Demographic Characteristics of Child Participants

Child ID	Age	Sex	Ethnicity	PPVT-III Standard Score (Mean=100, SD=15)	CELF-P Sent. Struc. Subtest Standard Score (Mean=10, SD=3)	CELF-P Word Struc. Subtest Standard Score (Mean=10, SD=3)
52	3;2	M	C	110	11	10
58	3;2	F	C	102	14	12
16	3;4	F	C	111	17	13
14	3;5	M	C	82	11	10
12	3;5	M	H	99	9	9
24	3;5	M	C	96	10	9
53	3;6	F	C	123	12	14
71	3;7	F	C	117	15	13
34	3;7	M	C, H	103	9	7
72	3;7	F	AA, C	100	15	13
48	3;7	M	C	132	16	13
80	3;7	F	C	122	16	11

Table C1 (cont.)

Child ID	Age	Sex	Ethnicity	PPVT-III Standard Score (Mean=100, SD=15)	CELF-P Sent. Struc. Subtest Standard Score (Mean=10, SD=3)	CELF-P Word Struc. Subtest Standard Score (Mean=10, SD=3)
94	3;8	F	C	112	12	11
39	3;9	M	C	111	12	10
37	3;9	M	C, NA	108	15	11
47	3;9	F	C	117	13	12
88	3;10	M	C	108	15	12
44	3;11	M	AA; C	109	19	15
90	3;11	F	C	109	11	13
79	3;11	M	C	112	14	12
26	4;0	M	C	101	10	12
89	4;1	F	C	110	9	10
77	4;2	M	As, C, H	105	9	11
75	4;2	M	C	114	15	13
74	4;2	M	C	116	15	18
10	4;2	M	C, H	97	8	10
31	4;2	M	C, NA	127	15	14

Table C1 (cont.)

Child ID	Age	Sex	Ethnicity	PPVT-III Standard Score (Mean=100, SD=15)	CELF-P Sent. Struc. Subtest Standard Score (Mean=10, SD=3)	CELF-P Word Struc. Subtest Standard Score (Mean=10, SD=3)
29	4;2	F	C	114	11	11
15	4;2	M	C	118	10	12
99	4;3	M	C	127	13	14
98	4;3	F	C		13	11
13	4;3	M	C	118	9	7
30	4;3	F	C	109	13	9
8	4;4	M	C	107	9	11
32	4;4	M	C	107	10	13
60	4;5	F	C	103	11	13
18	4;5	M	C	108	11	12
28	4;6	F	C	101	18	15
69	4;6	F	C	92	14	9
9	4;6	F	C	120	14	15
95	5;0	M	C	97	7	7
106	5;1	M	C	113	13	12

Table C1 (cont.)

Child ID	Age	Sex	Ethnicity	PPVT-III Standard Score (Mean=100, SD=15)	CELF-P Sent. Struc. Subtest Standard Score (Mean=10, SD=3)	CELF-P Word Struc. Subtest Standard Score (Mean=10, SD=3)
50	5;1	F	AA, C	121	13	14
11	5;1	M	C	127	11	14
1	5;2	F	C	103	8	10
66	5;2	M	C	107	11	9
33	5;2	M	C	98	11	11
82	5;3	F	C	128	15	12
78	5;3	M	AA, C	112	11	12
87	5;4	M	C	126	13	14
49	5;5	M	C	113	13	14
104	5;7	M	C	93	12	11
137	5;8	F	C	108	8	15
107	5;8	F	C	109	8	8
102	5;8	F	C	108	10	11
131	5;9	F	C	132	10	11
17	5;9	F	C	114	13	16

Table C1 (cont.)

Child ID	Age	Sex	Ethnicity	PPVT-III Standard Score (Mean=100, SD=15)	CELF-P Sent. Struc. Subtest Standard Score (Mean=10, SD=3)	CELF-P Word Struc. Subtest Standard Score (Mean=10, SD=3)
132	5;10	F	C	103	10	10
2	5;10	M	C	110	14	11
136	5;11	M	C	128	8	15
130	5;11	M	C	116	10	10
108	5;11	M	C	104	10	13
128	6;0	F	C	142	13	14
110	6;0	F	C	104	7	7
109	6;0	F	C	95	7	8
83	6;0	M	C	114	12	13
3	6;0	M	C	114	7	10
124	6;1	F	C	104	9	10
135	6;1	F	C	116	13	10
120	6;2	F	C	112	13	10
114	6;2	M	AA	96	7	8
101	6;2	M	C	114	7	9

Table C1 (cont.)

Child ID	Age	Sex	Ethnicity	PPVT-III Standard Score (Mean=100, SD=15)	CELF-P Sent. Struc. Subtest Standard Score (Mean=10, SD=3)	CELF-P Word Struc. Subtest Standard Score (Mean=10, SD=3)
125	6;2	M	H	115	11	12
123	6;3	F	C	129	9	12
127	6;4	M	C	125	11	10
113	6;5	M	C	98	13	9
121	6;5	F	C	111	11	10
126	6;9	M	C	108	10	11
103	6;10	F	NA/C	114	10	9

Note. AA = African American; As = Asian; H = Hispanic; NA = Native American

APPENDIX D

Qualified Responses

Table D1: Children's Qualified Responses

Child ID	Age	Item #	Question	Response
1	5;2	30	Did the man fix two dolls?	Uh uh, one.
3	6;0	33	Did the woman build the houses?	Yes, but only one though.
3	6;0	20	Did the woman push over the dogs?	Yes, only one though.
8	4;4	33	Did the woman build the houses?	Yes but the blue one didn't.
10	4;2	13	Did the woman eat up the brownies?	Yeah but he not eat one brownie.
10	4;2	25	Did the woman drink up the sodas?	Uhhuh, just one soda.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
10	4;2	7	Did the woman carry the bags?	Yes one bag just not two bags.
12	3;8	9	Did the woman drink two sodas?	Yes, one.
12	3;8	13	Did the woman eat up the brownies?	Yes, one.
13	4;3	21	Did the woman build the houses?	Yeah, just one house again.
13	4;3	9	Did the man eat two brownies?	Yeah, he just ate one brownie.
13	4;3	8	Did he woman push over the dogs?	Yeah, she pushed over one dog.
14	3;5	14	Did the woman eat up two brownies?	Yes, she didn't eat the last one.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
14	3;5	33	Did the man eat two brownies?	He's not gonna eat that yeah.
16	3;4	15	Did the man carry out the bags?	Yes but not that bag layinbg on the ground.
18	4;5	5	Did the man drink the sodas?	Mm-hmm, only one.
18	4;5	9	Did the man eat two brownies?	Um huh yes but guess what he only ate one half of it.
18	4;5	8	Did he woman push over the dogs?	Uh huh just one.
24	3;5	25	Did the woman eat up the brownies?	Yeah, there's one.
30	4;3	13	Did the woman eat up the brownies?	Yes, just one.
33	5;2	27	Did the woman push over two dogs?	Yes but she just knocked one dog off.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
33	5;2	32	Did the woman push over the dogs?	Yes, just one dog.
34	3;7	8	Did the man eat the brownies?	Yeah, just one.
34	3;7	13	Did the woman eat up the brownies?	Yeah, just one.
39	3;9	15	Did the woman build two houses?	Yeah, not the other one.
48	3;7	37	Did the man drink up two sodas?	(nods head yes) 1 soda.
52	3;2	35	Did the man fix the dolls?	(nods yes) But he didn't get the toes on her.
53	3;6	8	Did he woman push over the dogs?	No, yes, she pushed one down but not the other.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
60	4;5	15	Did the woman build two houses?	Yeah, didn't finish the rest of it.
72	3;7	14	Did the woman eat up two brownies?	Yeah but she left one.
72	3;7	37	Did the woman drink up the sodas?	Yeah, one is left.
74	4;2	8	Did he woman push over the dogs?	Yes, well she pushed one down.
80	4;7	35	Did the man fix the dolls?	Yes, who well I mean one.
80	4;7	20	Did the man eat the brownies?	Yeah but he eat one.
80	4;7	25	Did the woman eat up the brownies?	Yeah, her heat all of one.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
80	4;7	37	Did the woman drink up the sodas?	Yes, only one.
80	4;7	19	Did the woman carry the bags?	Yeah , but her carried only one.
87	5;4	33	Did the woman drink two sodas?	Yeah, but not both of 'em.
89	4;1	11	Did the man fix the dolls?	Yep, but not that one.
90	3;11	9	Did the woman drink two sodas?	Yes, only one of um.
90	3;11	35	Did the man push the dogs?	Yes only one of um.
90	3;11	36	Did the woman carry two bags?	Yes, only one of 'em.
98	4;3	33	Did the woman build the houses?	Yep only one.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
99	4;3	39	Did the woman build two houses?	Yeah, but one she couldn't finish; the white one she couldn't finish.
104	5;7	17	Did the man drink the sodas?	Yes, that one wasn't done (points to bottle with soda in it).
106	5;1	35	Did the man fix the dolls?	Yeah, but one is still broke.
106	5;1	39	Did the woman build two houses?	Yeah, but he drinked one and a half.
106	5;1	39	Did the woman build two houses?	Yeah, but one is still half broke.
106	5;1	17	Did the man drink up two sodas?	Yes, he drinked a half of one.
106	5;1	20	Did the man eat the brownies?	Yes, but he didn't eat half, not all of one.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
106	5;1	21	Did the woman drink two sodas?	Yes, but one she didn't drunk all of it.
106	5;1	25	Did the woman eat up the brownies?	Yep but she only ate half of one, she ate one and a half.
106	5;1	33	Did the man eat two brownies?	Yep, but he ate one and a half.
106	5;1	37	Did the woman drink up the sodas?	Yeah, but she drinked up one and a half.
106	5;1	19	Did the woman carry the bags?	Yes, but she left one in.
106	5;1	23	Did the man carry out two bags?	Yep, but he left one there.
107	5;8	27	Did the woman build two houses?	Yep, but one was too tired to build that house cause she just built a tiny bit and left it for a ?

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
107	5;8	33	Did the woman build the houses?	Yep but she was too tired to build that one.
107	5;8	8	Did the man eat the brownies?	Yes but there is just one left that he didn't eat yet.
107	5;8	9	Did the woman drink two sodas?	Yes but one is still left.
107	5;8	17	Did the man drink the sodas?	Yes, but one is left.
107	5;8	21	Did the man eat two brownies?	Yes, but he just took one like of that one and that one is left for later.
107	5;8	32	Did the man drink up two sodas?	Yep but ones left.
107	5;8	11	Did the man carry out two bags?	Yes, but one is still there.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
107	5;8	20	Did the woman push over the dogs?	Yep, just one 'cuz he wanted to see and he wanted to take?
114	6;2	9	Did the woman build the houses?	Yes, one and then 2 half houses.
120	6;2	8	Did the man eat the brownies?	Yes, half of one.
130	5;11	27	Did the woman build two houses?	Yes and no.
130	5;11	30	Did the man fix two dolls?	Yes and no.
130	5;11	33	Did the woman build the houses?	Yes and no.
130	5;11	25	Did the woman drink up the sodas?	Yes and no.

Table D1 (cont.)

Child ID	Age	Item #	Question	Response
130	5;11	38	Did the woman eat up two brownies?	Yes and no.
130	5;11	39	Did the man carry out the bags?	Yes and no.

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