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# THE INTERPRETATION AND PRODUCTION OF ASPECT IN BILINGUAL LEARNERS

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## ABSTRACT

*This study examines aspect and telicity in the production and comprehension of activity and motion verbs in the Greek of early successive bilingual Albanian-Greek children. In Greek, telicity is compositionally determined by morphological and situation type aspect and by a quantized object (Borer 2005). A telic sentence has an endpoint (DP or PP complement for activity and motion respectively) beyond which the event cannot continue (Depraetere 2007). The results show that the aspectual marking of telicity in activities appears earlier than in motion verbs. Bilingual children rely primarily on verb type differences in coding morphological aspect.*

**Keywords:** aspect, telicity, motion verbs, L2 Greek, early successive bilingualism

## 1. Introduction

Telicity is a notion that has been used to characterize verbs, predicates and sentences. Vendler's classification of verbs distinguishes between states and activities being atelic from achievements and accomplishments being telic (Vendler 1967, Dowty 1979). Smith (1991) discusses the shift from one situation type (i.e. aspectual verb class) to the other as in *build*, an activity, to *build a house*, an accomplishment. This shift renders the atelic verb into a telic predicate. A sentence is telic if the event is represented as having an endpoint beyond which the event cannot continue (Depraetere 2007). The visibility of the endpoint depends on different factors such as the lexical semantics of a verb (e.g. find, sneeze, explode), the presence of a PP-GOAL which acts as a boundary of the action denoted by the verb (e.g. He drove the car into the garage), contextual knowledge shared by discourse participants (e.g. He sang. *understood as* He sang a song, specific object NPs which provide the natural endpoint to the situation (e.g. drink a glass of wine).

Accordingly, telicity is a notion relevant to the syntax-discourse interface in that it enables the hearer to view the event with or without a natural endpoint. However, the visibility of the endpoint may be established and unambiguously determined within the sentence and prior to pragmatic interpretation through lexical or grammatical means. Alternatively, the endpoint of the event described by the sentence may not be determined at the sentence level but may be inferred from an interaction of linguistic and contextual information. Both options can be available within the same language (Verkuyl 1993, Krifka 1989). For example, the Greek sentence *Zografise ena portreto* ("He painted a portrait") is unambiguously telic in that the portrait is completed while the sentence *Zografize ena portreto* ("He was painting a portrait") leaves open the possibility that the portrait is still not completed (Tsimpli & Papadopoulou 2006)<sup>1</sup>. The crucial difference between the two sentences is the perfective/imperfective aspect on the verb form. Since perfectivity makes visible the endpoint of the event (Smith 1991) the presence of the object serves to identify the endpoint with the completion of the object painting event.

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<sup>1</sup> The atelic interpretation also arises if there is no object at all with either perfective or imperfective verbs or if the object is a bare indefinite (Tsimpli & Papadopoulou 2006):

- (i) a. Zografize / Zografise  
was-painting / painted  
"He was painting. / He painted."
- b. Zografize / Zografise portreta.  
was-painting / painted portraits  
"He was painting / painted portraits."

The imperfective aspect, on the other hand, does not make visible the endpoint of the event and consequently the specific object leaves open the possibility of either identifying the completion point of the portrait or not. Thus, in Greek telicity can be unambiguously defined within the sentence with the combination of perfective aspect and a specific object DP (cf. Mozer 1994; Chila-Markopoulou and Mozer 2001). Furthermore, even when telicity is unambiguously defined within the sentence, in Greek this is the result of a compositional interpretation of the aspectual form and the quantized object or a PP-GOAL, to which we turn immediately.

Zubizarreta & Oh (2007) propose that there is a semantic and syntactic distinction between motion verbs, reflecting argument structure differences. Specifically, whether the motion verb includes an inherent ‘directed motion’ feature or not is linked with the possibility of selecting a PP-PATH/GOAL complement. Accordingly, the bare motion verb ‘to go’ includes a directed motion feature which is expressed through a PP-complement whereas manner-of-motion verbs are divided into the ‘run’ type manner of motion verbs which can take a distance DP complement and the ‘wander’ type which cannot. The directed motion feature is included in the former but not in the latter. Motion verbs in Greek are the focus of our experimental study. Greek and Albanian show an interesting asymmetry in the ambiguity and lack thereof of (a)telic interpretations respectively. Consider the following Greek examples first:

- (1) a. O skilos etrehe ston kipo.  
the dog ran.IMP.3S in-the garden  
‘The dog was running in/towards the garden.’  
b. O skilos etrekse ston kipo.  
the dog ran.PERF.3S in-the garden  
‘The dog ran into/towards/inside the garden.’

Each of the two sentences in (1a) and (1b) is ambiguous between a telic and an atelic interpretation. Specifically, in (1a) the PP *ston kipo* can be construed as the GOAL argument which depicts the direction of the motion event or as the LOCATIVE modifier of the motion event which, in this case, is neither directional nor measured. In (1b), on the other hand, the ambiguity increases since the telic interpretation in which the PP-GOAL is interpreted as the endpoint of the event is also available. Thus, in (1a) the event is unbounded and therefore atelic while in (1b) the telic interpretation is possible. Despite the ambiguity just described, there is a strong preference for the atelic locative interpretation in (1a) and the telic in (1b). These preferences are associated with the aspectual distinction on the verb form in each case. The imperfective may only denote atelic<sup>2</sup> events, i.e. location or direction while the perfective form is ambiguous between the two atelic readings and the telic interpretation (cf. Horrocks and Stavrou 2007). Nonetheless, Greek native speakers seem to favor a particular reading with each aspectual form. In previous studies (Tsimpli & Papadopoulou 2009) it was found that Greek monolingual adults prefer to interpret sentences such as (1b) as telic, while sentences such as (1a) as locative.

Albanian has two distinct morphologically simple past “tenses”, the “Imperfect” and “Past Definite” which differ in terms of their (im)perfectivity value (Dalina Kalluli p.c). The morphological and interpretive differences between Past Definite and Imperfect for the activity verb *lexoj* ‘I read’ are illustrated in (2) versus (3).

- (2) Vajza lexoi gazetën.  
girl.the read.3s,DP newspaper.the  
‘The girl read the newspaper.’  
(3) Vajza lexonte gazetën.  
girl.the read.3s,IMP newspaper.the  
(i) ‘The girl was reading the newspaper.’  
(ii) ‘The girl used to read the newspaper.’

The Imperfect may yield either a progressive reading occurring at a time in the past (as rendered in (3i)), or a habitual one (as rendered in (3ii)). Perfective motion verbs followed by a PP do not necessarily yield a telic interpretation (4).

<sup>2</sup> Notice that imperfective manner-of-motion verbs may denote telic events when they are used to express habituality (cf. Tsimpli & Papadopoulou 2009).

- (4) Vajza vrapoi në dyqan.  
 girl.the run.3s,PD to/in/for store  
 (i) ‘The girl ran to the store.’ → telic  
 (ii) ‘The girl ran in the store.’ → atelic  
 (iii) ‘The girl ran for the store.’ → atelic

Imperfective motion verbs always yield atelic interpretations (5):

- (5) a. Vajza (po) vraponte në dyqan.  
 girl.the PROG run.3s,IMP in/to/for store  
 ‘The girl was running in/to/for the store’  
 b. Vajza vraponte në dyqan.  
 girl.the run.3s,IMP in/to/for store  
 (i) ‘The girl was running in/to/for the store’  
 (ii) ‘The girl used to run in/to/for the store’

One difference between Greek and Albanian is in the availability of a progressive marker (‘po’) in Albanian but not in Greek. Thus, the distinction in terms of aspectual features is [+/-perfective] for Greek and [+/-perfective] as well as [+/-progressive] in Albanian.

## 2. Research Questions

The aim of the study is to investigate the role of the aspectual verb form (Perfective vs. Imperfective) in combination with the complements (DPs vs. PPs) in the comprehension and production of activity and motion verbs by young successive bilingual learners. Research questions: (1) do early bilingual Albanian-Greek children show the same developmental pattern as monolingual L1 Greek with reference to the expression and perception of telicity? (2) if a delay is attested in bilinguals, does it relate to the motion vs. activity predicate distinction? (3) does the L1 aspectual system interfere with the comprehension and production of telicity in L2 Greek?

## 3. The Study

Two groups of bilingual Albanian-Greek children participated in the study. There were 40 participants in total and were drawn from two state schools in Thessaloniki and a private institution for the teaching of Albanian literacy skills to Albanian children run by an immigrant association<sup>3</sup>. For each age group there were 20 participants. At the time of testing, the Bil\_1 group had a mean age of 7;8 yrs old (Female: 7 & Male: 13) and the Bil\_2 group a mean age of 9;1 yrs old (Female: 8 & Male: 12). A linguistic background questionnaire was distributed to the parents/guardians of participants and the information collected is presented on Table 1.

Group	Age at Testing	Home Language	Birth Place	Minimum Length of Exposure to L2 Greek	Bilinguals with Literacy Skills in L1 Albanian
Bilingual_1 (N=20)	7;8 yrs old (7;7-8;9)	Albanian & Greek (N=18) Albanian (N=2)	Greece (N=18) Albania (N=2)	6 yrs	60% (N=12)
Bilingual_2 (N=20)	9;1 yrs old (8;10-10;4)	Albanian & Greek (N=16) Albanian (N=4)	Greece (N=16) Albania (N=4)	7 yrs	70% (N=14)

**Table 1** Bilingual Participants Profile

<sup>3</sup> We would like to thank the 6<sup>th</sup> Intercultural Primary School of Eleftherio-Kordelio, the 6<sup>th</sup> Primary School of Evosmos and the immigrant association Mother Teresa for participating in this study and offering their help for the conduction of the experiments and the selection of information on the learners’ background.

Additionally, four control groups of monolingual speakers of Greek participated in the study; in particular, three monolingual learners groups and an adult group of 20 participants each (Total N of monolinguals: 80). At the time of testing, the monolingual 5-6 yrs old group had a mean age of 5;5 (Female: 25 & Male: 25), the monolingual 6-7 yrs old group a mean age of 6;4 (Female: 27 & Male: 23), the monolingual 7-8 yrs old one a mean age of 7;4 (Female: 26 & Male: 24), and the adult native speakers group a mean age of 36;5 (Female: 27 & Male: 13).

### 3.1 Aspectual Marking Pre-test

In order to establish that the bilingual participants have acquired the perfective-imperfective distinction regardless of telicity or other factors, we used a sentence completion task designed by Agathopoulou & Papadopoulou (2009)<sup>4</sup>. The participant was given a sentence to complete using the verb provided either in perfective, as in example (6) or in imperfective, as in example (7):

- (6) Hthes o Nikos yirise sto spiti *stis* 8.  
 Yesterday the Nick return-PERF home at 8 o'clock.  
 'Yesterday Nick returned home at 8 o'clock.'
- (7) Hthes sto parti tis Elenis o Nikos horeve *sinehia*.  
 Yesterday s-the party the Helen the Nick dance-IMP continuously.  
 'Yesterday Nick was dancing continuously at Helen's party.'

There were 32 items and the type of aspect was controlled by time adverbials expressing punctuality (in example (6) *stis* 8) or continuity (in example (7) *sinehia*). The accuracy score for the Bil\_1 group was 85.19% and for the Bil\_2 group 93.25%. Both scores show an established knowledge of aspectual marking.

### 3.2 The Comprehension Study

The comprehension experiment examines the understanding of telicity in the bilingual grammar of young successive bilingual learners.

#### 3.2.1 Materials

The comprehension task designed by Kaltsa (in prep.) consisted of 64 short video stimuli. For each verb, we constructed two videos the one presenting a telic/complete event and the other an atelic/ongoing one. Each aspectual verb form [+/- Perfective] was presented with the same pair of videos. There were 18 target verbs (6 intransitive, 6 activity and 6 motion verbs) and 14 filler verbs. The verbs employed in the task in intransitive constructions were *hamogelo* ('smile'), *kimame* ('sleep'), *kleo* ('cry'), *spao* ('break'), *klino* ('close') and *pefto* ('fall'). The activity verbs were *zografizo* ('paint'), *dhiavazo* ('read'), *troo* ('eat'), *pino* ('drink'), *katharizo* ('clean') and *ftiahno* ('make'). The motion verbs were *strifogirizo* ('turn around'), *sernome* ('crawl'), *treho* ('run'), *pidho* ('jump'), *pigeno* ('go') and *horopidho* ('gambol'). An example of sentences with activity VPs employed in the task may be seen in (8) and an example of motion VPs in (9).

- (8) (a) Hthes to koritsi efage ena milo.  
 yesterday the girl eat-PERF an apple  
 'Yesterday the girl ate an apple.'
- (b) Hthes to koritsi etroge ena milo.  
 yesterday the girl eat-IMP an apple  
 'Yesterday the girl was eating an apple.'
- (9) (a) Hthes to agori etrekse sti kuzina.  
 yesterday the boy run-PERF to/in the kitchen  
 'Yesterday the boy ran to the kitchen.'

<sup>4</sup> The original test (Agathopoulou & Papadopoulou 2009) was designed to be a written sentence completion task. In our study we modified the test so that it was administered in both written and spoken form in order to alleviate the written language burden from the bilingual children tested.

- (b) Hthes to agori etrehe sti kuzina.  
 yesterday the boy run-IMP in the kitchen  
 ‘Yesterday the boy was running inside the kitchen.’

In (8a), the perfective activity VP is expected to map onto a telic interpretation, that is a completed event where the goal has been accomplished (the whole apple has been consumed). In the case of the imperfective activity VP (8b), the utterance may only refer to an atelic event during which the goal has not been achieved (the apple remains uneaten). In (9a), the perfective motion VP can be interpreted either as telic or atelic. In order to receive a telic interpretation the PP needs to be interpreted as a goal (directional reading). The local interpretation of the PP, on the other hand, will lead to an atelic reading of the sentence. In the case of the imperfective motion VP (9b), the interpretation of the PP may only be locative and it consequently leads to an overall atelic interpretation.

### 3.2.2 Procedure

The participants were shown both videos presenting the telic and atelic condition simultaneously and a recorded stimulus sentence followed. The stimulus sentence was morphologically marked either with Perfective or Imperfective aspect and the task for the participant was to match this utterance to one of the two events. The experiment was conducted with the use of a laptop computer with a 15.4" screen. The participants were given the following protocol before starting the experiment: A robot was introduced to the participants on the computer screen. He/she was told that this robot had been learning Greek and the previous day it was watching two kids doing several things. The robot would describe what those kids were doing but it was not really sure how to use Greek accurately so it needed the participant's help. The participant had to watch carefully both videos, listen to what the robot says and point to the video that is best described by the robot's utterance.

### 3.2.3 Results

The data analysis consisted in counting the preferred matching of perfective aspectual verb forms with a telic or atelic interpretation of the events and imperfective aspectual verb forms with a telic or atelic interpretation. The data was subcategorized per verb type. The mean percentages of aspect-telicity matching per age group are presented in Figures 1 to 4.

#### *Activity and Telicity in L2 Greek*

In activity VP constructions, the interaction of aspect (perfective vs. imperfective) and event type (telic vs. atelic) is not significant only for the Bil\_1 group data. For the other groups, the interaction between aspect and telicity is significant (Bil\_1: 1:  $\chi^2=.137$ ,  $df= 1$ ,  $p= .711$ ; Bil\_2:  $\chi^2= 10.474$ ,  $df= 1$ ,  $p= .001$ ; Monol\_5-6-yrs-old:  $\chi^2= 4.800$ ,  $df= 1$ ,  $p= .028$ ; Monol\_6-7-yrs-old:  $\chi^2= 43.982$ ,  $df= 1$ ,  $p= .000$ ; Monol\_7-8-yrs-old:  $\chi^2= 108.330$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 120.000$ ,  $df= 1$ ,  $p= .000$ ).

Figure 1 presents the mean percentages of perfective activity verbs' interpretation as telic and atelic per group.

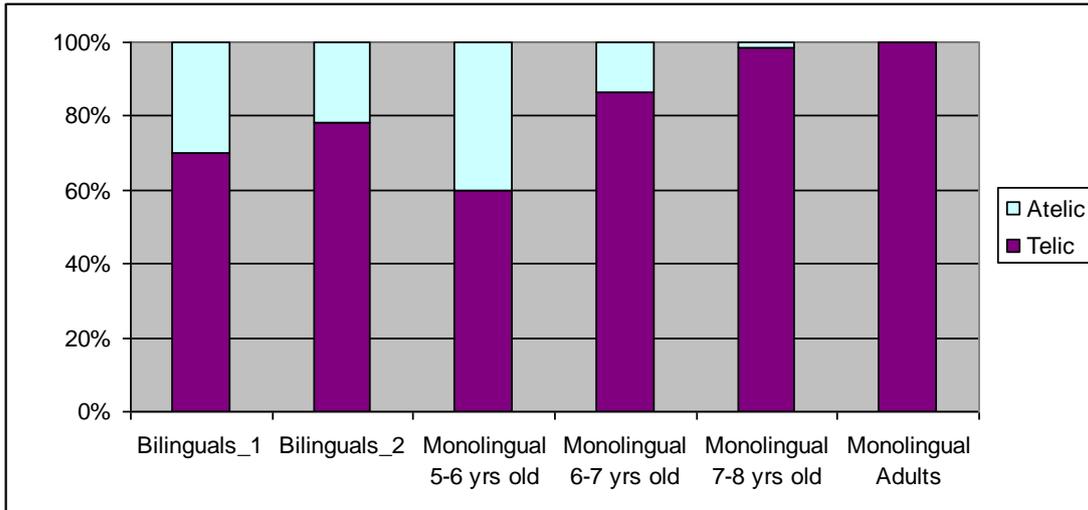


Figure 1 Perfective Activity VPs

The data reported in Figure 1 show that both bilingual groups prefer to match telic events to perfective activity verb forms. This observation was statistically supported by one-way-goodness-of-fit chi-square tests (Bil\_1:  $\chi^2 = 9.600$ ,  $df = 1$ ,  $p = .002$ ; Bil\_2:  $\chi^2 = 19.267$ ,  $df = 1$ ,  $p = .000$ ). The data of the control groups show that 5-6 yrs old monolingual children have not developed a strong enough preference for the telic interpretation (Monol\_5-6-yrs-old:  $\chi^2 = 2.400$ ,  $df = 1$ ,  $p = .121$ ). The rest of the monolingual children along with the adults, though, significantly prefer to match telic events to perfective activity VPs (Monol\_6-7-yrs-old:  $\chi^2 = 32.267$ ,  $df = 1$ ,  $p = .000$ ; Monol\_7-8-yrs-old:  $\chi^2 = 56.067$ ,  $df = 1$ ,  $p = .000$ ).

Figure 2 presents the mean percentages of imperfective activity verbs' interpretation as telic and atelic per group.

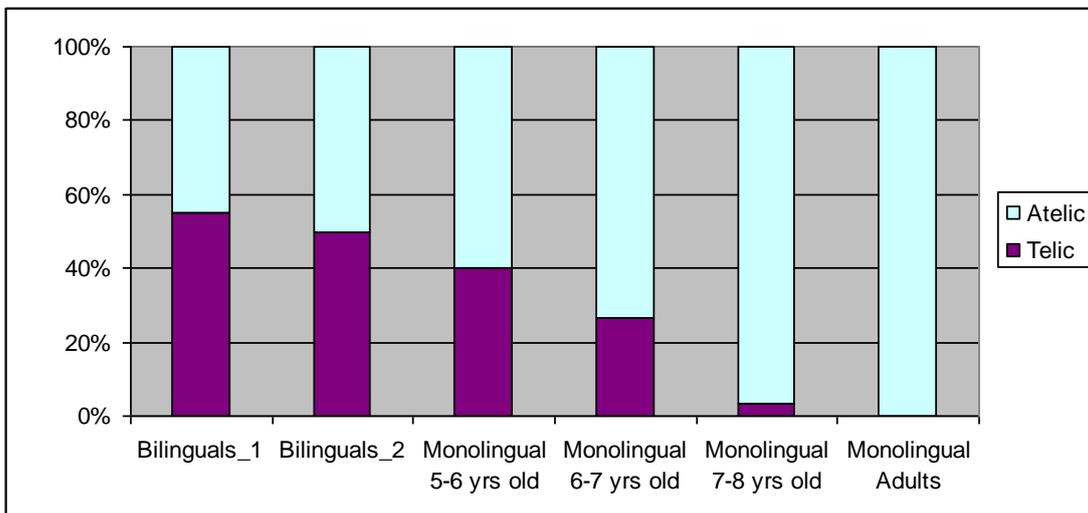


Figure 2 Imperfective Activity VPs

The data reported in Figure 2 show that both bilingual groups along with Monol\_5-6 yrs old group remain indeterminate when matching imperfective activity VPs to telic and atelic events. This observation was statistically supported by one-way-goodness-of-fit chi-square tests (Bil\_1:  $\chi^2 = .600$ ,  $df = 1$ ,  $p = .439$ ; Bil\_2: variable constant; Monol\_5-6-yrs-old:  $\chi^2 = 2.400$ ,  $df = 1$ ,  $p = .121$ ). The Monol\_6-7 and Monol\_7-8 yrs old groups align with the adult preferences (Monol\_6-7-yrs-old:  $\chi^2 = 13.067$ ,  $df = 1$ ,  $p = .000$ ; Monol\_7-8-yrs-old:  $\chi^2 = 52.267$ ,  $df = 1$ ,  $p = .000$ ).

Turning to the comparison between the two bilingual groups for activity verbs, no significant differences are found in the perfective or in the imperfective condition. Monolingual groups, in

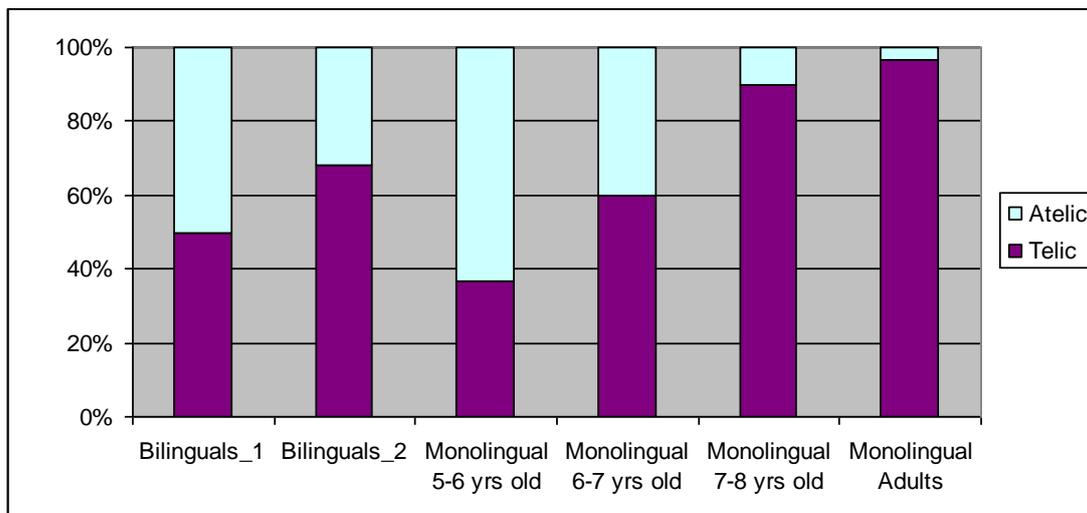
contrast, differ from each other in both aspectual conditions and the oldest group reaches adult performance (Kaltsa in prep.). Comparing each bilingual with each monolingual group it is shown that in the perfective condition Bil\_1 aligns with the performance of Monol\_5-6 yrs old group and Bil\_2 with that of Monol\_6-7 yrs old group suggesting a minimum of two years delay in the acquisition of perfective aspectual marking on activity VPs (Bil\_1 vs. Monol\_5-6-yrs-old:  $\chi^2= 1.319$ ,  $df= 1$ ,  $p= .251$ ; Bil\_1 vs. Monol\_6-7-yrs-old:  $\chi^2= 4.910$ ,  $df= 1$ ,  $p= .027$ ; Bil\_1 vs. Monol\_7-8-yrs-old:  $\chi^2= 18.072$ ,  $df= 1$ ,  $p= .000$ ; Bil\_1 vs. Monol\_adults:  $\chi^2= 21.176$ ,  $df= 1$ ,  $p= .000$ ; Bil\_2 vs. Monol\_5-6-yrs-old:  $\chi^2= 4.728$ ,  $df= 1$ ,  $p= .030$ ; Bil\_2 vs. Monol\_6-7-yrs-old:  $\chi^2= 1.443$ ,  $df= 1$ ,  $p= .230$ ; Bil\_2 vs. Monol\_7-8-yrs-old:  $\chi^2= 11.644$ ,  $df= 1$ ,  $p= .001$ ; Bil\_2 vs. Monol\_adults:  $\chi^2= 14.579$ ,  $df= 1$ ,  $p= .000$ ).

The same comparison in the imperfective activity verb condition shows that both bilingual groups align with the lack of a strong preference found also in the Monol\_5-6 yrs old group. This suggests a further delay in the imperfective activity Vs (Bil\_1 vs. Monol\_5-6-yrs-old:  $\chi^2= 2.707$ ,  $df= 1$ ,  $p= .100$ ; Bil\_1 vs. Monol\_6-7-yrs-old:  $\chi^2= 9.968$ ,  $df= 1$ ,  $p= .002$ ; Bil\_1 vs. Monol\_7-8-yrs-old:  $\chi^2= 38.763$ ,  $df= 1$ ,  $p= .000$ ; Bil\_1 vs. Monol\_adults:  $\chi^2= 45.517$ ,  $df= 1$ ,  $p= .000$ ; Bil\_2 vs. Monol\_5-6-yrs-old:  $\chi^2= 1.212$ ,  $df= 1$ ,  $p= .271$ ; Bil\_2 vs. Monol\_6-7-yrs-old:  $\chi^2= 6.910$ ,  $df= 1$ ,  $p= .009$ ; Bil\_2 vs. Monol\_7-8-yrs-old:  $\chi^2= 33.409$ ,  $df= 1$ ,  $p= .000$ ; Bil\_2 vs. Monol\_adults:  $\chi^2= 40.000$ ,  $df= 1$ ,  $p= .000$ ).

*Motion and Telicity in L2 Greek*

In motion VP constructions, the interaction of aspect (perfective vs. imperfective) and event type (telic vs. atelic) appears quite difficult for young learners, bilingual and monolingual. In particular, no effect of this interaction is found in the performance of Bil\_1 and Monol\_5-6 yrs old groups (Bil\_1:  $\chi^2= 1.656$ ,  $df= 1$ ,  $p= .198$ ; Monol\_5-6-yrs-old:  $\chi^2=.333$ ,  $df= 1$ ,  $p= .564$ ). Bil\_2, on the other hand, as well as the rest of the monolingual controls show a significant interaction (Bil\_2:  $\chi^2= 17.638$ ,  $df= 1$ ,  $p= .000$ ; Monol\_6-7-yrs-old:  $\chi^2= 20.000$ ,  $df= 1$ ,  $p= .000$ ; Monol\_7-8-yrs-old:  $\chi^2= 83.426$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 112.258$ ,  $df= 1$ ,  $p= .000$ ).

Figure 3 presents the mean percentages of perfective motion verbs' interpretation as telic and atelic per group.



**Figure 3** Perfective Motion VPs

Note that the data in Figure 3 differ from those in Figure 1 for activity verbs both for bilinguals and monolinguals. Perfective aspect for motion verbs appears to be problematic for the Bil\_1, Monol\_5-6 and Monol\_6-7 yrs old groups, whereas it is strongly related to a telic event for the older bilinguals and the 7-8 yrs old monolingual children (Bil\_2:  $\chi^2= 8.067$ ,  $df= 1$ ,  $p= .005$ ; Monol\_7-8-yrs-old:  $\chi^2= 38.400$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 52.267$ ,  $df= 1$ ,  $p= .000$ ).

Figure 4 presents the mean percentages of imperfective motion verbs' interpretation as telic and atelic per group.

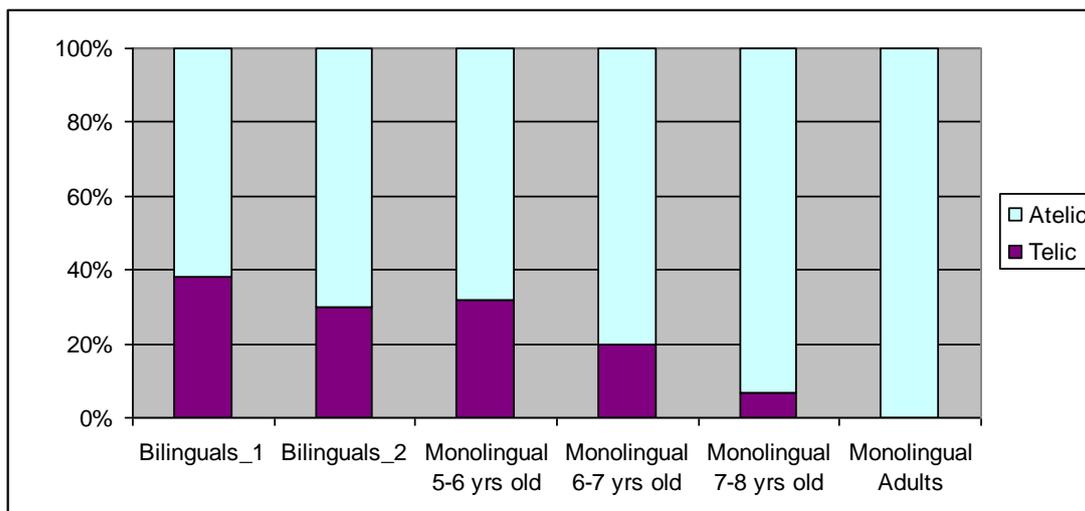


Figure 4 Imperfective Motion VPs

Comparing Figures 2 and 4, we note that imperfective motion events are readily interpreted as atelic while imperfective activities are at chance with respect to telicity. Figure 4 shows that both bilingual and monolingual groups match atelic events to imperfective motion verb forms. This observation was statistically supported by one-way goodness-of-fit chi-square tests (Bil\_1:  $\chi^2=3.267$ ,  $df= 1$ ,  $p= .071$ ; Bil\_2:  $\chi^2= 9.600$ ,  $df= 1$ ,  $p= .002$ ; Monol\_6-7-yrs-old:  $\chi^2= 21.600$ ,  $df= 1$ ,  $p= .000$ ; Monol\_7-8-yrs-old:  $\chi^2= 45.067$ ,  $df= 1$ ,  $p= .000$ ).

Developmentally, the between bilingual group comparisons for motion verbs show a difference only in perfective aspect (Bil\_1 vs. Bil\_2:  $\chi^2= 4.174$ ,  $df= 1$ ,  $p= .041$ ). The comprehension of aspectually marked motion VPs is an area of difficulty for monolingual children as well, who are found to differ from each other but still not attain the adult like preferences for the (a)telic interpretations (Kaltsa in prep.). The comparison between bilingual and monolingual groups reveal that in the perfective aspect condition Bil\_1 aligns with the performance of Monol\_5-6 yrs as well as Monol\_6-7 yrs old groups, while Bil\_2 with that of Monol\_6-7 yrs old group (Bil\_1 vs. Monol\_5-6-yrs-old:  $\chi^2= 2.172$ ,  $df= 1$ ,  $p= .141$ ; Bil\_1 vs. Monol\_6-7-yrs-old:  $\chi^2= 1.212$ ,  $df= 1$ ,  $p= .271$ ; Bil\_1 vs. Monol\_7-8-yrs-old:  $\chi^2= 22.857$ ,  $df= 1$ ,  $p= .000$ ; Bil\_1 vs. Monol\_adults:  $\chi^2= 33.409$ ,  $df= 1$ ,  $p= .000$ ; Bil\_2 vs. Monol\_5-6-yrs-old:  $\chi^2= 12.063$ ,  $df= 1$ ,  $p= .001$ ; Bil\_2 vs. Monol\_6-7-yrs-old:  $\chi^2=.906$ ,  $df= 1$ ,  $p= .341$ ; Bil\_2 vs. Monol\_7-8-yrs-old:  $\chi^2= 8.539$ ,  $df= 1$ ,  $p= .003$ ; Bil\_2 vs. Monol\_adults:  $\chi^2= 16.681$ ,  $df= 1$ ,  $p= .000$ ).

The between bilingual and monolingual group comparisons in the imperfective aspect condition for motion verbs suggest that Bil\_1 matches with the preferences of Monol\_5-6 yrs old group while Bil\_2 with that of Monol\_5-6 and Monol\_6-7 yrs old groups (Bil\_1 vs. Monol\_5-6-yrs-old:  $\chi^2= .586$ ,  $df= 1$ ,  $p= .444$ ; Bil\_1 vs. Monol\_6-7-yrs-old:  $\chi^2= 4.881$ ,  $df= 1$ ,  $p= .027$ ; Bil\_1 vs. Monol\_7-8-yrs-old:  $\chi^2= 17.252$ ,  $df= 1$ ,  $p= .000$ ; Bil\_1 vs. Monol\_adults:  $\chi^2= 28.454$ ,  $df= 1$ ,  $p= .000$ ; Bil\_2 vs. Monol\_5-6-yrs-old:  $\chi^2= .039$ ,  $df= 1$ ,  $p= .843$ ; Bil\_2 vs. Monol\_6-7-yrs-old:  $\chi^2= 1.600$ ,  $df= 1$ ,  $p= .206$ ; Bil\_2 vs. Monol\_7-8-yrs-old:  $\chi^2= 10.909$ ,  $df= 1$ ,  $p= .001$ ; Bil\_2 vs. Monol\_adults:  $\chi^2= 21.176$ ,  $df= 1$ ,  $p= .000$ ).

To further examine whether activity and motion verbs are treated by bilinguals as different types of constructions in the comprehension of aspect, two-way group-independence chi-square tests were performed. These show that (a) Bil\_1 interpret perfective aspect as telic in activity verbs but not in motion ones (Activity vs. Motion:  $\chi^2= 5.000$ ,  $df= 1$ ,  $p= .025$ ), while Bil\_2 do not treat the two verb types differently when they appear in perfective; and (b) in the imperfective condition both groups make a distinction between activity and motion verbs (Bil\_1:  $\chi^2= 3.348$ ,  $df= 1$ ,  $p= .067$ ; Bil\_2:  $\chi^2= 5.000$ ,  $df= 1$ ,  $p= .025$ ).

In the same comparisons, the monolingual data show that (a) the interpretation of perfective activity verbs as telic is more strongly preferred than that of perfective motion ones for all child groups leading to significantly different responses per verb type; and (b) in the imperfective condition no statistically significant difference is found for any group suggesting that the comprehension of imperfective aspect as atelic overrides the syntactic properties of activity and motion VPs. The adult data in the between verb type comparisons present a ceiling effect clearly indicating that the verb type is irrelevant to their preferred readings of (a)telicity (Kaltsa in prep.).

### 3.3 The Production Study

The production experiment examines the production of telicity in the bilingual grammar of young successive bilingual learners<sup>5</sup>.

#### 3.3.1 Materials and Procedure

The materials designed for the comprehension task were used for the production task as well. The production task was administered one or two months later than the comprehension task. The participants were shown one video at a time presenting either the telic or atelic condition and a test question followed. The test question was not morphologically marked for aspect (10) and it included a time adverbial to indicate past reference. The task for the participant was to describe the event.

- (10) Τι έκανε χθες το παιδί;  
 what do-PAST (Perf/Imp) yesterday the child  
 ‘What did the child do yesterday?’

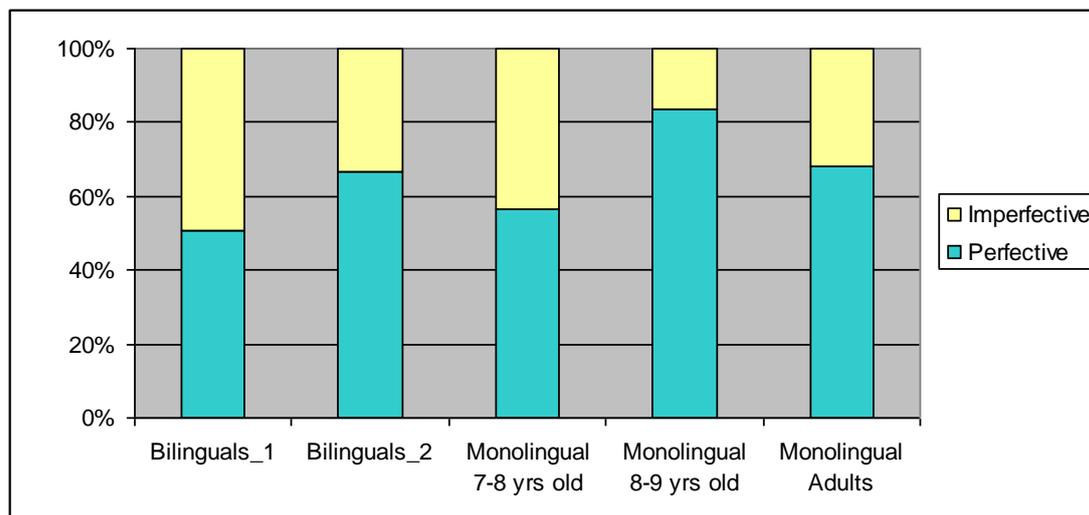
#### 3.3.2 Results

The data analysis consisted in (a) filtering out utterances with verbs not morphologically marked as past or inappropriate verbs; (b) counting the preferred use of perfective aspectual verb forms with telic and atelic events; and (c) counting the preferred use of imperfective aspectual verb forms with telic or atelic events. The data was subcategorized per verb type for all conditions. The mean percentages of the aspect/complement-telicity matching per group are presented in Figures 5 to 8.

##### *Activity and Telicity in L2 Greek*

In activity events, the interaction of aspect (perfective vs. imperfective) and event type (telic vs. atelic) is significant for all groups (Bil\_1:  $\chi^2=5.940$ ,  $df= 1$ ,  $p= .015$ ; Bil\_2:  $\chi^2= 14.982$ ,  $df= 1$ ,  $p= .000$ ; Monol\_7-8-yrs-old:  $\chi^2= 4.821$ ,  $df= 1$ ,  $p= .028$ ; Monol\_8-9-yrs-old:  $\chi^2= 48.187$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 14.704$ ,  $df= 1$ ,  $p= .000$ ).

Figure 5 presents the mean percentages for the use of perfective and imperfective in describing telic activity events.



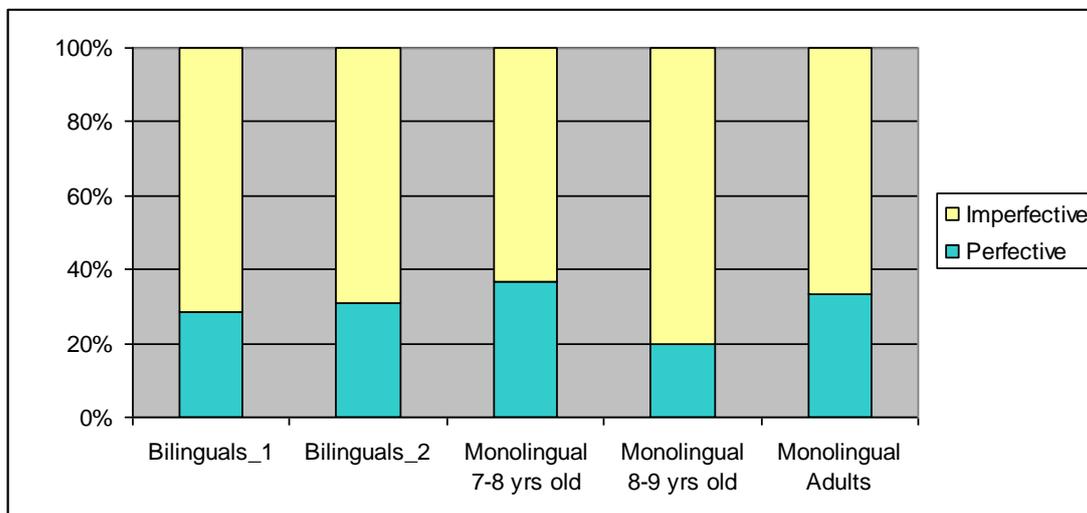
**Figure 5** Activity Telic Events

The data reported in Figure 5 show that the older bilingual group uses perfective forms to describe telic events, whereas the younger bilinguals don't show any preference. This observation was statistically supported by one-way-goodness-of-fit chi-square tests (Bil\_2:  $\chi^2= 6.667$ ,  $df= 1$ ,  $p= .010$ ).

<sup>5</sup> We do not include the results from the 5-6 yr old monolinguals due to space limitations. Nevertheless this group shows no significant results in production of telic and atelic events with respect to aspectual forms used (Kaltsa in prep.)

The data of the control groups show that 7-8 yrs old monolingual children have a similar attitude to Bil\_1 group, while older monolingual children and adults clearly prefer using perfective over imperfective aspect (Monol\_8-9-yrs-old:  $\chi^2= 26.667$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 8.067$ ,  $df= 1$ ,  $p= .005$ ).

Figure 6 presents the mean for the use of perfective and imperfective in describing atelic activity events.



**Figure 6** Activity Atelic Events

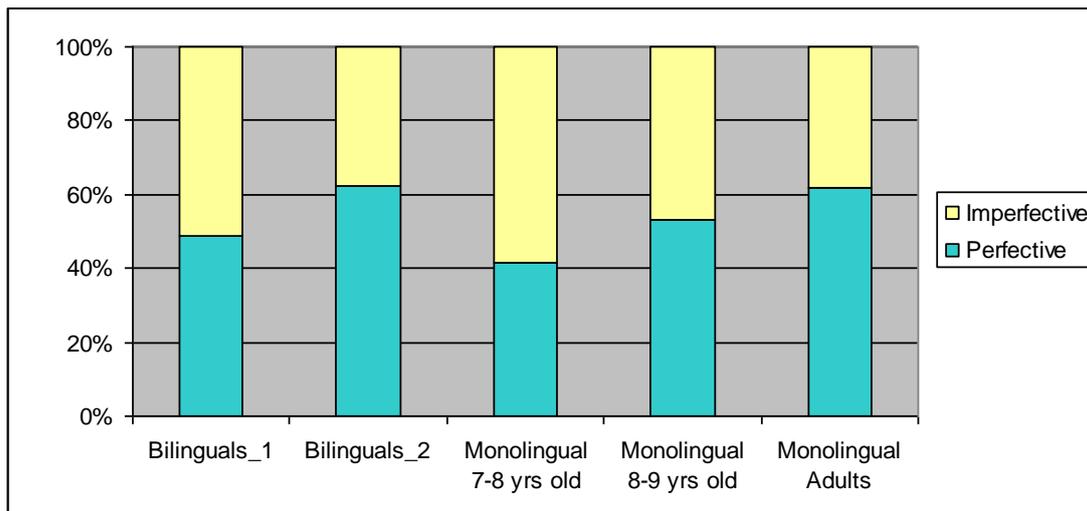
The data reported in Figure 6 show that both bilinguals and monolinguals strongly prefer to use imperfective to describe atelic events with activity predicates. This observation was statistically supported by one-way-goodness-of-fit chi-square tests (Bil\_1:  $\chi^2= 10.286$ ,  $df= 1$ ,  $p= .001$ ; Bil\_2:  $\chi^2= 8.345$ ,  $df= 1$ ,  $p= .004$ ; Monol\_7-8-yrs-old:  $\chi^2= 4.267$ ,  $df= 1$ ,  $p= .039$ ; Monol\_8-9-yrs-old:  $\chi^2= 21.600$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 6.667$ ,  $df= 1$ ,  $p= .010$ ).

Turning to the between bilingual group comparisons for activity verb production the Bil\_2 group uses perfective aspect more than the Bil\_1 group when describing a telic activity event (Bil\_1 vs. Bil\_2:  $\chi^2= 3.073$ ,  $df= 1$ ,  $p= .080$ ). Comparing bilingual with monolingual groups in the telic condition the use of aspect aligns bilingual performance with that of Monol\_7-8 yrs old. Moreover, while Bil\_1 group performs differently from the older monolingual children and adults, the older bilingual group differs from the older monolingual children but matches the adult performance (Bil\_1 vs. Monol\_8-9-yrs-old:  $\chi^2= 14.249$ ,  $df= 1$ ,  $p= .000$ ; Bil\_1 vs. Monol\_adults:  $\chi^2= 3.779$ ,  $df= 1$ ,  $p= .052$ ; Bil\_2 vs. Monol\_8-9-yrs-old:  $\chi^2= 4.444$ ,  $df= 1$ ,  $p= .035$ ). The groups are not differentiated to each other in the atelic condition.

*Motion and Telicity in L2 Greek*

In motion events, the interaction of aspect (perfective vs. imperfective) and event type (telic vs. atelic) is significant for both bilinguals and monolinguals (Bil\_1:  $\chi^2=15.267$ ,  $df= 1$ ,  $p= .000$ ; Bil\_2:  $\chi^2= 31.706$ ,  $df= 1$ ,  $p= .000$ ; Monol\_7-8-yrs-old:  $\chi^2= 4.596$ ,  $df= 1$ ,  $p= .032$ ; Monol\_8-9-yrs-old:  $\chi^2= 15.983$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 12.117$ ,  $df= 1$ ,  $p= .000$ ).

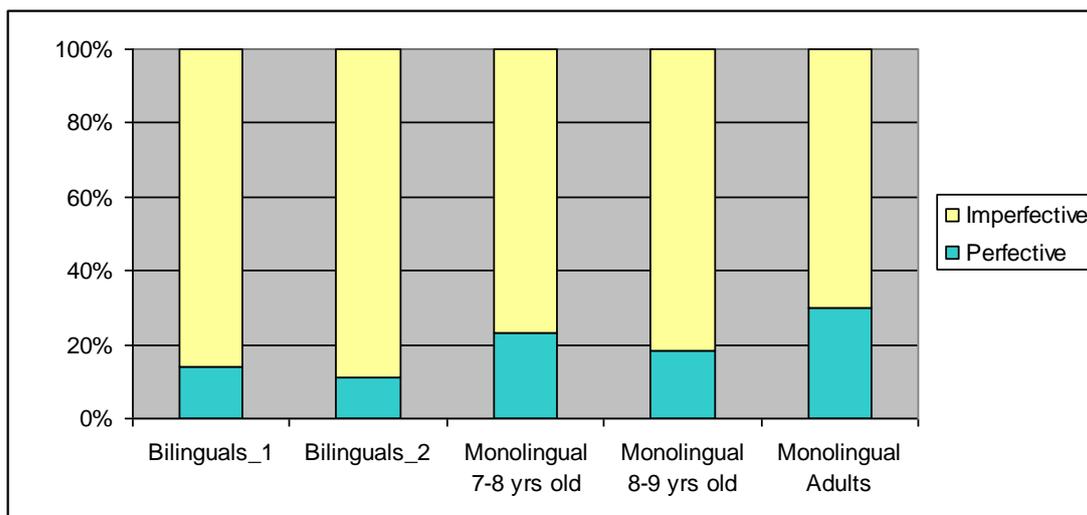
Figure 7 presents the mean percentages for the use of perfective and imperfective in describing telic motion events.



**Figure 7** Motion Telic Events

The data reported in Figure 7 show that only the older bilingual group and the adults use perfective verb forms to describe telic motion events. All other groups perform at chance (Bil\_2:  $\chi^2= 3.500$ ,  $df= 1$ ,  $p= .061$ ; Monol\_adults:  $\chi^2= 3.267$ ,  $df= 1$ ,  $p= .071$ ).

Figure 8 presents the mean for the use of perfective and imperfective in describing atelic motion events.



**Figure 8** Motion Atelic Events

The data reported in Figure 8 show that all groups significantly prefer to use imperfective with atelic motion events. This observation was statistically supported by one-way-goodness-of-fit chi-square tests (Bil\_1:  $\chi^2= 29.491$ ,  $df= 1$ ,  $p= .000$ ; Bil\_2:  $\chi^2= 33.618$ ,  $df= 1$ ,  $p= .000$ ; Monol\_7-8-yrs-old:  $\chi^2= 17.067$ ,  $df= 1$ ,  $p= .000$ ; Monol\_8-9-yrs-old:  $\chi^2= 24.067$ ,  $df= 1$ ,  $p= .000$ ; Monol\_adults:  $\chi^2= 9.600$ ,  $df= 1$ ,  $p= .002$ ).

Turning to the comparisons between bilingual groups there is no significant difference found. The comparison between bilingual and monolingual groups reveal that in the telic condition the use of perfective aspect is strong only for the Bil\_2 group while the other groups perform similarly ( $\chi^2= 5.035$ ,  $df= 1$ ,  $p= .025$ ). In the atelic condition, both bilingual groups differ from adults on aspect (Bil\_1 vs. Monol\_adults:  $\chi^2= 4.311$ ,  $df= 1$ ,  $p= .038$ ; Bil\_2 vs. Monol\_adults:  $\chi^2= 6.333$ ,  $df= 1$ ,  $p= .012$ ).

Comparing activity with motion events, (a) Monol\_8-9-yr-old children use perfective aspect for telic activities but not for motion ones (Activity vs. Motion:  $\chi^2= 12.478$ ,  $df= 1$ ,  $p= .000$ ), while the rest of the groups show no difference per verb type; (b) in the atelic condition both bilingual groups use the

imperfective with motion verbs more than with activity ones, while monolinguals show no difference (Bil\_1:  $\chi^2= 3.568$ ,  $df= 1$ ,  $p= .059$ ; Bil\_2:  $\chi^2= 6.835$ ,  $df= 1$ ,  $p= .009$ ).

#### 4. Discussion

The comprehension study shows that bilingual children map perfective aspect onto telic activities and imperfective aspect onto atelic motions. However, perfective motion VPs and imperfective activity VPs remain problematic for bilinguals. These results indicate that bilingual children's choices are mostly driven by the semantics of the verb, i.e. activity and motion while morphological aspect is basically a realisation of lexical aspect. Accordingly, a VP such as 'eat the apple' (accomplishment) is understood differently to a VP such as 'run in the kitchen' (activity) marked with perfective aspect. Turning to the production study, bilingual children seem to have difficulties with aspectual marking in Greek suggesting, as in the comprehension study, a priority of situation type over viewpoint/grammatical aspect.

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