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How subject animacy constrains motion event descriptions: evidence from sequential and simultaneous bilinguals in French and English

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### Abstract

Research has indicated that during sentence processing, French native speakers predominantly rely upon lexico-semantic cues (i.e., animacy) while native speakers of English rely upon syntactic cues (i.e., word order). The present study examined sentence production in L1 French/L2 English and L1 English/L2 French sequential bilinguals. Participants used animate and inanimate entities as sentence subjects while describing motion events represented by static pictures. To test a gradual change in animacy cue weighting in second-language sequential bilinguals with different proficiency levels were included. Sentence production of sequential bilinguals was compared against that of simultaneous bilinguals.

The results indicated an overall preference for the use of animate subjects for both languages at all proficiency levels. The effect of animacy was stronger for English L2 than French L2 while it did not differ between languages in simultaneous bilinguals. Evidence for potential change in the animacy-cue weighting was only observed for English L2.

*Key words:* animacy of the sentence subject, motion events, simultaneous bilingualism and sequential bilingualism

## Introduction

Numerous studies identify the animacy of nouns as an important linguistic cue for language comprehension and production (e.g., Aissen, 2003; Bates & MacWhinney, 1982; Bowerman 1973; Branigan, Pickering & Tanaka, 2008; Comrie, 1989). Linguistic cues are defined as mapping between form and function where “forms serve as cues to functions during comprehension and functions serve as cues to forms during production” (MacWhinney, 2005, p.50). Adult monolingual speakers might rely on animacy to assign grammatical functions – such as case-markings (Aissen, 2003; Branigan et al., 2008; Comrie, 1989) – and to assign syntactic functions to entities. Generally, native English speakers strongly prefer to use active sentences to describe an agent performing an action when the agent is animate and to use passive sentences to assign inanimate entities as subjects (Altmann & Kemper, 2006; Bock, Loebell & Morey, 1992; Branigan et al., 2008; Ferreira, 1994; McDonald, Bock & Kelly, 1993; Rosenbach, 2005). This phenomenon is also documented for German (van Nice & Dietrich, 2003) and Spanish (Prat Sala, 1997). A cross-linguistic comparison conducted by Gennari, Mirković and MacDonald, (2012) indicates that English participants tended to use animate entities as sentence subjects in passive sentences while Spanish and Serbian participants relied instead more on active structures using impersonal and object relative structures. This difference could be linked to the influence of animacy on selection of sentence subjects or causers. Acceptable causers vary cross-linguistically (Achard, 2002; Folli & Harley, 2005, 2007, 2008). In some languages, like French, inanimate arguments are not compatible as causers while other languages, like English, license the use of various elements as causers and their animacy is not compulsory (Achard, 2002; Wolff, Jeon & Li, 2009; Wolff, Jeon, Kettkle & Li, 2010).

In addition to constraining adult L1 production, animacy constrains L1 acquisition in children (MacWhinney & Bates, 1989). From as early as three months of age, children learn to distinguish between animate and inanimate entities (e.g., Rakison & Poulin-Dubois, 2001). Research suggests that children make such a distinction based on the fact that animate entities are self-propelled (Tremoulet & Feldman, 2000). This could explain why children have a tendency to assign animate entities as agents and inanimate entities as patients (Bowerman, 1973; Brown, 1970; Brown, Cazden & Bellugi, 1973; Chapman & Miller, 1975; de Villiers & de Villiers, 1974; Slobin, 1968). Studies on the acquisition of English L1 reveal that children between the ages of 2;5 and 5;5 – similarly to adults – predominantly rely on word order rather than animacy during sentence comprehension and production, these tendencies are not as systematic as in adults, as their language skills are still developing (Bates et al., 1984). Cross-linguistic variations have also been observed in child language development. A study by Bates et al. (1984), investigating the development of sentence comprehension in L1 English and L1 Italian children (ages 2-5), indicates that L1 English children rely on word order during sentence comprehension while L1 Italian children rely on animacy. Following on from this study, Devescovi, D'amico and Gentile (1999) shows that unlike Italian children, Italian adults relied more on subject-verb agreement than animacy during sentence comprehension. A study conducted by Kail (1999) suggests that unlike French adults, who dominantly rely on animacy, French children prefer to rely on word order followed by animacy. It is only after the age of five that French children adopt a French adult-like pattern, (i.e., start dominantly relying on animacy rather than word order) (Kail, 1999; Kail & Charvillat, 1986). The Competition Model (MacWhinney, 2005) explains such changes during child language acquisition by proposing that cue strength is influenced by both the availability of a cue – the amount of times the cue is encountered – and its reliability – how well it predicts a certain outcome. The more available and reliable a cue is; the stronger it is.

As children acquire their L1, they encounter cues more frequently and learn which are more reliable than others. This impacts language production: as cues are readjusted, their accuracy improves. This leads to an adjustment of cue strength.

The results of the studies reviewed above suggest that animacy cue strength for comprehension and production not only varies across languages but also changes during L1 acquisition. With such findings established for L1 acquisition, the current study aims to examine whether cross-linguistic differences in animacy cue strength in French and English impact on language production in sequential bilinguals who are living in the country of their L2 and on language production in simultaneous bilinguals. To do so, we investigated (i) the production of sentences in L2 (for sequential bilinguals with either French or English) that describe motion events and employ either animate or inanimate sentence subjects; (ii) qualitative and quantitative changes in cue pattern choice in L2 during sentence production at different proficiency levels, (iii) sentence productions of sequential bilinguals were compared to those of simultaneous bilinguals.

### **Animacy, L2 and bilingualism**

Cross-linguistic differences in the acquisition and processing of L1 have implications for L2 acquisition and language processing in bilinguals. Throughout this paper, the term “L2 learners” refers to people who are learning an L2 but are not necessarily bilingual. The term “bilinguals” refers to people who use two languages on a daily basis. Amongst bilinguals we differentiate between sequential bilinguals who first acquired their L1 and subsequently their L2 and simultaneous bilinguals who acquired two languages at the same time.

When cue strength differs between L1 and L2 for a given cue like animacy, L2 learners face the task of first, identifying the difference and determining the relative cue

strength of that cue in the L2 then, gradually reassigning the L1 values accordingly during L2 comprehension and production as acquisition progresses. Because L2 learners have already acquired an L1 and the cue strength of its available and reliable cues, their comprehension, production and acquisition may reveal an influence of L1 cue strength patterns at the start of L2 acquisition. As L2 acquisition progresses, L2 cue strength might be gradually readjusted to reach native-like levels (Ellis, 2006; MacWhinney, 2005; 2013). This means producing more accurate sentences in terms of grammar but also of meaning conveyed. This begs the question of examining whether sequential bilinguals and L2 learners are able to adopt native-like cue strength patterns in the L2. Given that acquisition of linguistic cues and in particular changes in their strength might involve complex mechanisms of observing cue saliency shift through mechanisms such as attentional learning (Smith & Samuelson, 2006), this process could be influenced by the amount of time speakers spend in the L2 environment, the type of instruction received, and the amount of time spent in monolingual versus bilingual mode (Grosjean, 1998).

Most studies investigating whether L2 learners were able to adopt native-like cue weighting for animacy of sentence subject in L2 focus on comprehension only. So far, the findings are contradictory. Some studies find that L2 learners and sequential bilinguals were unable to adopt near-native-like animacy weighting in L2 comprehension (Gass, 1987; Sasaki, 1991; Wust, 2010); others report that this was not the case (McDonald & Heilenman, 1991; Morett & MacWhinney, 2013; Su, 2001); further studies report that sequential bilinguals can adopt the L2 cue patterns but use L2 cue patterns for both L1 and L2 comprehension (Hernandez, Bates & Avila, 1994; Pham & Ebert, 2016; Pham & Khonert, 2010). Most of these studies (e.g., Liu, Bates & Li, 1992; Morett & MacWhinney, 2013; Su, 2001) include both grammatical and ungrammatical sentences that native speakers and L2 learners were asked to interpret. The choice of using ungrammatical sentences in this type of

task is debatable. For instance, in Morett and MacWhinney, participants had to decide who the agent was in the following sentence:

(1) Is hitting the father he.

This type of stimuli does not reflect natural language and therefore results might not represent language behaviour in its natural context. Because participants would never produce sentences like (1) and would most likely just follow dominant linguistic cues in their language during sentence production, this type of experimental design could only be applied to language comprehension and not language production. A rare study examining the change of cue weighting in L2 sentence production by Wang and Xu (2015) compares passive sentence comprehension and production in native Chinese speakers as well as Japanese and English learners of Chinese with different proficiency levels. The study uses static pictures to elicit (i) the notional passive where the patient comes before the verb while the verb form is not changed and there is no additional cues to indicate passive, and (ii) the marked passive that uses a morpheme, typically “by” to indicate passive. The choice between the two depends on context and also on the conflict between animacy and word order cues. While Chinese native speakers produced more notional passives than marked passives, this difference was even more pronounced for L2 Chinese learners indicating that they were relying on animacy cue rather than word order. The results further indicate that the productions of L2 learners became more native-like as proficiency improved. Although L2 learners showed good comprehension of marked passives, those structures were not frequent in their production. This difference between comprehension and production illustrates the importance of studying language production as well as comprehension.

The above findings are in line with the idea proposed by Ellis (2006) that L2 cue weighting is readjusted gradually. L2 cue readjustment is proposed to depend upon cue saliency: if a cue is not salient in the L2, learners may not pay sufficient attention to it to



acquire it. When two cues compete, the more salient cue overshadows the less salient one, which becomes harder to acquire (Ellis, 2006). Bilingual mental representations can be described using the Shared Distributed Asymmetrical Model (SDAM) (Dong, Gui, & MacWhinney, 2005) which proposes that conceptual representations are shared between languages. Learning an L2 implicates a process of integrating the conceptual differences that involves dynamic coordination of shared and separate representations. With an increase in L2 proficiency the conceptual differences between languages tend to converge while at the same time the separatist tendency aims to maintain the L1 conceptual system and to adopt the L2 conceptual system. Such process results in a system where common elements between two languages are represented via the same conceptual system while specific characteristics are represented separately. If the links to common elements of the languages become strong enough and links to the specific characteristics of individual languages become weak enough, the system represents the state of ideal balanced bilinguals (Dong et al., 2005). In order to picture this dynamic readjustment of the representational system, language behaviour of L2 learners at different proficiency levels must be observed and compared to that of balanced simultaneous bilinguals rather than monolinguals. In the context of the present study, this would mean that more proficient sequential bilinguals should opt for L2 cues in their L2 and L1 cues in their L1. On the other hand, less proficient sequential bilinguals would opt for L1 cues in L2 production. In particular, because of word order dominance in English, L1 English speakers would be expected to be more prepared to use inanimate sentence subjects than L1 French speakers who dominantly rely on animacy and therefore would be less prepared to use inanimate entities as sentence subjects. More proficient sequential bilinguals would be expected to increasingly opt for L2 cues in their L2, meaning that L1 French speakers would increasingly rely on word order in L2 English and be more prepared to use inanimate entities

as sentence subjects, while L1 English speakers would rely more on animacy and would become less prepared to use inanimate entities as sentence subject in their L2 French.

In Modified Hierarchical Model (MHM) Pavlenko (2009) proposes three levels of conceptual representations: (i) shared representations between L1 and L2, (ii) partially shared representations between L1 and L2, and (iii) fully specific representations. Assuming that cues that are characteristic for either L1 or L2 have specific representations which are activated only through that language, a cue for assigning sentence subject can solely become activated and trigger a specific function in one of those languages. Only if the speaker chooses the correct language, a target-like sentence will be produced. Following the difference between semantic and conceptual transfer proposed by MHM, this model suggests that syntactic cues such as word order might be easier to abandon than semantic cues, like animacy, because semantic cues are linked to concepts which are acquired before syntax or word order (Clark, 1973) and thus may be more difficult to reassign. Given that French favours animacy while English favours word order, we could hypothesise that French lexico-semantic constraints may be more powerful than syntactic constraints in English. If this is the case, it may be difficult for L1 French/L2 English sequential bilinguals to abandon animacy as a semantic cue and follow word order as a syntactic cue to produce active sentences using inanimate subjects, even at an advanced proficiency level. At the same time it may be easier for L1 English/L2 French sequential bilinguals to abandon word order cue and rely on animacy to produce sentences using inanimate objects.

### **Motion events and animacy in bilinguals**

The current study used motion events to elicit sentences with animate and inanimate subjects as they both can provoke motion and therefore can be used as subjects/agents in sentences that contain motion verbs (Ochsenbauer & Engeman, 2011). This study is a follow up to the

study by the authors (Antonijević & Berthaud, 2009; Berthaud & Antonijević, 2012) that examined sentence production combining motion verbs and their compatible argument structures in L2 French and English. The encoding of motion events varies across languages. Talmy's typology (Talmy, 2000; see also Slobin, 1996, 2004) first established that languages could be categorised into two groups depending on how motion was encoded. The first group, "satellite-framed languages" like English, encode the manner of motion in the verb while the path is usually encoded in a prepositional phrase, or satellite. The second group, "verb-framed languages" like French, encode the path in the verb while manner may optionally be added as an adjunct. However, further research indicated that this typology is not always accurate, in particular in the case of French. Indeed, further investigation reveals that French native speakers use a variety of patterns and do not solely rely on a "verb-framed pattern" (e.g., Pourcel & Kopecka, 2005; Beavers, Levin & Tham, 2010). French speakers can rely on satellite-framed patterns for certain goal-oriented events. This is also the case of caused-motion events, when an entity puts another entity into motion. Unlike in English where one main syntactically simple pattern applies, French native speakers rely on an opaque system of several patterns that are more complicated syntactically (Ochsenbauer & Engemann, 2011; Hickmann & Hendriks, 2010).

Cross-linguistic differences between French and English also occur in the description of static motion events (e.g., "It is located on the left") and fictive motion events, where a motion verb describes a static situation (e.g., "the road descends to the beach"). Previous research indicate that speakers of verb-framed languages like French tend to use static descriptions more often than speakers of satellite-framed languages such as English (Hickmann, 2007; Hickmann & Hendriks, 2010; Slobin, 1996; Stosic & Sarda, 2009). Verb-framed language speakers tend to encode more background information and static descriptions instead of dynamic descriptions (see Hickmann, 2007 for examples). The lack of

posture verbs in French means that fictive motion is somewhat more salient in French than in English (Stosic & Sarda, 2009).

Although the aim of Antonijević and Berthaud's previous study was not to examine the effect of animacy of sentence subject systematically, the results indicate that animacy had influenced sentence production (2009; 2012). Using a picture elicitation task, they examined sentence production in L2 by upper-intermediate and advanced sequential bilinguals of L1 French/L2 English and L1 English/L2 French. The analysis indicated that sequential L1 English/L2 French bilinguals produced a higher percentage of correct sentences than sequential L1 French/L2 English bilinguals. The subsequent qualitative analysis of incorrect sentences – comprised of ungrammatical productions and productions with argument structures different than expected – revealed that animacy of the sentence subject systematically contributed to sentences being incorrect. In particular, sequential L1 French/L2 English bilinguals had difficulties describing motion events involving inanimate subjects, which was not the case for L1 English L2/French bilinguals. For instance, to describe a plant that was climbing up a wall, one of the L1 French/L2 English bilinguals produced the following,

- (2) There is a wall, there is a plant but a plant does not climb (Antonijević & Berthaud, 2009).

While plants do not *monter* 'climb' in French, they do *grimper* 'climb/creep'. It was therefore surprising that an advanced sequential L1 French/L2 English bilingual was unable to describe this particular motion event. Antonijević and Berthaud proposed that such difficulty was linked to the animacy of the sentence subject: if the distinction between animate and inanimate entities is based on the fact that animate entities are self-propelled (e.g., Tremoulet

& Feldman, 2000), speakers would automatically prefer to include animate entities in motion event description. However, this did not explain the difference observed between the two groups of participants. Antonijević and Berthaud proposed that cross-linguistic differences were at play. As English, unlike French, licenses a greater number of causers (such as inanimate entities), English L1 speakers, unlike French L1 speakers, may not have difficulties using inanimate entities as sentence subjects in describing motion events. Cross-linguistic differences in motion event lexicalisation patterns between French and English could lead to additional difficulties in sentence production for bilingual participants (e.g., Berthaud & Antonijević, 2012). As the previous study focused on the L2 acquisition of verbs of motion in French and English, the animacy of sentence subject was neither fully balanced across the languages nor systematically manipulated.

Observed difficulties in use of inanimate entities as sentence subject to describe motion events in the L2 could be linked to the fact that the L2 cue weighting of animacy was not readjusted. So far, research findings on the readjustment of cue weighting for animacy remain conflicting. It remains unclear whether and to what extent L2 animacy patterns can be acquired, especially in the case of languages where animacy does not play such a dominant role, as in English. A relatively small number of studies have addressed the acquisition and use of correct animacy patterns in L2 (McDonald & Heilenman, 1991; Su, 2001; Wang & Xu, 2015), most of which were examined through sentence comprehension rather than production. The proficiency of L2 learners was not systematically manipulated and the proficiency levels were self-reported (e.g., Liu, Bates & Li, 1992; McDonald & Heilenman, 1991).

### **Aim and design of the study**

As evidenced by Kail (1999), English speakers rely more on word order rather than animacy to assign sentence subject while French speakers rely more on animacy than on word order. Given that L1 cues can influence sentence production in L2, the question is whether L1 French speakers would be more sensitive to animacy of the potential agent than L1 English speakers while assigning sentence subject in their L2. Therefore, the first aim of this study is to examine production of sentences in L2 that describe motion events and include either animate or inanimate agent as sentence subject by L1 French/L2 English and L1 English/L2 French speakers.

The second aim of the study is to explore changes in strength of lexico-semantic versus word order cues that may come with improved proficiency in L2. This would be reflected in incremental improvement in using the language appropriate linguistic cues; in particular L1 French/L2 English participants with a higher proficiency level are expected to be more successful in using animate and inanimate sentence subjects in their L2 than participants with a lower proficiency level. Given that positive transfer between languages is enhanced by explicitly aligning of L2 forms with L1 forms (MacWhinney, 2005) one objective of aim 2 was to examine whether sequential bilinguals with specific applied training in language translation would be more accurate in using animate and inanimate sentence subjects to describe motion events in their L2 than participants who did not receive such training. Therefore, a group of professional translators was included in the study. Translating between English and French, translators participating in this study are regularly faced with challenges of translating motion events between a satellite-framed (manner salient) language and verb-framed (path oriented) language where they have to balance between giving detailed information on path and manner in a native-like form (e.g., Ibarretxe-Antuñano, 2003; Slobin, 2005). A better awareness of differences in expressing

motion events between the two languages could lead to improved language production in L2. Professional translators were also recruited as a specialist group that received training including both “Focus on Form” (Doughty & Williams, 1998) (i.e., drawing awareness of the language learner to meaning and form equivalences), and usage-based learning. Both “Focus on Form” and usage-based learning have been found to be effective for L2 acquisition (for a summary of instruction methods and SLA issues see Robinson & Ellis, 2008). Teaching cross-linguistic differences pertaining to motion events is also well established in translation training for French and English. Translation studies scholars document the *chassez-croisé* technique identifying the different cross-linguistic patterns and how to translate them into either French or English (Hervey & Higgins, 2002; Vinay & Dalbernet, 1995). In other words, translators learn to match not only constructions between cross-linguistically different languages but also to match their meaning. This type of training might help positive transfer between the languages (MacWhinney, 2013) and also may facilitate L2 acquisition (Campbell, 2013).

The third aim of the study is to investigate how L2 sentence productions of sequential bilinguals compare to those of simultaneous bilinguals. Productions in L2 are compared to simultaneous bilinguals’ productions rather than monolinguals’ productions because previous research indicates that bilingual language production differs from monolingual production (Abutalebi, Cappa & Perani, 2009; Barac & Bialystok, 2011; Bialystok, 1999, 2001; Costa & Caramazza, 1999; Green, 1998; Kroll & Stewart, 1994). Furthermore, because of specific knowledge of their L1 and L2, Cook suggests that L2 learners should be considered as a special category of speakers rather than an approximation of monolinguals (Cook, 1999). Processing differences between monolinguals and bilinguals are evident during comprehension and production and may also have an impact on cognition (Costa & Sebastián-Gallés, 2014). Thus, comparing language production of bilinguals to production of

monolingual native speakers may not be the best research strategy due to language interaction in bilinguals (Bialystok & Feng, 2011; Bylund & Athanasopoulos, 2015; Grosjean & Li, 2012). To avoid treating bilinguals like “two monolinguals” (Grosjean, 1989) sequential bilingual production is compared to simultaneous bilingual production to reflect more appropriately the full bilingual acquisition and production of motion event lexicalisation patterns with animate and inanimate entities.

Finally, the study includes a qualitative analysis of both ungrammatical sentences and sentences that did not correspond to the expected/targeted sentence structure to explore the presence of any underlying factors that systematically influenced their production.

The study employs a 2x3x2 factorial design with the first two factors language of production (L2 English-L2 French) and the level of proficiency (upper-intermediate/advanced/translators) as between-subjects factors while the third factor animacy of intended agent presented in the picture stimulus (animate/inanimate) was within-subjects factor. This design results in 6 groups of participants: 3 groups of sequential bilinguals (upper-intermediate, advanced and translators) in L2 English and the same 3 groups in L2 French. Sentence productions in terms of their grammatical accuracy and matching expected/targeted sentence structure of those 6 groups of participants are compared to the sentence productions of the 7<sup>th</sup> group comprised of simultaneous bilinguals.

To elicit sentence production custom-made static pictures (see Appendix 2) were used. This method has already been used to elicit sentences representing motion events (e.g., Papafragou, Massey, & Gleitman, 2005; Slobin, 1996, 2004) and was chosen for the current study because it enabled us to show fictive motion as well as to avoid difficulty in representing actions that involve very slow movement like in the sentence “The plant climbs up the wall”. Arrows added to the pictures were used to indicate motion (see Appendix 1).



Ethical approval for the study was granted by the Ethics Committee of the National University of Ireland, Galway.

## Method

### Participants

Demographic details such as mean age, number of male/female participants, proficiency level and the average age of L2 onset for all participant groups are presented in Table 1.

The L2 proficiency levels of all participants were matched to the levels described in the *Common European Framework of Reference for Languages* (2001). Online language tests were used to test the proficiency level of the sequential bilinguals: the “Cambridge ESOL placement” test for English L2 and completed the “France Langue Test” for French L2. All participants had completed a bachelor’s degree. Testing occurred in France for French L2 sequential bilinguals and in Ireland for English L2 sequential bilinguals. All sequential bilinguals lived in the L2 country at the time of testing. Professional translators that participated in the study had at least 2 years of working experience ( $M = 6$  years; range: 2 - 11) and a postgraduate qualification in translation.

Simultaneous bilinguals filled in a questionnaire and all reported having been brought up communicating with one parent in French and another in English. All of them also reported having learned both languages from birth and having spent a significant amount of time in both Ireland and France. Ten of the simultaneous bilinguals had been educated in both countries. All simultaneous bilinguals also reported having spent more time in an English-speaking country ( $M = 22$  years) than a French-speaking country ( $M = 6$  years). However, they all reported being fluent in both languages and using them on a daily basis. They were tested in France ( $n=2$ ) and Ireland ( $n=11$ ).

Table 1: *Demographic details for seven groups of bilingual participants.*

Group	Proficiency Level	Mean Age of L2 onset	Mean Age	Gender Male/Female
Simultaneous bilinguals	-	Birth	28;9	7/6
L1 French L2 English sequential bilinguals	Upper-intermediate (B2)	10;7	26;6	2/8
	Advanced (C1-C2)	8;4	28;4	4/8
	Translators	11;3	28;7	2/7
L1 English L2 French sequential bilinguals	Upper-intermediate (B2)	11	26;9	4/6
	Advanced (C1-C2)	9;1	34	3/9
	Translators	11;8	29;3	1/8

### Task

In order to avoid direct translations of sentences or L1-L2 word associations, a sentence elicitation task with custom-made pictures was used (Pavlenko, 2009). To create the stimuli, two databases, one for French and one for English, listing verbs of motion together with their syntactic frames were established in order to be able to compare syntactic realisation of verbs of motion in the two languages. Only motion verbs with translational equivalents (i.e., equivalent meaning in both languages: go/aller, leave/sortir, carry/porter, fall/tomber, slip/glisser, climb/grimper) as well as equivalent syntactic realisations in French and English were selected, see for instance:

(3) The pepper is falling off the table.

*Le poivron tombe de la table.*

A total of 6 verb pairs were selected and 4 sentences in English together with 4 equivalent sentences in French were formed for each verb (see Appendix 1). In order to use only verbs that were translational equivalents with equivalent syntactic frames in French and English the verb ‘to go’ *aller* was used for 2 sets of 4 sentences. Thus, 28 sentences were created for each language, amounting to 56 sentences all together. Half of the sentences had an animate agent as sentence subject; half had an inanimate agent as subject. 24 sentences focused on path (including 3 fictive motion events), 24 on manner of motion (including 1 fictive motion event) and 8 on caused motion. Four fictive motion events were included out of 56 events all together to enable us to use only verbs that are translational equivalents and have the same syntactic frames in French and English.

To avoid the influence of the overall sentence frequency on the production, the average frequency of the sentences selected for each verb was matched across animate and inanimate subjects using the lemma frequencies available in the Celex database for English (Baayen et al., 1993) and in the Lexique 3.1 database for French (New, Pallier, Ferrand & Matos, 2001; New, Pallier, Brysbaert & Ferrand, 2004). After calculating the overall frequencies, some sentences were adjusted in order to match the average frequencies between sentences with an animate subject and sentences with an inanimate subject.

The selected sentences were used to design A4 custom-made pictures using software programmes Boardmaker, Powerpoint and MS Word. The pictures were designed in such a way that all the arguments of the verb required in the sentence were represented in the picture (see Appendix 2 for picture examples). Half of the pictures included an animate agent while the other half included an inanimate agent. The pictures were piloted using native speakers of English and French. Following this procedure, 6 pictures were adjusted to elicit the targeted

structures. In addition, a further 5 pictures were designed for practice block that served as a warm-up exercise preceding the empirical testing. Therefore, a total of 61 pictures were presented to each participant.

### **Procedure**

The participants were instructed in their L2 to ‘describe what is happening in the picture using one sentence’ *décrire ce qui se passe sur l’image en une phrase* using a given motion verb. They were limited to one sentence to describe each picture. Before the testing, the participants were made aware that they could omit a picture if they did not know how to describe it. The first 5 pictures were practice trials after which the participants had an opportunity to ask questions about the task; the remaining 56 pictures were test items. All pictures were presented one by one using Powerpoint presentation. To avoid an effect of trial order pictures were presented in a different random order for each participant. The participants were not given a time limit to start producing their sentence or complete the task. The mean length of task duration was 9 minutes and 30 seconds. Unlike sequential bilinguals who were tested only once in their L2, simultaneous bilinguals were tested twice: once in each language. Half of them were tested first in French and then in English. The other half were first tested in English and then in French. The two sessions took place at least 3 weeks apart.

All productions and comments made by the participants were audio recorded and later transcribed. After they completed the task, the sequential bilinguals were asked to translate all productions into their native language to ensure they had correctly understood the pictures.

### **Analysis**

Produced sentences were judged for grammaticality by two native speakers for each language. Sentences were judged for word order, preposition choice and lexis. The native speakers were asked to judge if the sentences produced were acceptable to describe the picture presented. The sentences were not judged for aspectual issues as some sentences required present simple while others required present progressive (e.g., “The road goes to the house”; “The man is going to the house”) and neither were they judged on the use of presentative constructions (e.g., “It’s a man who is going towards a house”). Sentence structures were further analysed to examine whether they corresponded to the expected/targeted structures. In particular, it was expected that sentences elicited by the pictures with animate agents would have an animate sentence subject while those elicited by pictures with an inanimate agent would have an inanimate sentence subject. In some instances, participants produced grammatically correct sentences that did not directly correspond to the pictures or to the intended structures. For example, some participants described the picture representing a road going up a mountain using the following sentence:

(4) ‘We are going hiking.’

This sentence, although grammatically correct, neither accurately described the picture nor matched the targeted structure. The sentences that did not correspond to the targeted structures were marked as unexpected and were separately analysed both quantitatively and qualitatively.

Taking into account their grammatical accuracy and whether sentences corresponded to the expected/targeted structure three measures were calculated: (i) the number of grammatically correct sentences (irrespective of whether they corresponded to the expected/targeted structures), (ii) the number of expected sentences that had the targeted structure (i.e., animate subject corresponding to the animate agent and inanimate subject

corresponding to the inanimate agent in the elicitation picture (this was irrespective of whether they were grammatically correct)), and (iii) the number of sentences that were grammatically correct and had the expected/targeted structure. The numbers of sentences for each of the three measures across all participants' groups are presented in Figures 1-3.

Separate sets of statistical analyses were performed on the three measures: (i) the number of expected/targeted and grammatically correct sentences, (ii) the number of expected/targeted sentences, and (iii) the number of grammatically correct sentences; all were first expressed as proportions and subsequently arcsine transformed to normalise the distributions (Scholfield, 1995; Woods, Fletcher, & Hughes, 1986).

We anticipated that the number of grammatically correct sentences would correspond to participants' proficiency level reflecting their ability to form grammatically correct sentences in their L2 and, therefore, we expected the number of grammatically correct sentences to increase with the proficiency level in both languages. For the number of expected/targeted sentences we hypothesised that the difference in the number of expected/targeted structures elicited by the pictures with animate versus inanimate agents will reflect the strength of lexico-semantic versus syntactic cue of participants' L1 and that it might change with proficiency level reflecting the adoption of L2 cue strength. Therefore, we expected that participants with L1 French, where lexical cue is dominant over the word order, would find it more difficult to form sentences using inanimate sentence subject in their L2 English and would, therefore, produce a higher number of unexpected sentence structures than participants whose L1 is English when producing sentences in their L2 French where the cue strength is reverse. Finally, the third measure is a combination of the previous two indicating the number of grammatically correct sentences that had expected/targeted sentence structure. For this measure the prediction is similar to that of expected/targeted sentences

with the proficiency effect possibly more pronounced as a result of the additional requirement for sentences to be grammatically correct.

## Results

### Quantitative analysis

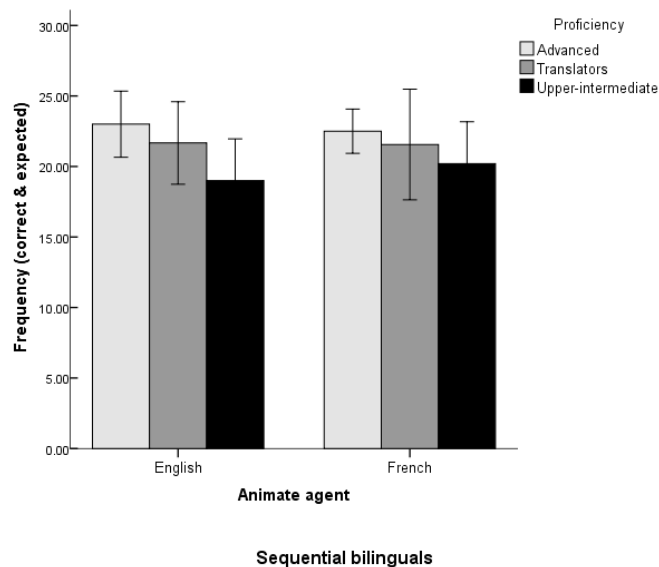
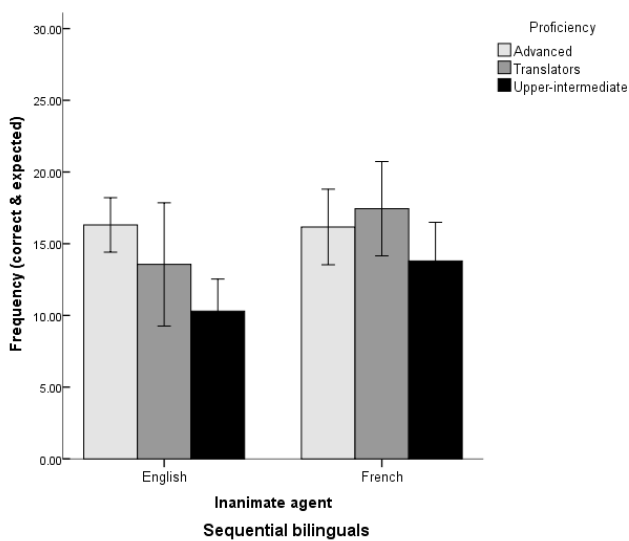
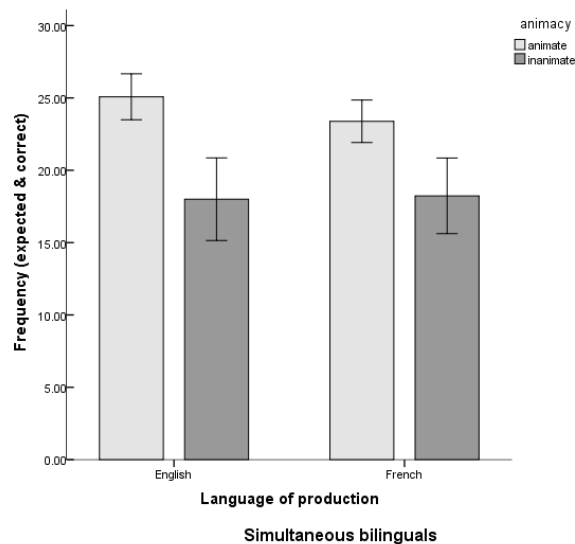
**Sequential bilinguals.** The first set of analyses was conducted on the number of sentences that were both grammatically correct and had expected/targeted sentence structure. The numbers of correct and expected sentences for all conditions and all groups of participants are presented in Figure 1. A repeated measures ANOVA with language of production and proficiency level as between-subjects factors and animacy of agent in elicitation picture as within-subjects factor revealed a significant main effect of agent animacy, ( $F(2,57) = 152.02, p = 0.0001, \eta^2 = 0.73$ ); the number of correct and expected sentences with an animate subject was significantly higher than the number of correct and expected sentences with an inanimate subject. A significant main effect of proficiency level was also observed ( $F(2, 57) = 6.01, p = 0.004, \eta^2 = 0.17$ ). The effect stems from the overall difference between advanced and upper-intermediate proficiency levels ( $MD = 0.19, SE = 0.06, p = 0.004$ ). Language of production did not lead to significant differences in the number of correct and expected sentences ( $F(2,57) = 0.97, p = 0.33, \eta^2 = 0.02$ ). The analysis further revealed a significant two-way interaction with a low effect size between animacy of agent in elicitation picture and the language of production ( $F(1,57) = 4.06, p = 0.049, \eta^2 = 0.07$ ). The interaction was further examined through analyses conducted separately for sentences produced in L2 English and L2 French. For the sentences produced in L2 English, a repeated measures ANOVA revealed significant difference in the number of correct and expected sentences produced with an animate subject ( $M = 21.22, SE = 0.70$ ) and an inanimate subject

( $M = 13.39$ ,  $SE = 0.71$ ) ( $F(1, 29) = 105.58$ ,  $p = 0.0001$ ,  $\eta^2 = 0.78$ ). For the sentences produced in L2 French, the analysis also revealed significant difference between the number of correct and expected sentences produced with an animate ( $M = 21.42$ ,  $SE = 0.71$ ) and an inanimate subject ( $M = 15.80$ ,  $SE = 0.74$ ), ( $F(1, 28) = 51.83$ ,  $p = 0.0001$ ,  $\eta^2 = 0.65$ ). Although both groups produced a higher number of correct and expected sentences as a response to pictures with an animate versus inanimate agent, this tendency was more pronounced for L1 French/L2 English participants than L1 English/L2 French participants. L1 French participants produced a smaller number of correct and expected sentences with inanimate subjects in their L2 English than L1 English speakers in their L2 French (see Figure 1).

Further analyses indicated significant effect of proficiency for English L2 ( $F(2,29) = 4.97$ ,  $p = 0.014$ ,  $\eta^2 = 0.26$ ) stemming from the difference between advanced and upper-intermediate levels ( $MD = 0.26$ ,  $SE = 0.08$ ,  $p < 0.011$ ) while the same effect was absent for French L2 ( $F(2,28) = 1.70$ ,  $p = 0.20$ ,  $\eta^2 = 0.11$ ). For neither of the languages was a significant interaction between proficiency and animacy of agent in the elicitation picture observed.



Figure 1: Frequency of grammatically correct and expected sentences produced as a response to an animate and an inanimate agent in the elicitation picture in English and French by simultaneous bilinguals as well as sequential bilinguals with advanced, upper-intermediate and translators levels of proficiency.

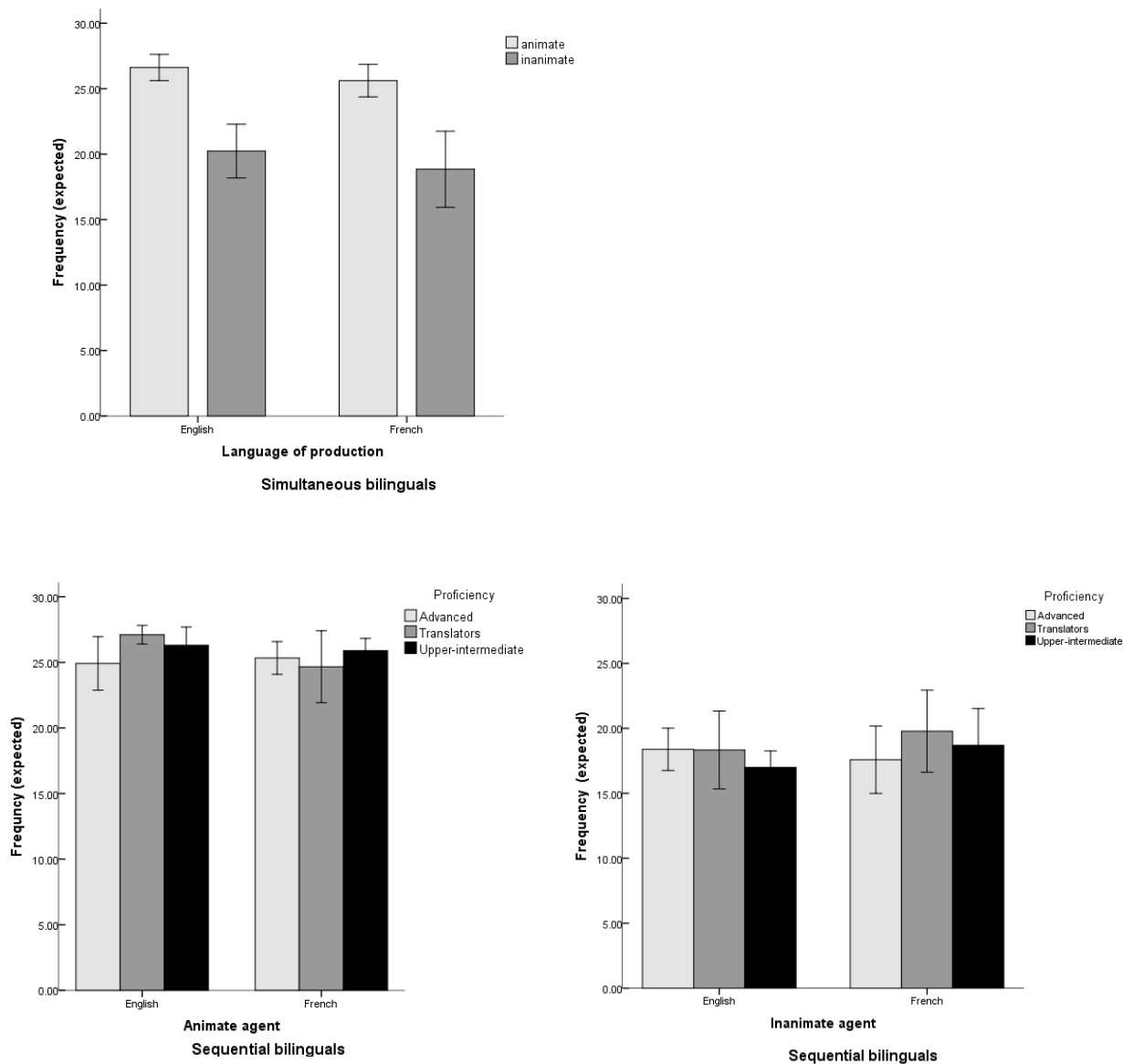


The second set of analyses was performed on the number of sentences that had expected/targeted structure irrespective of their grammatical accuracy (see Figure 2). These are sentences that used correct syntactic frame for the given verb and where the animacy of the sentence subject corresponded with the animacy of the agent in the elicitation picture. Sentences that deviated from the expected/targeted structure were subsequently qualitatively analysed (see below).

A repeated measure ANOVA with language of production and proficiency level as between-subjects factors and animacy of agent in elicitation picture as within-subjects factor indicated significant main effect of animacy ( $F(1,57) = 224.59, p = 0.0001, \eta^2 = 0.80$ ). A significantly higher number of sentences with expected/targeted structures was produced with an animate ( $M = 25.71, SD = 0.31$ ) than with an inanimate sentence subject ( $M = 18.93, SD = 0.44$ ). The analysis also indicated significant interaction between language of production and animacy of agent in elicitation picture ( $F(1,57) = 6.92, p = 0.011, \eta^2 = 0.11$ ) that was further examined in separate analyses for each language. Main effects of language and proficiency as well as the interaction between proficiency and animacy of agent in elicitation picture and the three way interaction did not reach the level of significance.

Separate analyses for English L2 and French L2 both indicated a significant effect of animacy of agent in elicitation picture. However a stronger effect was observed for English L2 ( $F(1,29) = 164.10, p = 0.0001, \eta^2 = 0.85$ ) than French L2 ( $F(1,28) = 72.23, p = 0.0001, \eta^2 = 0.72$ ). No significant interaction between proficiency and animacy of agent in elicitation picture was observed for either of the languages.

Figure 2: Frequency of expected sentences produced as a response to an animate and an inanimate agent in the elicitation picture in English and French by simultaneous bilinguals as well as sequential bilinguals with advanced, upper-intermediate and translators levels of proficiency.



The third analysis was performed on the number of correct sentences (irrespective of whether they had expected/targeted structure) (see Figure 3). A repeated measure ANOVA showed no effect of animacy of agent in elicitation picture ( $F(1,57) = 0.32, p = 0.573, \eta^2 = 0.006$ ) indicating that there was a similar number of correct sentences with an animate and with an inanimate subject. The analysis further indicated a significant main effect of proficiency ( $F(1,57) = 8.50, p = 0.001, \eta^2 = 0.23$ ) stemming from the difference between advanced ( $M = 25, SE = 0.58$ ) and upper-intermediate ( $M = 21.85, SE = 0.65$ ) levels ( $MD = 0.25, SE = 0.06$ ). In addition, there was a significant main effect of language of production ( $F(1,57) = 5.18, p = 0.027, \eta^2 = 0.08$ ) revealing somewhat higher number of correctly produced sentences in L2 French ( $M = 24.38, SE = 0.52$ ) than L2 English ( $M = 22.41, SE = 0.58$ ). Further analyses indicated a significant effect of proficiency for both languages (English L2:  $F(2,29) = 5.62, p = 0.009, \eta^2 = 0.28$ ; French L2:  $F(2,28) = 3.00, p = 0.066, \eta^2 = 0.18$ ).

Sentences that were judged to be grammatically incorrect were subsequently qualitatively analysed (see below).

**Simultaneous bilinguals.** As for sequential bilinguals, in all analyses, the number of sentences for each condition was first expressed as a proportion and then arcsine transformed.

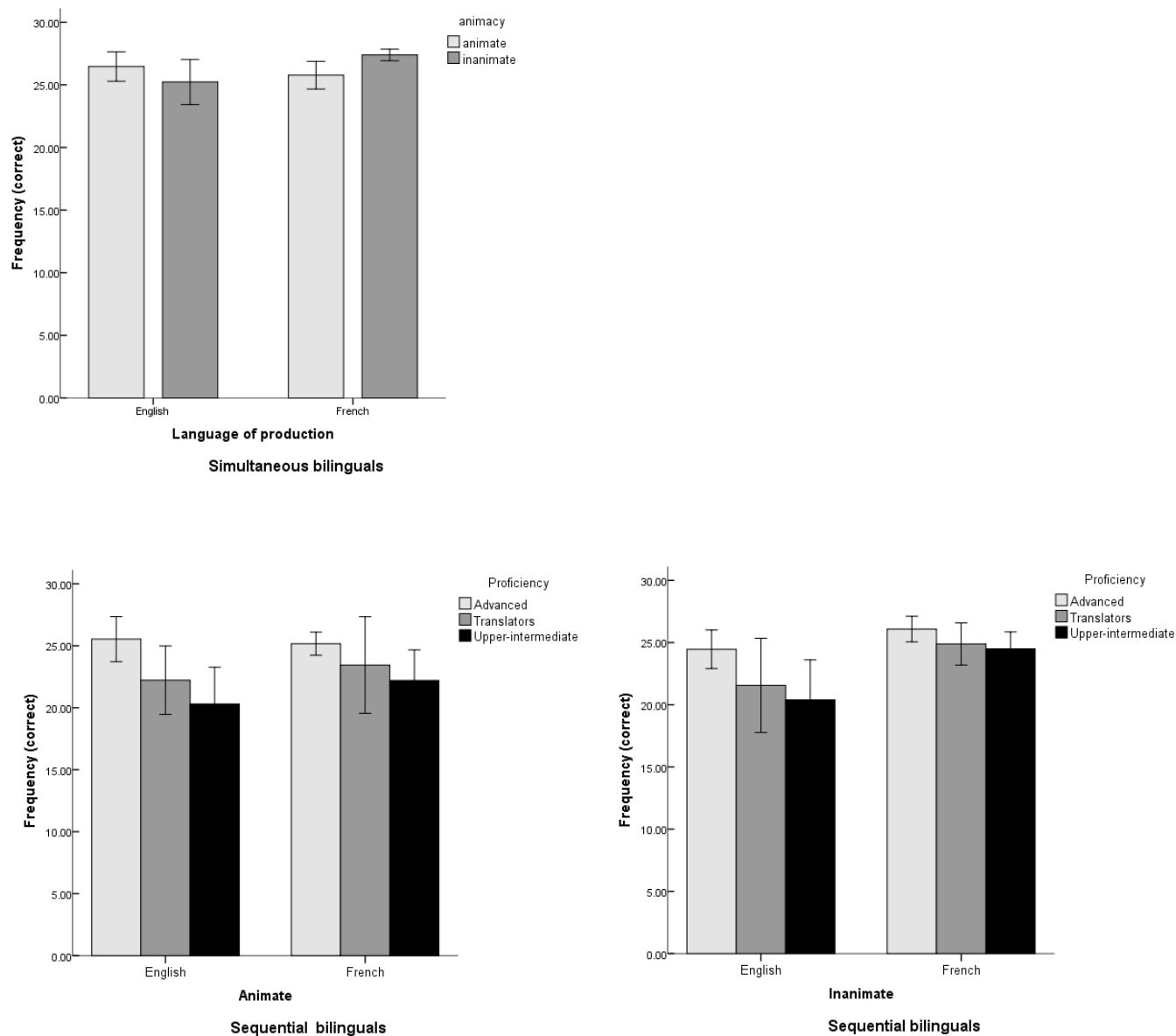
The first analysis was performed on the number of grammatically correct sentences that had expected/targeted sentence structure. A repeated measure ANOVA with two within-subjects factors, language of production (English, French) and animacy of agent in elicitation picture (animate, inanimate), revealed a significant main effect of animacy ( $F(1,12) = 27.27, p = 0.0001, \eta^2 = 0.69$ ). Like the sequential bilinguals, simultaneous bilinguals produced a higher percentage of correct and expected/targeted sentences with an animate subject than

with an inanimate subject (see Figure 1). No main effect of the language of production was observed ( $F(1,12) = 0.001$ ,  $p = 0.98$ ,  $\eta^2 = 0.00$ ). The participants produced as many correct sentences with expected/targeted sentence structure in French as they did in English. Moreover, the results did not reveal any significant interaction between animacy of agent in elicitation picture and the language of production ( $F(1,12) = 0.001$ ,  $p = 0.98$ ,  $\eta^2 = 0.00$ ). Separate analyses indicated similar effects of animacy for English ( $F(1,12) = 18.55$ ,  $p = 0.001$ ,  $\eta^2 = 0.61$ ) and French ( $F(1,12) = 21.083$ ,  $p = 0.001$ ,  $\eta^2 = 0.63$ ).

Second analysis was performed on the number of sentences that had expected/targeted sentence structure irrespective of their grammatical correctness. The only factor that reached the level of significance in the repeated measure ANOVA was animacy of agent in elicitation picture ( $F(1,12) = 37.42$ ,  $p = 0.0001$ ,  $\eta^2 = 0.76$ ).

Third repeated measure ANOVA with within-subjects factors language of production and animacy of agent in elicitation pictures was performed on the number of correct sentences irrespective whether they expected/targeted sentence structure. The analysis revealed significant interaction between language of production and animacy of agent in elicitation picture ( $F(1,12) = 14.28$ ,  $p = 0.003$ ,  $\eta^2 = 0.54$ ). The interaction stems from the reverse animacy of agent in the elicitation picture effect for sentences produced in French (see Figure 3); while in English there was a higher number of grammatically correct sentences produced as a response to elicitation picture with an animate agent than to those with an inanimate agent in French, there was a higher number of correct sentences produced as a response to pictures with an inanimate agent than to those with an animate agent.

Figure 3: Frequency of grammatically correct sentence produced as a response to an animate and an inanimate agent in the elicitation picture in English and French by simultaneous bilinguals as well as sequential bilinguals with advanced, upper-intermediate and translators levels of proficiency. Error bars represent 95% confidence interval.



### Qualitative analysis

The qualitative analysis was conducted on the ungrammatical sentences and the sentences that did not match the expected/targeted structure.

**Sequential bilinguals.** Most of the ungrammatical sentences were the result of an incorrect use of syntactic frames, as documented in the following sentences:

(5) ‘\*The boy falls down the table.’

Instead of ‘The boy is falling off the table.’

(6) ‘\*The pepper falls out of the stall.’

Instead of ‘The pepper is falling off the stall.’

In (5) and (6), the verb ‘to fall’ is associated with ‘off + NP’ to indicate something has become detached from a surface and is falling. Upper-intermediate sequential bilinguals with English L2 were not always able to associate the correct syntactic frame to the verb ‘to fall’. Instead, they used a syntactic frame that described a different motion event like in (5) and (6) where a boy would have slipped down along a table and the pepper would have fallen out of a container.

In some cases participants produced grammatically correct sentences that did not match the targeted structures or did not accurately describe the picture as nobody was on the picture. For example, both French L2 and English L2 sequential bilinguals sometimes used passive sentences instead of producing active sentences with the inanimate entity shown in the pictures as subject.

(7) ‘The coat is taken out of the wardrobe by someone.’

Instead of ‘The coat goes into the wardrobe.’

(8) Le gâteau est sorti du four par quelqu'un.

The cake is left from the oven by someone.

'The cake is taken out of the oven by someone.'

Instead of Le gâteau sort du four.

The cake exits from the oven.

'The cake is coming out of the oven.'

In addition to passive sentences, both English and French sequential bilinguals also produced alternative sentences using impersonal pronouns like 'Someone' *quelqu'un* or 'One' *On*. Instead of using an inanimate entity, participants used an impersonal animate entity as an agent even though no animate entity was presented in the picture.

(9) 'Someone is taking a coat out of the wardrobe.'

(10) 'On sort le gâteau du four.'

One exits the cake from the oven.

'Someone is taking the cake out of the oven.'

In contrast, for pictures involving an inanimate sentence subject, sequential bilinguals with English L2 produced sentences in which they added an animate agent using a personal subject pronoun, such as 'we', 'he', 'you' or even 'I'. They produced 36 such sentences.

(11) 'We are going hiking.'

(12) 'I am climbing a mountain.'

Instead of 'The road climbs up the mountain.'

In comparison, none of the sequential bilinguals with French L2 produced any sentence with personal pronouns to describe motion events involving inanimate agents.

Additionally, some of the sentences produced were not included in the analyses because instead of a motion event they depicted a static event. In particular, sequential bilinguals used constructions such as 'there is/there are' or 'it is'.



(13) 'It's a cloudy day at the beach.'

(14) 'Il y a des nuages et la mer.'

It there has some clouds and the sea.

'There are some clouds and the sea.'

Instead of 'The road goes to the sea.'

Lastly, 5 of the sequential bilinguals with English L2 expressed their difficulties when describing scenes depicting fictive motion events such as 'The road goes up the hill,' or 'The road goes to the house'. They communicated the difficulties encountered as follows:

(15) 'There is a road and an arrow pointing up but no one is moving so I don't know.'

**Simultaneous bilinguals.** In the case of inanimate sentence subjects, simultaneous bilinguals produced some incorrect sentences as well as those that did not match the targeted sentences (see Figures 1-3). To describe scenes involving an inanimate subject, like sequential bilinguals, simultaneous bilinguals produced passive structures in both French and English.

(16) 'The newspaper is being blown away.'

For scenes involving inanimate subjects, they also produced a few sentences with impersonal pronouns:

(17) 'Someone is washing the sink.'

Instead of, 'A sponge is falling off the sink.'

Compared to sequential bilinguals, simultaneous bilinguals produced fewer sentences with impersonal pronouns in English. In French, simultaneous bilinguals produced a marginally higher number of sentences with impersonal pronouns than sequential bilinguals.

Unlike sequential bilinguals, simultaneous bilinguals did not produce sentences in French or English using personal pronouns like 'we' or *nous*.

Some of the sentences produced by simultaneous bilinguals suggest that they had difficulties with fictive motion descriptions in French and English. For such scenes, simultaneous bilinguals produced a few static descriptions in both languages.

(18) ‘There is a picture of the sea.’

(19) ‘Il y a une route à côté d’une rivière.’

There is a road at side of one river.

‘There is a road beside a river.’

Simultaneous bilinguals produced a higher number of static descriptions in French than in English.

### **Discussion**

The aim of the current study is to investigate the use of animate and inanimate agents as sentence subjects in L2 sentences describing motion events. Sequential L1 French/L2 English and L1 English/L2 French bilinguals were compared to simultaneous bilinguals. Three separate measures of production were analysed: (i) the number of grammatically correct sentences (irrespective of their structure), (ii) the number of sentences with expected/targeted structure, and (iii) the number of sentences with expected/targeted structure that were also grammatically correct. Different measures were included because the initial analysis of grammaticality indicated that in addition to grammatically incorrect sentences a number of sentences had a structure that deviated from the expected structure while still being grammatically correct. The expected/targeted structures incorporated an animate subject as a response to an animate agent and an inanimate subject as a response to an inanimate agent in the elicitation pictures. While grammatical accuracy was taken to be an indicator of grammatical knowledge, responding with an expected/targeted structure was taken to indicate that participants were accustomed to using the structure and chose to use it in the context of

the task in preference to other possibilities (e.g., choosing to use an inanimate subject instead of passive). Finally, producing grammatically correct sentences with an expected/targeted sentence structure requires both grammatical knowledge and being accustomed to using the targeted form. Given that in the current study grammatical accuracy mainly referred to word order, choice of preposition, and lexis, and that the aim of this study was to examine use of animate and inanimate subject in sentence production, we decided to use the number of expected/targeted sentences as the main measure as well as to combine it with grammatical accuracy. Pure grammatical accuracy irrespective of whether sentences had expected/targeted sentence structure was also analysed because it reflects general proficiency in L2.

Analysis of expected/targeted sentences and the analysis of expected/targeted and grammatically correct sentences yielded similar results. The animacy of agent in the elicitation picture influenced the production of sentences describing motion events at all proficiency levels, in both languages and in both types of bilinguals. All participants produced a significantly higher number of sentences with expected/targeted structure as a response to a picture containing an animate agent than to a picture containing an inanimate agent. This is in line with previous studies, which document that animate entities are more likely to be selected as sentence subjects and agents (Clark & Begun, 1971; Itagaki & Prideaux, 1985; Pearson, Stevenson & Poesio, 2001). Although the effect of animacy was strong in all groups of participants, differences were observed between simultaneous and sequential bilinguals. While the effects of animacy in L2 French and L2 English were of a different size for sequential bilinguals, there was no interaction between animacy and language of production for simultaneous bilinguals (see Figures 1 and 2). Furthermore, sequential bilinguals with L1 French/L2 English and those with L1 English/L2 French produced similar number of expected/targeted grammatically correct sentences with animate sentence subject while participants with L1 French/L2 English produced a smaller number of

expected/targeted grammatically correct sentences with an inanimate subject relative to participants with L1 English/L2 French. This finding suggests influence of lexico-semantic cues from L1 French on sentence production in L2 English corroborating findings by Gass (1987) that Italian speakers learning English had difficulties adopting the word order cue in English and continued to rely on semantic cues, such as animacy. However, this influence was not present in simultaneous bilinguals.

In addition, for sentences with expected/targeted structure, the effect of proficiency was only observed for L1 French/L2 English speakers indicating that only this group improved their performance with an increase in proficiency level. Still, the lack of interaction between animacy and proficiency indicated that there was no change in the size of animacy effect, but an overall increase in the number of sentences with expected/targeted structure involving both animate and inanimate agent/subject. Although this is an evidence for gradual improvement in production of expected/targeted sentence structures as predicted by the Unified Model (MacWhinney, 2013) and the cue readjustment model suggested by Ellis (2006), the question still remains whether this can be taken as an evidence of progressive readjustment of the linguistic cues from lexico-semantic to word order in L2 English. In line with SDAM (Dong et al., 2005), we can propose that this data indicates the phase of convergence of linguistic representations from L1 and L2 rather than separation of specific characteristics of L1 and L2 because participants were gradually becoming more prepared to use animate/inanimate sentence subjects to represent animate/inanimate agents instead of using an altogether different type of sentence structure. However, participants were not yet at a stage where their cue readjustment in L2 would lead to a significant change in the animacy effect with an increase in their proficiency. The performance of simultaneous bilinguals indicated that a balanced representation between the two languages would result in animacy effect of equal size across the languages.

The fact that translators did not produce a higher number of correct sentences with inanimate subjects than advanced sequential bilinguals might indicate that the specific training they received was not enough to ensure the correct use of animacy weighting in the L2. It is possible that during their training, translators did not receive specific training in motion event lexicalisation patterns. Additionally, given that translators usually translate from their L2 into their L1 (Hatim, 2014), it is possible that the focus on form received during their training did not influence L2 production.

The analysis performed only on grammatically correct sentences showed rather different results. The effect of animacy was observed for neither of the languages nor for any levels of proficiency indicating that participants were equally capable of producing grammatically correct sentences in both languages and that when they were allowed to use other forms instead of producing sentences with an inanimate subject they were doing so successfully. In addition, sentence accuracy increased with an increase in the proficiency level in both languages. The increase in production of grammatically correct sentences with an increase in the proficiency level was expected as the ability to produce grammatically correct sentences should reflect participants' knowledge of grammar in their L2. However, an unexpected reverse effect of animacy was observed for simultaneous bilinguals where they produced higher number of grammatically correct sentences with inanimate subjects than with animate subjects in French while the opposite was the case in English (see Figure 3). We are unsure of the source of reversal of this effect.

The observed difference between the number of expected/targeted sentences and grammatically correct sentences could have been a result of picture constructions. To avoid this, all pictures were piloted with native speakers of French and English and following that procedure several pictures were adjusted to better represent intended events. If the effects were indeed due to picture construction, these effects should be relatively random and

influence all groups of participants. However, the interaction between the language and animacy was observed only for sequential and not for simultaneous bilinguals, and in particular only for L1 French/L2 English speakers. These effects are in line with what was expected on the basis of models of bilingual language acquisition and mental representation of L1 and L2 (Dong et al., 2005; Ellis, 2006; MacWhinney, 2005; 2013; Pavlenko, 2009).

The qualitative analysis revealed that many sentences that were grammatically correct, but did not correspond to the targeted structures, used a passive construction. This is in line with previous findings indicating that speakers favoured inanimate entities as subjects in passive sentences (Ferreira, 1994). The passive construction enabled participants to infer or even specify an animate entity absent from the pictures. Given that caused motion implies the idea of force, which can emanate from an agent or a natural force (Alexiadou & Schäfer, 2006; Cruse, 1973; Grimm, 2007), this finding suggests that when faced with inanimate agents in elicitation pictures participants used passive constructions to be able to include animate agents or natural forces while describing caused motion events. A number of studies have indicated that arguments compatible as causers vary across languages (Achard, 2002; Wolff, Jeon, Klettke, & Li, 2010; Wolff, Jeon & Li, 2009). It is, thus, possible that verbs of motion are more constraining in the arguments they allow in French than in English. It would be valuable for further research to examine whether this is specific for verbs of motion and how restraining it is.

Previous studies indicated that English accepts a wider variety of external arguments as a sentence subject than Romance languages like French. In particular, this refers to inanimate agents in causative constructions (Folli & Harley, 2005, 2007, 2008). This raises the possibility that French is more constraining than English in the way arguments are licensed by verbs of motion when describing caused motion. Results of the current study suggest that for sequential bilinguals with L1 French L2 English it was difficult to associate

motion verbs with inanimate entities, specifically with caused motion events. This could be the case because such utterances are not frequent in French (Hickmann & Hendriks, 2010). The finding suggests that animacy has a heavier constraining effect on verbs of motion for French speakers learning English L2 than English speakers learning French L2. This is in line with previous research indicating that French is more restrictive in the causers it allows (Achard, 2002; Folli & Harley, 2008). We can hypothesise that this restrictiveness of French with respect to potential causers of motion contributed to sequential bilinguals with L1 French/L2 English reverting to strategy of using personal pronouns as subjects in their L2 instead of an inanimate subject even though no animate agent was represented in the picture (see sentences (11) and (12)).

In some instances, sequential bilinguals with English L2 opted for impersonal pronouns instead of using an inanimate sentence subject. These constructions are more frequent in French than in English and are often used instead of passive constructions (Hurford, 1994). Impersonal pronouns were produced in both English L2 and French L2, however, this trend was more pronounced in English L2. Given that ‘on’ *one* is often used in French instead of a passive construction and can be translated by an active construction using ‘someone/one’ or ‘we’ in English, the use of impersonal pronouns could indicate that sequential bilinguals with English L2 used them as a way to convey structures they would have produced in their L1 French. In addition, the fact that sequential bilinguals with L2 English produced static descriptions instead of describing displacement could be an indication of L1 transfer into the L2. Previous research has shown that static descriptions are more common in French than English (Hickmann, 2007; Hickmann & Hendriks, 2010; Slobin, 1996).

Comparison of sentence productions by simultaneous and sequential bilinguals indicated that simultaneous bilinguals were equally constrained in using inanimate agents as

sentence subjects in both languages. At the same time, L1 French/L2 English sequential bilinguals were less prepared to use inanimate agents as subject than L1 English/L2 French sequential bilinguals. On the basis of these results we can hypothesise that acquiring simultaneously two languages with a different degree of constraint for the use of inanimate sentence subjects led to a common representation of the function of sentence subject with a general preference for animate entities as agents in motion events. This results in setting the level of constrain for using inanimate agents at the level of the more flexible of the two languages, in this case English rather than French. This pattern appears to be the same for sequential bilinguals who first acquired English language which is less restrictive with respect to use of inanimate sentence subjects followed by acquisition of French as L2 that is more restrictive. On the other hand, native French speakers who had first acquired more restrictive use of inanimate agents as subjects in sentences representing motion events seem to find it difficult to abandon the more restrictive reliance on lexico-semantic cue in order to adopt more flexible word order cue when assigning sentence subjects. For this group of sequential bilinguals, we can hypothesise that the original representation of sentence subject formed through the use of more restrictive language with respect to the use of inanimate sentence subjects does not merge with the representation of their more flexible L2 English. The original reliance on lexico-semantic cue when assigning function of sentence subject in L1 French seems to be difficult to shift and is therefore transferred to L2 English.

The study had several limitations that could be improved in further research. The study included only 6 verbs and also involved sentences that represented different types of motion events. We used only those verbs that were translational equivalents in English and French and had equivalent syntactic structures to avoid random influence of those factors. Further limitation refers to the use of static pictures to indicate motion events. Although we used arrows to indicate the direction of movement, the results of the current study should be



compared with sentences elicited by a dynamic presentation of motion events. The results should be further compared to sentence productions of monolingual speakers as this could lead to important insights about representation and use of linguistic cues in L1 and L2. Furthermore, we did not control for the amount of time participants spent in either monolingual or bilingual mode (Grosjean, 1998). All sequential bilinguals lived in the country of their L2 at the time of testing which might indicate significant amount of time spent in bilingual mode, however, this was not explicitly measured. Given that perceptual learning might be involved in cue readjustment, these factors could have influenced our results.

### **Conclusion**

All groups of participants showed strong preference for using animate versus inanimate sentence subjects when describing motion events. While the animacy effects were of similar size in L1 English/L2 French sequential bilinguals and in both languages in simultaneous bilinguals, this effect was significantly larger in L1 French/L2 English sequential bilinguals. In addition, an effect of proficiency was also only observed in this group indicating that they progressively adopted targeted sentence structures with both animate and inanimate sentence subjects in their L2. The findings suggest that common sentence subject representation based on more flexible word order cue is adopted when the language that dominantly uses this cue is acquired before or simultaneously with a more restrictive language. However, when a more restrictive language utilising lexico-semantic cue is acquired first, the more restricted approach to licensing an inanimate sentence subject is preserved and transferred to more flexible L2. Systematic training received by translators did not seem to facilitate L2 acquisition of more flexible word order cue weighting. However, further research is needed to collect empirical and observational data from different learning environments.

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## Appendix 1

Verbs and syntactic frames with animate and inanimate subjects targeted in English and French

## Animate subjects

English	French
The man is going to the house	L'homme va à la maison
The man is going to the swimming pool	L'homme va à la piscine
The man is going to the train station	L'homme va à la gare
The man is going to the river	L'homme va à la rivière
The man is going into the office	L'homme va dans le bureau
The man is going into the garden	L'homme va dans le jardin
The man is going into the park	L'homme va dans le parc
The man is going into the shop	L'homme va dans le magasin
The man is slipping off the water	L'homme glisse de la chaise
The man is slipping off the table	L'homme glisse de la table
The man is slipping off the step	L'homme glisse de la marche
The man is slipping off the cliff	L'homme glisse de la falaise
The woman is climbing up the wall	La femme grimpe au mur
The woman is climbing up to the ceiling	La femme grimpe au plafond
The woman is climbing up the fence	La femme grimpe au grillage
The woman is climbing up the pole	La femme grimpe au poteau

The woman is carrying suitcases	La femme porte les valises
The woman is carrying a baby	La femme porte un bébé
The woman is carrying a dog	La femme porte un chien
The woman is carrying a bag	La femme porte un sac
The boy is coming out of the cinema	Le garçon sort du cinéma
The boy is coming out of the theatre	Le garçon sort du théâtre
The boy is coming out of the shop	Le garçon sort du magasin
The boy is coming out of the office	Le garçon sort du bureau
The boy is falling off the chair	Le garçon tombe de la chaise
The boy is falling off the motorbike	Le garçon tombe de la moto
The boy is falling off the table	Le garçon tombe de la table
The boy is falling off the beam	Le garçon tombe de la poutre

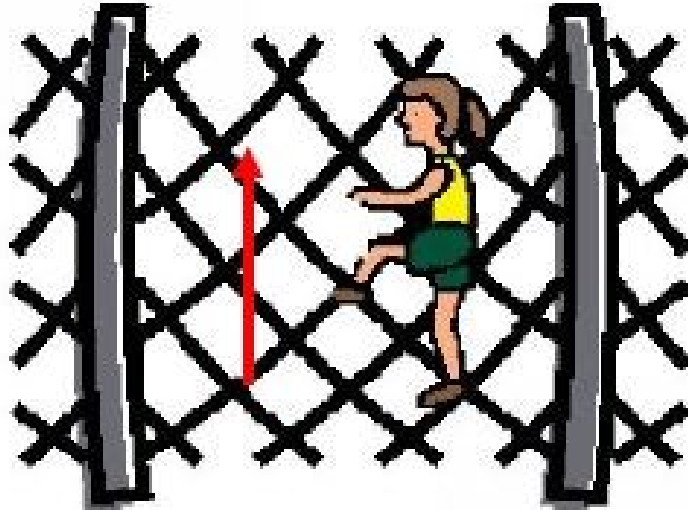
## Inanimate subjects

English	French
The road goes to the house	La route va à la maison
The path goes to the sea	Le chemin va à la mer
The train goes to the train station	Le train va à la gare
The road goes to the river	La route va à la rivière
The books go into the bag	Les livres vont dans le sac
The shoes go into the press	Les chaussures vont dans le meuble
The coins go into the purse	Les pièces vont dans le porte-monnaie
The biscuits go into the cupboard	Les biscuits vont dans le placard
The soap is slipping off the bathtub	Le savon glisse de la baignoire
The coat is slipping off the chair	Le manteau glisse de la chaise
The blanket is slipping off the chair	La couverture glisse de la chaise
The soap is slipping off the sink	La savonnette glisse de l'évier
The plant climbs up the wall	La plante grimpe au mur
The car is climbing up to the top	La voiture grimpe au sommet
The plant climbs up the trellis	La plante grimpe au treillis
The road climbs up to the top	La route grimpe au sommet
The wind is carrying the ball	Le vent porte le ballon
The wind is carrying the newspaper	Le vent porte le journal
The wind is carrying the trunk	Le train porte le tronc
The wind is carrying the bag	Le vent porte le sac

The bike is coming out of the garage	Le vélo sort du garage
The cake is coming out of the oven	Le gâteau sort du four
The dish is coming out of the fridge	Le plat sort du frigo
The coat is coming out of the cupboard	Le manteau sort du placard
The book is falling off the chair	Le livre tombe de la chaise
The apple is falling off the stall	La pomme tombe de l'étalage
The photo is falling off the table	La photo tombe de la table
The phone is falling off the table	Le téléphone tombe de la table

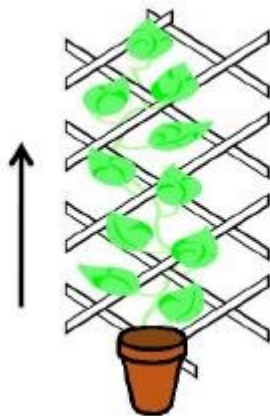


Appendix 2: Samples of pictures used to elicit sentence production.



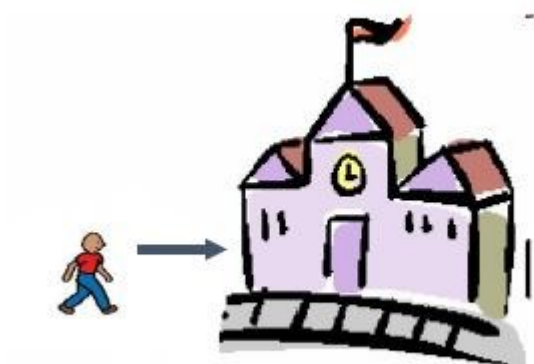
A woman is climbing up the fence

Une femme grimpe au grillage



A plant climbs up a trellis

Une plante grimpe au treillis



A man is going to the train station

Un homme va à la gare



A train is going to the train station

Un train va à la gare



A man is going to the house

Un homme va à la maison



A road goes to the house

Une route va à la maison