Event construal in the auditory and visual modalities:

A crosslinguistic study of placement events in Mandarin Chinese and German

Vera Trojansky

Supervisors: Professor Marianne Gullberg, Professor Michael Schoenhals
Centre for Language and Literature, Lund University
MA in Language and Linguistics, Specialisation Chinese
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Abstract

This study investigates whether event construal of placement events varies between Mandarin Chinese and German speakers by comparing how native speakers of the respective languages speak and gesture about placement events. It has been argued that there are universal constraints on how languages encode placement events. However, languages arguably differ in their semantic divisions of placement events. Whether those differences in semantics lead to a language-specific event construal has been debated. Since speech alone cannot provide sufficient answers, gestures are suggested to give additional information about language-specific event construal. To test how the two languages differ in event construal, an empirical study was conducted of speech and speech-accompanying gestures testing how the two variables gestural temporal alignment with speech and handshape of gestures might inform the view on event construal. Data on speech as well as gestures was elicited in a director-matcher task for both languages. Based on previous studies and theoretical considerations, it was predicted that gestures would differ across languages with regard to handshapes and alignment with speech. The results show that for temporal alignment of gestures, both languages behave similarly, mainly aligning with locative expressions. However, they differ in handshapes, with German targeting information about end configuration of the object and its end location and Chinese targeting information about the object being placed and its end location. In conclusion, the study shows that there are subtle differences in event construal between German and Mandarin Chinese speakers.

Keywords: placement verbs, gestures, German, Mandarin

Acknowledgments

Table of contents

List of figures

List of tables

Abbreviations

ACC	accusative
BA	把ba3
CL	classifier
COMP	complementiser
DUR	durative aspect (zhe)
GEN	genitive
GER	gerund
LOC	locative phrase
NP	nominal phrase
O	direct object
PFV	perfective aspect (le)
PRF	perfect
PRS	present
PST	past
PTCP	participle
RVC	resultative verb compound
S	subject
SG	singular
V	verb
VP	verb phrase
3	third person

Note: for Chinese, the glossing conventions in Li & Thompson (1981) were followed. In examples taken from sources the glossing follows the one in the original, even if this does not follow the Leipzig Rules of Glossing. Leipzig Rules of Glossing were modified where this seemed sensible.

1. Introduction

1.1 Aims of the study

This thesis aims to contribute to our understanding of crosslinguistic event construal by empirically investigating German and Mandarin Chinese[1] native speakers' speech and speech-accompanying gestures in the domain of placement events. It is also, to my knowledge, the first attempt to date to investigate Mandarin Chinese speakers' gestures about placement events.

A traditional question in linguistic typology is whether there are generalities that all languages attend to, and how far languages differ in their structures. There seems to be agreement that at least to some extent, languages differ in how they encode certain events, and studies in previous decades have explored such crosslinguistic differences in speech. This observation leads to the question of how far mental concepts might be influenced by structures that the native language provides to verbalize them, and to what extent languages differ in event construal. Recently, studies have started to investigate whether speech-accompanying gestures, which are closely connected to speech, can provide insights into event construal that go beyond what spoken or written language alone can account for (Gullberg, 2009; Kendon, 2004, Kita & Özyürek 2003, McNeill, 1992). Information in gestures is linked to semantic as well as to syntactic properties of languages and gestures have been shown to include information that is not included in speech. They can therefore provide researchers with clues to aspects of event construal that speech alone cannot.

A domain that has gained a lot of attention is the domain of motion events, that is, the description of movements in space. Languages typically differ in their encoding of motion events with regard to the expression of semantic elements such as path and manner of motion (Talmy, 1991). The domain that will be of interest in the current study will be caused motion, and specifically placement events. Because motion events are basic events that occur in all cultures and have a shared biological foundation, it has been suggested that there are universal constraints that lead to similar verb semantics across languages (Pinker, 1989). However, there is considerable crosslinguistic variation in how languages encode these events (Narasimhan, Kopecka, Bowerman, Gullberg & Majid, 2012), and the question is still open as to whether that variation reflects differences in event construal. The two languages that will be investigated in the current study show differences in their encoding of placement events in several aspects, including

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[1] Mandarin Chinese refers to the national language in the People's Republik of China and the Republic of China (Taiwan). This standard language is based on Northern Chinese dialects regarding its pronounciatin, grammar and vocabulary (Li & Thompson, 1981).

verb semantics and syntactic constructions. While German has three posture verbs, Chinese mainly uses a semantically light verb. Another difference between the languages is that in Chinese, placement events can involve verb compounds, while in German there is one main verb that carries all the semantic information. Lastly, the languages differ in sentence structure, with Mandarin typically using so-called BA-constructions to encode placement events. In German SVO structures or variations (OVS, VSO) are typically used to talk about placement. Since previous studies in the visual modality have revealed differences in gestural behaviour for languages that vary in placement verb semantics, and since there are remarkable differences in how Mandarin Chinese and German encode placement events, an empirical study could probe in how far those differences in speech are reflected in the visual modality, and ultimately, whether we might talk about differences in event construal across the languages. Previous studies have shown that Mandarin Chinese speakers gesture differently than speakers of English, Spanish and Japanese regarding frequency, temporal alignment of gestures relative to speech, and content that gestures express in the field of voluntary motion (Brown & Chen, 2013; Duncan, 1996; McNeill & Duncan, 2000). It is therefore tempting to explore whether this is also true for the field of caused motion events.

The current study therefore seeks to answer the following research questions:

Do Mandarin Chinese and German differ in their event construal of placement events? More specifically:

Do gesture behaviours in Mandarin Chinese and German differ as a function of differences in verb semantics and sentence construction?

To answer the research question, an empirical study will be conducted. Its aim is to elicit speech and gesture data from native German and native Mandarin Chinese speakers. The design is based on a previous study by Gullberg (2002). An analysis of speech as well as speech-accompanying gestures can then provide information about what aspects of a placement event speakers of the two languages in question attend to, and thus will shed light on whether there is a difference in the event construal of placement events in Mandarin Chinese and German speakers.

1.2 Disposition

The thesis is structured as follows: there are five main chapters. Chapter 2 explains the theoretical background of the paper. Chapter 3 subsequently presents the current empirical study. Chapter 4 provides the results and Chapter 5 the discussion. Chapter 2 consists of three sections. Section 2.1 will

build the frame of the thesis, introducing theoretical considerations about crosslinguistic event construal, as well as give an overview of empirical studies within the field. Section 2.2 will then introduce placement events, the linguistic domain of interest in the thesis. It will do so in general, for German and for Mandarin Chinese taking into consideration verb semantics and sentence constructions. In the last section 2.3 a theoretical background and empirical evidence for gesture and speech as an integrated system are presented and a short literature review of crosslinguistic studies including the visual modality is provided. Chapter 3 is divided into two sections. Section 3.1 introduces and motivates the research question. Section 3.2 outlines the method of the current study and provides information about participants, stimuli and procedure. Chapter 4 presents the results for speech in 4.1 and gesture in 4.2. Chapter 5 contains the discussion and is divided into three sections where section 5.1 will provide a discussion of the results of the current study and their implications. Section 5.2 discusses the design of the study critically, and finally conclusions and an outlook are presented in section 5.3.

2. Theoretical background
2.1 Event construal

In the following, the paper presents the theoretical assumptions as well as empirical studies that contribute to the idea that there are differences in event construal between languages. *Thinking-for-speaking*, Talmy's typology of motion events, and empirical studies on voluntary and caused motion are presented in turn.

2.1.1. Crosslinguistic differences and their consequences

Typological studies in linguistics are concerned with how languages behave similarly and differently in their encoding of meaning and events. Domains that are rooted in human perception (e.g. spatial relationships or colours) have gained a lot attention since generalities in encoding are most likely to occur here. Although there are certain regularities in how languages encode events, there are also crosslinguistic differences, for example, in the domain of motion events, which will be the example domain in this study. Whether those differences then represent differences in the mental concepts or event construals of speakers of different languages is debated. According to one view, the mental concept is not influenced by linguistic properties of the language but determined by innate or environmental constraints (Jackendoff, 1992; Pinker & Prince 1988). This view suggests that mental concepts reflect the *same* aspects of an event in all languages. Innate constraints can be understood as a

universal grammar shared by all humans, while environmental constraints would arise through perception. According to that view, the mental concept that is being established is based on what we perceive, and since humans all share the same perception apparatus, the mental concept should also be the same (see Narasimhan, Kopecka, Bowerman, Gullberg & Majid, 2012: 1 for a discussion of this view). This is especially argued to be true for motion language since motion events are based on spatial perception that is biologically determined and the same for all humans. However, this stands in contrast to the considerable variation languages show in verbalizing motion events (cf. 2.1.2). An opposing view therefore assumes that in verbalizing events, languages make speakers attend to *different* aspects of the same event. To generate an utterance, according to Slobin (1987), involves on the one hand conceptualizing the event by choosing relevant characteristics to describe it, and on the other hand choosing the characteristics that "are readily encodable in the language" (Slobin, 1987: 435). Since languages differ in the means they provide for encoding, the habit of choosing those elements then influences what aspects of an event are part of the event construal a speaker of a certain language has in a given communicative context. In this process, language shapes *thinking-for-speaking* (Slobin, 1996). This is a more process-focused version of linguistic relativity that does not assume that thinking is shaped by language in general (Slobin, 1996). Instead, it concerns the thinking that is involved in the speech production process (Slobin, 1996).

2.1.2 An example: Motion and verb- and satellite-framed languages
In one of the most well-known attempts in semantic typology, Talmy (1985) introduces the idea that languages fall into one of two groups concerning how they express motion, verb-framed versus satellite-framed languages. The distinction between verb- and satellite-framed languages is based on their differences in packaging and mapping meaning elements of manner and path onto morphosyntactic structures in motion events (Talmy, 1985). Generally, motion events involve the elements of an agent, a figure, a ground, motion, manner of motion, path of motion, and cause of motion (Talmy, 1985). In verb-framed languages like Spanish path is expressed in the main verb root.

(1) **Sal-e**   *vol-ando*
   exit-3SG-PRS   fly-GER

   path   **manner**

 'He exits flying'

(Özyurek, Kita, Allen, Furman & Brown, 2005: 220).

In satellite-framed languages such as English path is expressed by a so-called satellite, whereas the main verb instead expresses manner of motion.

(2) **He walk-ed**   *down the road.*
   3SGwalk-PST   down the road.

   manner   **path**

In verb-framed languages manner is instead expressed in a subordinate clause.

(3) *La botella*   **entr- ó**   *flotando*   *a*   *la*   *cueva.*
   the bottle   enter- 3SG-PST   float-GER   into   the   cave.

                     path   **manner**

 'The bottle floated into the cave'

(Talmy, 1991: 488).

In satellite-framed languages manner is expressed in the main verb root, as already seen.

(4) *The bottle*   ***floated***   *into*   *the cave*

                                          manner   **path**

(Talmy, 1991: 488).

Importantly, verb-framed languages may leave out manner altogether rather than use a subordinate form to express it, whereas manner is very common in satellite-framed languages, since it is expressed in the main verb root.

Talmy's binary categorization has been argued to not sufficiently capture differences between languages (Beavers, Levin & Tham, 2009; Slobin, 2004; Zlatev & Yangklang 2004). Slobin (2004) proposed adding a third group to Talmy's (1985) original typology, that includes equipollently-framed languages like Mandarin Chinese where manner and path are encoded in verb compounds (Chen, 2010; Chen & Guo, 2008; Slobin, 2004). It has further been proposed that Talmy's distinction is better understood as a

continuum, where languages vary in their productivity of either verb-framed or satellite-framed structures (Narasimhan, Kopecka, Bowerman, Gullberg, & Majid, 2012). Still, Talmy's typology is important for our analysis of placement events and to gain a better understanding of studies in the visual modality that have explored voluntary motion often based on Talmy's typology.

2.1.3 Crosslinguistic studies on voluntary motion

There have been a large number of empirical studies that have investigated how speakers vary in their encoding of motion events. We report here on a subset that are also relevant to the visual modality. Many of these studies have focused on a prediction based on Talmy and Slobin to the effect that speakers of verb-framed languages may express less manner than speakers of satellite-framed languages, which in turn might mean that they attend to different aspect of an event and have a different event construal. Analyses therefore target the amount of encoding of path versus manner across examined languages. Kita & Özyürek (1999) conducted a study to explore differences between verb-framed and satellite-framed languages. They found differences in English (satellite-framed) and Turkish (verb-framed) speakers' speech as well as speech-accompanying gestures. While English speakers expressed motion events in one verb-clause expressing both path and manner (e.g. *the cat rolls down*), Turkish speakers used two verbal clauses one expressing path, the other manner (e.g. *it rolling descends*). McNeill & Duncan (2000) explored differences in Spanish, English, and Mandarin Chinese speakers and found that Spanish speakers were less likely to encode manner in speech than English and Mandarin speakers. English and Mandarin speakers patterned similarly in their encoding of path and manner. Another study on voluntary motion compared English, Japanese, and Mandarin Chinese speakers (Brown & Chen, 2013) to probe whether there is evidence for a three-fold typology of motion events that adds equipollently-framed languages to Talmy's (1985) original typology (cf. Slobin, 2004). That study finds that English and Chinese speakers encode manner in speech significantly more often than Japanese speakers. In this respect, satellite- and equipollently-framed languages seem to behave similarly. Duncan (2006) found conflicting results in her study. She compared how English, Spanish, and Mandarin speakers encoded manner in motion events and found for speech that Mandarin speakers described manner more often than English and Spanish speakers who described it even less often. We next turn to another sub-domain of motion events, namely caused motion and more specifically, to placement events.

2.2 Placement events

Since the domain of interest in the current study is placement events and their verb semantics, this section attempts to first, describe the domain of placement events in general, some crosslinugistic findings, and finally, to outline how German and Mandarin encode placement events, with a focus on the verb semantics as well as sentence structures they use.

2.2.1 General and some crosslinguistic findings

As shown in section 2.1.2, voluntary motion events have received a lot of attention in typology studies. Another domain of motion is caused motion, where an agent causes a figure to move rather than moving themselves. A further subdomain of caused motion are placement events. Placement events typically involve semantic information about agent, figure, ground and motion. We will follow Talmy's (1985) original typology in the following: we adopt the definition of agent as the entity that causes motion, the figure as the entity that undergoes the movement, and ground as the location in relation towards which the motion takes place. Motion in the following will refer to the general motion the figure undergoes. The notion of path will not be adopted since in the case of placement events information about path is implicitly encoded in the information about the placing itself but not necessarily foregrounded in the sense of trajectory of motion or motion in relation to the speaker.

There have been several crosslinguistic studies on placement events. Placement events are different in the way from voluntary motion events in that they include an agent that causes the motion. The studies on caused motion events have focused on the semantics of placement verbs, since there is considerable variation between languages in this sub-domain as well, as documented in a large-scale study of 19 languages (Narasimhan, Kopecka, Bowerman, Gullberg & Majid, 2012; see figure 1).
Gullberg (2011a) compared French and Dutch speakers. While in French, there is a general verb *mettre* 'put', Dutch differentiates between two different posture verb *zetten* 'set' and *leggen* 'lay'. In Dutch the appropriate verb form depends on whether the object ends up in a vertical or horizontal position as well as on what its natural position would be (Alferink & Gullberg, 2014). The speech results showed the expected difference. French speakers mainly used general verbs, whereas Dutch speakers used different posture verbs. Other studies have investigated English speakers (Hoetjes, 2008). English, like French, has one general verb to express placement events. The findings for speech were that English speakers predominantly use the general verb *put*. Gullberg (2009) showed similar results for native English

speakers who predominantly used the general verb *put*. For English speakers of Dutch as a second language she found that *zetten* 'set' was used most frequently and the general verb *zijn* 'to be'. In an unpublished study, Gullberg (2011b) investigated German speakers. She found that in German, like in Dutch, speakers predominantly use posture verbs. Thus, empirical evidence provides support for the assumption that languages show a stark crosslingustic variety in their encoding of voluntary and caused motion events.

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Figure 1: Languages examined showing crosslinguistic variation in the expression of placement

(Taken from Gullberg, 2011b).

2.2.2 German placement events

In German placement events typically encode information about agent, figure, motion and ground. German belongs to the Germanic language family. Languages of that family (with the exception of English) have posture verbs to describe placement events (Alferink & Gullberg, 2014). Those posture verbs encode information about cause and change of location, and information about the figure as well as its end position in relation to the ground. German has three posture verbs *setzen* 'set', *stellen* 'stand', *legen* 'lay' (Berthele, 2012:5). The choice of the specific verb is dependent on the end position of the figure in relation to the ground and on characteristics of the figure that undergoes the movement.

German can thus be characterized as a "positional verb language" (Kutscher & Schultze-Berndt, 2007).

Posture verbs are semantically rich and thus differ from general verbs such as *put* in English.

The following examples illustrate the German use of posture verbs:

For objects that end in an upright position *stellen* 'stand' is used.

(5) *Er*	*stell-t*	*das*	*Buch*	*auf*	*den*	*Tisch*.
3SG	put-PST-SG	the-ACC	book-ACC	on	the-ACC	table-ACC

'He stands the book on the table'

For objects that end in a side position or for objects that are much wider than high *legen* ('lay') is used.

(6) *Er*	*leg-t*	*die*	*Decke*	*auf*	*den*	*Tisch*.
3SG	put-PST-SG	the-ACC	cloth-ACC	on	the-ACC	table-ACC

'He lays the cloth on the table'

Finally, *setzen* 'set', which is used the least frequently of all three forms, refers to an animate object ending up in a seated position, while for inanimate objects the figure ends in a fit situation (see Berthele 2012:8).

(7) *Er*	*setz-t*	*das*	*Baby*	*auf*	*den*	*Tisch*.
3SG	put-PST-SG	the-ACC	baby-ACC	on	the-ACC	table-ACC

'He sets the baby on the table'

There are also more specific verbs in German that include information about the manner of placing something. Those are, for example, used in situations in which the figure is in a tight fit situation after the placing (*stopfen, stecken*).

(8) *Sie*	*stopft*	*ein*	*Handtuch*	*in*	*die*	*Tasche*.
3SG	stuff-PST-SG	a-ACC	towel-ACC	in	the-ACC	bag-ACC.

'She stuffs a towel in the bag'

(9) *Diesen*	*Ball*	*steckt*	*sie*	*in*	*die*	*Schublade*.
this-ACC	ball-ACC	stick-PST-SG	3SG	in	the-ACC	drawer-ACC

'She sticks that ball in the drawer'

However, posture verbs are used more frequently (Berthele, 2012). Posture verbs are three valence verbs in German and require an agent, a figure, and a locative. In German, the agent of the action is typically encoded in the form of a nominal phrase. In an active phrase this is the grammatical subject as well. The figure is encoded in a nominal phrase that is the grammatical direct object of the sentence. The ground is encoded in a prepositional phrase.

Concerning its word order, German is flexible. In the present tense the finite verb is in the second position in a main clause (Gerdes & Kahane, 2001), either following subject, object, conjunction or an adverbial. On a semantic level the subject is typically the agent, the figure the object, and the ground an adverbial or prepositional phrase. There are no special sentence constructions that are used commonly in German to encode placement events.

2.2.3 Mandarin placement events

2.2.3.1 Verb constructions

In the following description of Mandarin Chinese, we will draw on suggestions made by Chen (2010) but also add other instances of placement events to her model. Those are partly based on Li & Thompson (1981) as well as on my own considerations. In Mandarin Chinese, there are different ways of encoding placement events that include information about different aspects of the motion event. Those differences are caused by verbs and co-verbs. In general, a verb phrase in Chinese can encode information about cause and change of location, about the orientation of motion, the trajectory of motion, as well as about the end configuration of the figure in relation to its ground. There appear to be four main ways that vary in which of those elements they encode.

Firstly, a verb compound can encode information about the cause and change of location as well as about the trajectory and orientation of motion. When this is the case, the information about cause and change of location is encoded in the first verb of the compound (V1), while information about the trajectory of motion is encoded in the second verb of the compound (V2). A third verb in such a construction can encode deictic information that encodes orientation of motion (Chen: 2010)[2]. The first verb in the verb compound typically consists of a semantically light verb (放 *fang4*) similar to the English *put* (Chen, 2010). Like in (10) the second verb encodes the trajectory of motion. As indicated in table 1, the verbs encoding trajectory of motion are limited and only consist of eight different verbs: 上 *shang4* 'up', 下 *xia4* 'down', 进 *jin4* 'in', 出 *chu1* 'out', 过 *guo4* 'cross', 回 *hui2* 'return', 走 *zou3* 'be away' and 起 *qi3* 'rise' (following Chen 2010). The verbs containing deictic information are also limited only consisting of two verbs 来 *lai2* 'come', indicating a motion towards the agent, and 去 *qu4* 'go'

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[2] Note that Chen refers to the elements V2 and V3 as verbs. It is important to note however that the classification of those elements is not straightforward. They have properties of prepositions as well as verbs. They have therefore been suggested to be labeled as 'coverbs' by other authors (Li & Thompson, 1981). In this analysis, the terms of the original sources are applied.

indicating a movement away from the agent. Each verb is a full verb and could be used independently in other constructions (see Chen 2010: 35). The third verb is optional and regularly omitted in spoken language.

(10) 他   把   裤子   放   进   抽屉 里。
      tā   bǎ   kùzi   fàng   jìn   chōuti lǐ
      3SG   BA   trousers-SG/PL put   enter   drawer inside

'He puts the trousers in the drawer'

Table 1:Mandarin Path Verbs and Their Combinations

V2/ V3	*lai2 'come'*	*qu4 'go'*
shang4 'ascend'	*shang4-lai2* 'ascend-come' (come up)	*shang4-qu4* 'ascend-go' (go up)
xia 'descend'	*xia-lai2* 'descend-come' (come down)	*xia-qu4* 'descend-go' (go down)
jin4 'enter'	*jin4-lai2* 'enter-come' (come in)	*jin4-qu4* 'enter-go' (enter)
chu1 'exit'	*chu1-lai2* 'exit-come' (come out)	*chu1qu4* 'exit-go' (go out)
hui2 'return'	*hui2-lai2* 'return-come' (come back)	*hui2qu4* 'return-go' (return)
guo4 'pass'	*guo4-lai2* 'pass-come' (come over)	*guo4qu4* 'pass-go' (go over)
zou3 'be away'	-	-
qi3 'rise'	*qi3-lai2* 'rise-come' (come up)	-

(Taken from Chen, 2010: 36).

A second way to encode placement events in Mandarin Chinese is to encode information about the cause and change of motion but not about the trajectory. For example, the general verb 放*fang4* 'put' can be followed by a locative phrase only. Ground is encoded in a locative phrase that subsequently follows the

verb. It is introduced by the co-verb 在*zai4* 'at' which is followed by a noun phrase and a locative particle that "specifies a spatial relationship" (Li & Thompson, 1981: 391). The locative phrase then encodes information about the location of the direct object as a result of the verb of the sentence (Li & Thompson, 1981).

(11)	他	把	被子	放	在	桌子	上。
	tā	*bǎ*	*bèizi*	*fàng*	*zài*	*zhuōzi*	*shàng*
	3SG	BA	cup-SG/PL	put	at	table	on

'She puts the cup on the table'

The third option to encode placement events is very similar to the one in *(11)* but instead of the co-verb 在*zai4* 'at', the co-verb 到*dao4* 'arrive' is used. Although 到*dao4* 'arrive' does not encode specific information about the trajectory of motion, it stresses the goal orientation of the movement. Finally, there are also cases in which more specific verbs than 放*fang4* 'put' are used. They then include information about the cause and change of location and/or about the trajectory of motion or the end configuration of the object in relation to the ground. However, 放*fang4* 'put' is used in the majority of cases (Chen 2010).

(12)	她	把	毛巾	塞	到	包	里。
	tā	*bǎ*	*máojīn*	*fàng*	*dào*	*bāo*	*lǐ.*
	3SG	BA	towel-SG/PL	squeeze	arrive	bag	inside

'She stuffs the towel into the bag.'

2.2.3.2 The BA-construction

In Chinese, the construction that is most frequently used to encode placement events is the so-called BA-construction. It has gained a lot of attention among scholars because it is different from the default SVO construction in Chinese (Huang, Li & Li: 2009). In the BA-construction the object is put into a pre-verbal position (Thompson, 1973) that is preceded by the morpheme 把*ba3*. In a BA-construction the BA and the direct object it takes build the argument of the verb. The particle 把 *ba3* indicates that the object is manipulated in some way (Chen, 2010). The direct object that can occur in a BA-construction is either generic or definite (Li & Thompson, 1981). 把*ba3* in Classical Chinese had the

meaning 'to hold', this meaning is strongly weakened in modern Mandarin where it has been grammaticalized (Chen, 2010). "The referent of the BA NP usually receives a reading of being disposed of, dealt with, manipulated or handled, and, thus, affected by the action denoted by the VP in the clause" (Chen, 2010: 34).

2.2.3.3 SVO-construction and OSV-construction

In Chinese, the canonical word order is SVO (Li & Thompson, 1981). However, the language provides flexibility in its sentence structure. OSV structures also commonly occur (Huang, Li & Li: 2009, Li & Thompson 1981). In OSV-sentences, the object is interpreted as definite when the nominal is not marked (Huang, Li & Li 2009). On the semantic level, OSV structures "set a framework in naming what the sentence is about" (Li & Thompson, 1981). OSV structures have been suggested to be best described as topic-comment structures in which the comment introduces new information that modifies the topic that is already known in discourse. Hence, in our analysis the term topic-comment-structure will refer to sentences in which the object has a sentence initial position, is interpreted as definite and on a semantic level fulfills the criteria of "aboutness".

In conclusion, German and Mandarin vary in several aspects of their encoding of placement events. Firstly, in German the verbs most frequently used (*setzen* 'set'*, stellen* 'stand'*, legen* 'lay') include a lot of semantic information about the figure itself as well as about the figure's end configuration in relation to the ground. In Chinese specific verbs exist, but in the majority of cases the general verb 放*fang4* 'put' is used. Furthermore, in Chinese different verb phrases can be used to encode information about motion that varies in what aspects of the motion are verbalized. German and Mandarin Chinese further vary in their sentence structure. In Mandarin Chinese, BA-constructions are typically used to encode placement events, while in German, SVO constructions are used. The question remains whether these differences in encoding options also reflect differences in event construal among speakers of German and Mandarin Chinese. We now turn to gestures as a means to probe that issue.

2.3 Gesture and speech: an integrated system

As outlined previously, languages differ in their encoding of events in the auditory modality. Whether those crosslinguistic differences reflect differences in event construal, is however still debated. Gestures and speech are an integrated system through which meaning is conveyed in two modalities. Gestures have been shown to semantically and syntactically mirror elements of language (Gullberg, 2011a; Kita

& Özyürek, 1999). They furthermore have been shown to contain information that is absent in speech and to be an important modality when it comes to spatial descriptions (Gullberg, 2011a; Kendon, 2004). They can therefore provide information that goes beyond what speech can do and open additional views in a crosslinguistic comparison to establish whether there is support for the idea that languages differ in their event construal. In the following, an overview of the theoretical investigations of gestures, as well as of recent empirical work in the field will be given. This has the aim to firstly, establish a definition of gestures that will be adopted throughout, and secondly, to put the current study into a broader research context.

2.3.1 An integrated system

Amongst the first contemporary scholars to systematically study gestures were Adam Kendon and David McNeill. Kendon defines gestures as "visibly bodily actions [that] are employed in the accomplishments of expressions that […] are similar to or even the same as expressions in spoken language" (Kendon, 2004: 1). He has suggested that gestures are closely linked to language and seem to be "produced along with speech, as if the speech production process is manifested in two forms of activity simultaneously: in the vocal organs and in the bodily movement, particularly in movements of the hands and arms" (Kendon, 1972: 205). McNeill strongly argues that speech and gesture form an integrated system. He points out that gestures almost only occur together with speech (but not in the absence of speech). Furthermore, gestures are closely linked to speech temporally, semantically and pragmatically (McNeill, 1992). He points out that "gestures and speech should be viewed within a unified conceptual framework as aspects of a single underlying process" (McNeill, 1992: 23).

It is important to establish which phenomena exactly fall under the definition of gesture. In communicative contexts, people engage in all sorts of activities and movements. Gestures, however, are clearly distinct in that they are part of the communicative intention and, together with speech, express meaning (Gullberg, 2011a; Kendon, 2004; McNeill, 1992; Özyürek, 2014). They are linked to speech and language in timing as well as in meaning. Non-gestural movements include movements during communication that clearly serve non-communicative functions such as eating (Kendon, 1980), self-regulators such as scratching the nose or other instances of self-touching (Kendon, 1972, 1980). The distinction between self-regulators and meaningful gestures in discourse might at first glance seem subjective. However, there is very high agreement on the part of recipients about what is seen as meaningful movements related to speech (Kendon, 1978). Observers agreed to a high degree on what

they classified as movements that were communicatively relevant in contrast to what was not (Kendon 1986). Furthermore, gestures seem to differ in their articulatory properties compared to other movements that occur during speech. They have been found to mainly involve the right hand and arm for right handed people in contrast to self-regulators that occur with both hands equally often (Kendon, 1980; Lomas & Kimura, 1976).

2.3.2 Empirical evidence for speech and gesture as an integrated system

Many studies have examined whether gesture and speech form an integrated system, and they stem from both investigations of language perception and production.

In neurological studies, it has been investigated in which area of the brain gestures are processed. It has been found that hand gestures that have a conventionalized meaning (e.g. 'thumbs up') and non-meaningful hand gestures both show a similar effect on processing. Semantic difficulties and gesture difficulties are treated in the same way by the brain, generating a so-called N400 effect (Gunter & Bach, 2004). In measurement of electrical activity of the brain, the N400 shows a change in electrical activity that occurs when processing is disturbed for example by the occurrence of unexpected lexical elements. Gunter & Bach (2004) interpret their finding in favor of a mutual underlying mechanism in conventionalized gestures and abstract word processing.

Insights from language development also give support to the idea that there is a close link between speech and gesture. While it is still debated whether speech and gesture are an integrated system from birth or whether they evolve into an integrated system during language development, there is no doubt that children use both modalities to communicate (Gullberg, de Bot & Volterra, 2008). In language acquisition, children go through similar phases in both modalities. There is babbling in gesture as well as in speech, and toddlers' hands perform movements that are rhythmically aligned with the babbling (Esteve-Gibert & Prieto, 2014). Also, in later stages the two modalities show similarities in development. For example, first gestures and speech are both concerned with similar semantic domains (Gullberg, de Bot & Volterra, 2008). Evidence for speech and gesture as an underlying system can also be found in the reversed process, when speech is absent in people who suffer from aphasia. Here it has been found that gesture and speech disappear together (McNeill, 1985).

Kelly, Özyürek & Maris (2010) showed that information in gesture and speech mutually interact in comprehension leading to a better understanding of multimodal utterances when gesture and speech do not convey conflicting information. The mutual interaction of speech and gesture in language

comprehension has been suggested to count as evidence for speech and gesture being an integrated system.

Although there are different hypotheses with regard to the details of the speech-gesture production process (e.g. De Ruiter, 2007; Kita & Özyürek 2003), there is consensus regarding the view that gesture and speech are generated by the same underlying system and that they thus form an integrated system (Gullberg, 2011a).

This short literature review is not exhaustive. Its function is merely to underline that there are different kinds of empirical evidence from very different fields that all seem to support the idea that speech and gesture together constitute meaning and cannot be regarded as separated phenomena.

2.3.3 The "anatomy of gestures"

In order to scientifically investigate gestures, the mentioned difference between self-regulators and meaningful gestures can serve as a starting point. However, for a systematic investigation it is necessary to also recognize the inner structure of gestures. Kendon (1980) illustrated the inner structure of gestural movements to show that there is a systematic relationship between speech and gesture. Gestures typically involve "arm extensions (and) elaborate movements of the hands in front of the body" (Kendon, 1980: 208). According to Kendon (1980), there are gestural units that can contain different gesture phrases. A gesture phrase typically includes a preparation phase, in which the forelimb extends in a movement away from the body to a position where the stroke begins. The stroke is the core part of the gestural phrase in that it is the most effortful part of the movement and the part in which the meaning or function of a gesture in a given communicative context is most visible. A gesture stroke is subsequently followed by a recovery phase, in which the forelimb returns to its former position or by a post-stroke hold which then might be followed by a recovery phase, thus ending the gestural phrase. "In forelimb gesticulation the limb is typically lifted away from the body as it performs one or more complex movement patterns, and then it is returned to what may be called its *rest position*" (Kendon, 1980: 212).

Several gesture phrases together can constitute a gestural unit. This happens for example in instances where after a stroke the forelimb does not return to its rest position, but a subsequent stroke follows. The subsequent stroke typically follows a post-stroke hold of the previous stroke. For the analysis of gestures in our study, this definition of a gestural phrase and its parts (phases) will be followed.

Kendon's (1980) illustration can help to create a coding scheme that identifies *when* gestures occur, namely to establish what the beginning as well as the end of a gesture is. This is the crucial first step on the way to establish a gesture's given function in a communicative situation and is also interesting itself, since alignment of gestures has been shown to differ crosslinguistically (McNeill & Duncan, 2000).

2.3.4 Categorizations

The interest in gestures in the 20th century have generated numerous empirical studies that vary in their description of gestures' function and form and in their attempts to categorize them. As Kendon (2004) points out, different categorizations of gestures might be useful in certain research contexts but none of the classifications should be regarded as a "single universal system" (Kendon 2004: 107). Despite the differences, there are also commonalities between different categorization attempts.

> "Everyone seems to recognize that gestures may be used in pointing, for representing through some form of depiction or enactment something that is relevant to the referential content of what is being said, and many have recognized that there are also important functions for gesture in respect to marking up or displaying aspects of the logical structure of the speaker's discourse" (Kendon 2004: 107).

The approach taken in this study is based on Kendon's suggestions. Kendon (2004) proposes that gestures can serve referential, pragmatic and interactional functions. Those functions are not mutually exclusive but only illustrate different dimensions gestures can have at the same time. Referential gestures are directly related to the content of speech (Kendon, 2004). Such gestures then can have differences in what they express in relation to speech. For example, they can be co-expressive when gestures express what is expressed in speech (Kendon, 2004). They can be complementary, when speech and gesture refer to the same event but present different aspects of it (Kendon 2004, McNeill, 1992). Gestures can furthermore add supplementary information to what is expressed in speech in that they highlight a certain aspect of it and make it more specific. In order to illustrate what is expressed in speech, gestures can represent objects that are present in the communicative discourse in a general way. They can also express specific properties of objects present in speech by referring to spatial characteristics of an object such as shape and size. There are gestures that are similar to deictic expressions, when they are objects of deictic reference in speech (Kendon 2004: 176,77). It is crucial to note that these functions are neither mutually exclusive nor exhaustive.

Kendon (2004) furthermore differentiates between pragmatic and interactive functions (Kendon, 2004; Streeck 2009). Gestures can have pragmatic functions, like we see in beats that highlight certain parts of speech, or "stalling" gestures, when someone indicates that he has not finished his utterance and does not want to be interrupted. They can have illocutionary force and turn statements into questions or they can contribute to the discourse structure by marking new information. Finally, they can also be interactive, for example, in turn taking (Kendon, 1994).

The gestures that will be of interest in the current study are gestures that *among other dimensions* can be described as having referential functions (Kendon, 2004).

2.3.5 Crosslinguistic differences in gesture

In an attempt to understand what elements in speech are important parts of the event construal of a speaker, and to explore in how far differences in semantic and grammar are reflected in gestures, empirical studies have investigated crosslinguistic differences in gestural behavior related to differences in speech.

Kita & Özyürek (1999) investigated whether differences between speakers of Turkish, a verb-framed language, and speakers of English, a satellite-framed language, also occurred in gestures. They found that typological differences were reflected in gestures as well. Turkish speakers produced more path only and manner only gestures, following the distribution of these elements over two clauses, than English speakers who produced more gestures that expressed manner and path at the same time, following the distribution of these elements into a single clause in English (Kita & Özyürek, 1999).

In her dissertation Duncan (1996) conducted an explorative study comparing English and Mandarin Chinese speakers' gestures in a broad range using three different sets of stimuli. She showed that English and Mandarin Chinese speakers differed in their gestures regarding the temporal alignment of gestures as well the form of gestures. McNeill & Duncan (2000) explored differences in Spanish, English and Mandarin Chinese speakers and found that Spanish speakers were more likely to encode manner in gesture, whereas English speakers were more likely to encode path information. For Mandarin Chinese speakers the temporal alignment of the gesture was again different in that it did not occur with the speech part it referred to, but occurred earlier. McNeill & Duncan (2000) count this as evidence for differences in conceptualization of events that are due to differences in information structure. They argue that the prominence of topic-comment structures in Chinese is visible in gestures

since gestures are temporally aligned with the topic, whereas the content of the gesture refers to the comment, thus building a frame for the topic (McNeill & Duncan, 2000).

Brown & Chen (2013) compared gestures of Mandarin, Japanese and English speakers. They found a significant difference between Mandarin speakers and Japanese and English speakers. When manner was present in speech, Mandarin speakers gestured significantly less about manner than Japanese and English speakers did. When manner was absent in speech, Mandarin and English speakers patterned together, and gestured rarely about manner (Brown & Chen, 2013).

In the domain of caused motion events a few crosslinguistic studies have also been undertaken. Gullberg (2011a) investigated how speakers of French and Dutch gesture when talking about placement events. She found that French speakers mainly expressed path in gesture that was aligned with the verb. For Dutch, she found that gestures express object incorporation and also align temporally with the verb (Gullberg, 2011a). Since Dutch speakers have to attend to information about the object and its end position when forming the utterance, that information might be present in their event construal whereas for French speakers it is not.

Hoetjes (2008) investigated how English speakers gesture about placement events. She found that they mostly used path-only gestures that were temporally aligned with the locative expression. Gullberg (2009) similarly found that in their native language, English speakers predominantly used path-only gestures and aligned gestures with spoken locative expressions. When speaking their second language Dutch, English speakers gesturally behaved similarly to when they were speaking their native language, suggesting that on a representational level, second language speakers have not yet started to behave native-like (Gullberg, 2009). Gullberg (2011b) also investigated gestures of German speakers and found that Germans predominantly gestured about path and that the gestures aligned with locative expressions, similarly to English speakers.

2.4 Summary

This chapter gave an overview of the current state of typological studies with and without the visual modality concerning issues of crosslinguistic variation and possible consequences for event construal. Although there are still open questions in the field, there is substantial empirical evidence for the view that gesture and speech form an integrated system. Gestures are closely linked to speech and "reflect linguistic choices both at the level of information structure and at the level of linguistic structural choices" (Gullberg, 2011a: 169). As the review on crosslinguistic differences in the visual modality

showed, gestures can add information about spatial aspects of an event the speaker attends to. Building on those assumptions, the investigation of gestures can provide information about language specific event construal that speech alone cannot. German and Mandarin Chinese vary in how they encode placement events in verb semantics and sentence constructions. This study therefore wants to probe whether those differences also occur on an event construal level. To do so, speech and speech-accompanying gestures will be compared across the two languages.

3. The current study

3.1 Research question

The current study will focus on placement events, which involve the manual manipulation of an object in order to move it somewhere. They are of the form 'she puts a cup on the table' and typically involve agent, figure, ground and motion (cf. 2.2.1). There are good arguments for the assumption that there are general regularities to conceptualize such events and that the mechanisms that are involved in it are language neutral. Such assumptions are based on first, the observation that placing objects is a basic action that occurs in all cultures and even among our close primate ancestors where it has been shown to involve special neurons (Arbib, 2005). Second, this assumption has been strengthened by the argument that many languages employ so-called light verbs that do not include a lot of semantic information such as *put* (Pinker, 1989). As a crosslinguistic comparison of 19 languages showed, there are commonalities in expressing placement events (Narasimhan, Kopecka, Bowerman, Gullberg & Majid, 2012). The study showed that all those languages encode the agent and figure in noun phrases and motion in verb phrases. However, the typological data of numerous languages suggests that there are also differences in how languages package placement events and that some languages do not rely on 'light' verbs but rather on a range of semantically rich verbs to convey meaning (Narasimhan, Kopecka, Bowerman, Gullberg & Majid, 2012: 13). Since spoken language alone cannot provide a clear answer to the question of how far languages vary in their conceptualization of placement events, crosslinguistic studies including the visual modality investigated gestural behaviour in placement events to probe in how far crosslinguistic differences in semantics are reflected in event construal. Those studies showed crosslinguistic differences in speech-accompanying gestures (cf. 2.3.5) that point towards crosslinguistic differences in event construal (e.g. French speakers included path information in their gestures seeming to reflect

attention to path, while Dutch speakers included object information in their gestures seeming to reflect attention to the object that undergoes movement).

Given the fact that there are differences between verb semantics in German and Mandarin Chinese, it seems promising to compare both of those languages in an empirical study of placement. No study to date has explored how Mandarin Chinese speakers gesture about caused motion events.

A gap of knowledge clearly exists. The current study therefore asks:

Do Mandarin Chinese and German differ in event construal of placement events? More specifically:

Do gesture behaviours in Mandarin Chinese and German differ as a function of differences in verb semantics and sentence construction?

Based on the previous study about placement events in German, the predictions for German gestures are as follows:

German gestures will temporally align with the locative.

German gestures will mainly encode information about path as instantiated in handshapes that do not include objects.

Concerning Mandarin Chinese, the reviewed studies only allow one to draw conclusions about speech and gesture patterns in voluntary motion events. In this regard, they also provide mixed results. The overall tendency seems to show similarities in speech for satellite-framed languages like English and Mandarin in speech. In gesture however, Mandarin Chinese speakers differ from English speakers regarding their temporal alignment of gestures, the frequency with which they encode manner in motion events (for conflicting results see Duncan, 2006), and content of gestures. Furthermore, evidence for differences in the visual modality due to information structure has been found (Duncan, 1996). She showed that in BA-constructions action is encoded more frequently than in other constructions (Duncan, 1996). Because of the very mixed results for Mandarin Chinese speech accompanying gestures in voluntary motion events, no sensible predictions can be made. However, based on the difference in verb semantics in German and Mandarin and previous studies that show that verb semantics influence gestures, we predict that Mandarin speakers' gestures will differ in temporal alignment and handshape from German speakers' gestures.

Furthermore, a within-language comparison of gestures could provide interesting results regarding the role information structure plays in gestures. The results in McNeill & Duncan (2000) explained differences in alignment of gestures with the topic-comment structure in Mandarin Chinese. Assuming our study tracks crosslinguistic differences, it could be explored whether differences within Mandarin Chinese data can be found depending on the sentence construction. This could help to disentangle which linguistic features are correlated with differences in gestures between languages and contribute to our knowledge of semantic typology.

The second research question for a within language comparison is therefore:

How do gestures differ in temporal alignment and handshape with regard to information structure within the language?

The subordinate research question for both languages are:

SQ1: How do gestures differ in temporal alignment and handshape in instances where BA/ OSV / SOV constructions are used in Mandarin Chinese speakers' data?

SQ2: How do gestures differ in temporal alignment and handshape when O/LOC/ S is fronted in German speakers' data?

3.2 Method

In the following, the design of the study will be introduced. This includes information about participants, materials, procedure, as well as coding and data treatment.

3.2.1 Participants

Native speakers of Mandarin Chinese (*n*= 13, 11 female) and German (*n*=17, 14 female) were recruited via Facebook and by word of mouth to participate in the study. German participants' age ranged from 20 to 52 years (mean 27, *SD* 7) Mandarin Chinese participants' age ranged from 23 to 62 years (mean 30, *SD* 10). All participants had a high school diploma or higher and either studied or worked in Lund. They had normal or corrected-to-normal eye vision. Before taking part in the experiment, participants completed a language background questionnaire that was provided in their native language (based on Gullberg & Indefrey, 2003; see Appendix 2). The questionnaire included biographic information such as age and education as well as information about the participants' language use and knowledge. Participants were required to be native speakers of German or Mandarin Chinese and could not be early simultaneous bilinguals with two native languages (Patterson, 2002). Language use prior to the

experiment was kept constant to the participants' native language to create a situation in which the use of the native language would feel as natural as possible. This was necessary since all experiments took place in a Swedish speaking environment. The participants' knowledge of any other language than their native language was reported and accounted for on a scale from one to five (for participant characteristics, see Appendix 1).

Participants who produced fewer than five gestures were later excluded, leading to a number of 12 participants in each of the two groups included for analysis.

3.2.2 Materials

The stimuli consisted of eight video clips (mean duration 43.12 seconds; *SD*: 11,77) that were displayed on a laptop. The clips showed a woman in a room manually placing different objects on different grounds (Gullberg, 2002). Those placement events were framed by an introductory and closing scene in which a second woman asks another woman to clean up the messy room and thanks her afterwards. In each of the eight clips, four objects are moved, leading to a total number of 32 objects. Two objects were always mentioned together and thus are throughout defined as only one, which leaves the final number of objects at 31. There are 20 experimental and 11 filler items. Experimental items end up in a position with support from below either vertically (e.g. bottle standing on shelf; $n=10$) or horizontally (e.g. tablecloth lying on table; $n=10$), while the 11 filler items have different end positions that vary in their form of containment and support (see Appendix 6). The video clips did not have sound and could therefore be used for both language groups. To make them user-friendly, the video clips were embedded in a power point presentation.

3.2.3 Procedure

All experimental sessions took place in Lund University Humanities Lab. Participants were informed beforehand that they would be videotaped and signed a consent form prior to the beginning of the experiment (See Appendix 3). In each session, two people participated, one confederate and one real participant. The confederate was a native speaker of the respective language. The room was set up with a table and two chairs on opposite sides of the table. There were markings on the floor to indicate the correct chair position. This was necessary to prevent the participants from moving the chair too close to the table. A position close to the table was to be avoided since this could lead to obscured gestures or sitting positions in which the participant was less likely to gesture (e.g. resting arms on the table). On

one side of the table there was a laptop, on the other side a picture of an empty room and pencils (see Appendix 5).

The experiment was set up as a director-matcher task. The director was the genuine participant, while the matcher was the confederate. For the Chinese participants, the confederate was the same person throughout all experiments, for the German participants, two confederates were needed due to organizational problems.

The eight clips were shown one at a time to the director only. After each clip, the screen went black, showing the question: 'what did the woman do?' in the respective language. The director's task was then to report to the matcher what the woman did to the objects in the video clip. The matchers' task was to draw the end position of the four objects accordingly in a picture of the room they had in front of them. To proceed to the following clip, the participant had to push the button on the laptop. There was no time limitation for the description. Director and matcher decided together when to proceed.

Director and matcher were separated by a visual protection to prevent the director from pointing to the picture instead of expressing information about the objects verbally. As a memory aid, a word list of the objects being moved was attached to the visual protection (see Appendix 7) to make sure the director would not hold this list throughout the experiment and thus would not be able to gesture.

All sessions were videotaped. Gestures were not mentioned either in the recruitment or in the task instructions. In instances, where participants asked if they could use their hands for description as well, this was allowed but not further commented on.

To successfully accomplish the task, director and matcher had to work together. Instructions were given to both director and matcher before the start of the session in written form (see Appendix 4) as well as orally in the respective language. All questions participants had about the procedure were answered.

3.2.4 Data treatment and coding

The software ELAN was used for transcription and coding (Wittenburg, P., Brugman, H., Russel, A., Klassmann, A., Sloetjes, H. (2006). ELAN: a Professional Framework for Multimodality Research. In: Proceedings of LREC 2006, Fifth International Conference on Language Resources and Evaluation. Retrieved from: https://tla.mpi.nl/tools/tla-tools/elan/) using a frame-by-frame analysis (Lausberg & Sloetjes, 2009).

3.2.4.1 Speech

In a first stage, speech was analyzed and spontaneous utterances about placement events were identified. Spontaneous utterances occurred when the placement of an object was first mentioned. This usually subsequently followed a description of the picking-up of the object. Spontaneous first utterances mentioning the placing after the picking-up event, thus in many instances were not complete sentences. Repetitions, further descriptions of the objects, the location or other things were not taken into consideration as target utterances.

Following this stage, placement verbs used were extracted. For both languages utterance types were also coded (German: active, passive, intransitive, other; Mandarin Chinese: active, intransitive, other). Furthermore, information about the sentence constructions was coded (BA, SVO, topic-comment in Mandarin Chinese; S-fronted, O-fronted, LOC-fronted in German).

3.2.4.2 Gesture

In a second stage, with sound turned off, gesture strokes and post-stroke-holds that lay within the target utterances were identified (as explained in section 2.3.3). Gesture strokes were defined as the part of the gestural movement that expresses meaning. Post-stroke-holds were defined as the part of the gesture where the gesture stays in an effortful position after the stroke and before the retraction (Kendon, 1980; McNeill, 1992).

In the next step, still without sound, handshape was coded (1/2/3). That analysis was based on Gullberg's (2002) approach but slightly modified. In our coding, this led to three different handshape categories. Handshape was coded as 1 when an extension of the arm took place with a relaxed hand or an extended index finger (pointing) (see Gullberg & Narasimhan, 2010; figure 2). This handshape would naturally only encode information about direction of motion. Handshape was coded as 2 when there was a flat tensed hand that could express meaning about either the object itself, the surface, or the location (figure 3). Handshape was coded as 3 when the fingers were curved effortfully towards the hands' inside, indicating holding or grasping something (figure 4). This handshape seems to indicate the presence of an object that is being manipulated.

3.2.4.3 Speech-gesture relationship

In a third step, with sound turned back on, speech that co-occurred exactly with the stroke and any poststroke hold was transcribed for all identified gestures. Alignment with speech was categorized into

alignment with locative, verb, locative plus verb, and other for German. For Mandarin Chinese it was categorized into locative, verb, locative plus verb, object plus, and other.

3.2.4.4 Quantitative analyses

Throughout we provide descriptive statistics, specifically mean proportions. For speech and gestures proportions were calculated per participant, subsequently the mean over all participants was calculated. This was done to make each participant count the same in the data, as opposed to make every single gesture or speech use count the same. Proportions were used for analysis of verbs, sentence structures and utterance types in speech and for handshape and alignment in gesture. Also, for the effects of sentence structures on gestures, proportions were used. The mean proportion that will be given in the following is always based on the mean of proportion over all participant and not over all data. The standard deviation then can help to understand the degree of dispersion of the data. All calculations are based on experimental items only, except for the range of verbs analysis. Here filler items were included as well to illustrate the variety the languages offer to describe placement.

Figure 2: Handshape 1
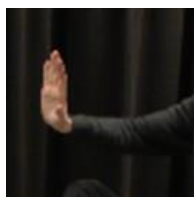
Figure 3: Handshape 2
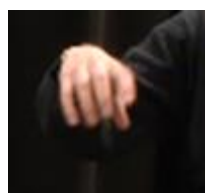
Figure 4: Handshape 3

Participant 9, X-Football2   Participant 1, X-Books   Participant 2, X-Bottle2

(X= experimental item. See Appendix)

4. Results

4.1 Speech analysis

For speech, an analysis about the range of verbs and their frequency, the sentence constructions and their frequency as well as the utterance types and their frequency will be given.

4.1.1 Verbs in the German data

The verbs that were extracted from the German speech data were the following: *aufräumen* 'clean up', *aufsetzen* 'put on', *bappen* 'stick', *befestigen* 'attach', *breiten* 'spread', *einhängen* 'mount', *hängen* 'hang', *kicken* 'kick', *kleben* 'glue', *knödeln* 'crease', *knüllen* 'crumpl', *kommen* 'come', *legen* 'lay', *lehnen* 'lean', *liegen* 'lie', *machen* 'make', *packen* 'grab', *pappen* 'stick', *platzieren* 'place', *rollen* 'roll', *schieben* 'push', *schießen* 'shoot,kick' *schmeißen* 'toss', *sein* 'to be', *setzen* 'set', *sitzen* 'sit', *stecken* 'stick', *stehen* 'stand', *stellen* 'stand', *stopfen* 'squeeze', *tatschen* 'fumble', *tun* 'do', *werfen* 'throw'.

The three posture verbs together made up the largest proportion (mean: .68, *SD*: .02). Within the posture verbs, *stellen* 'stand' was used most frequently, followed by *legen* 'lay' (see table 2).

Table 2: Mean proportion (SD) verbs German

Setzen	*Stellen*	*Legen*	Others
.03 (.02)	.35 (.16)	.30 (.19)	.36 (.18)

4.1.2 Utterance types in the German data

Regarding the utterance types that were used in the German speech data, there were active, passive as well as intransitive constructions. The active constructions represented the largest proportion of the used constructions (mean .83, *SD* .28). Passive constructions accounted for only .09 (*SD* .30). All passive constructions were produced by the same participant. Intransitive constructions occurred also between participants, however they only made up .054 (*SD* .10) of the speech data (see figure 5).
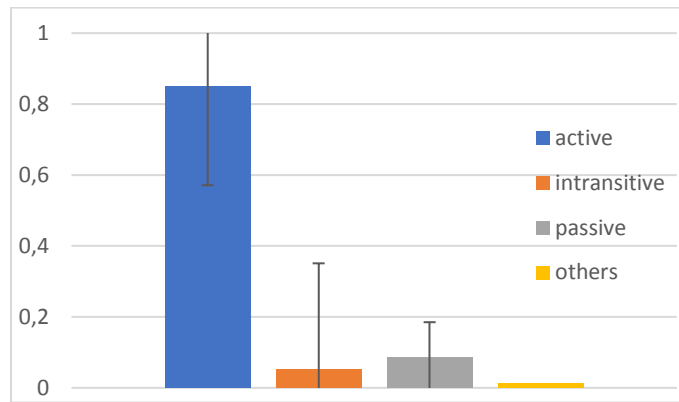
Figure 5: Mean proportion utterance types in German

4.1.3 Sentence construction in the German data

Within the active utterances, there were seven constructions that accounted for 82% of all active constructions. As already mentioned in section 2.2.2, German has a flexible word order. Participants made use of that flexibility, leaving us with the following constructions that occurred most frequently.

O-V-S-LOC

(13)	*Den*		*zweiten*	*Fußball*	*steckt*	*sie*	*äh*
	the-ACC		second-AKK	football-AKK	sticks-PRS-SG	3SG	uhm

	in die	*mittlere*	*Schublade*.
	in the-AKK	middle-AKK	drawer-AKK

'She sticks the second football in the middle drawer.'

(German Participant 2, X-Football2).
(X=experimental item. See appendix).

Constructions of this form were in the present tense with fronted object.

O-V-S-LOC-V

(14)	*Und*	*das*	*Nilpferd*	*hat*	*sie*	*neben*	*das*
	and	the-ACC	hippo-ACC	PRF-3SG	3SG	next to	the-ACC

	Krokodil	*ge-*	*stell-t.*
	crocodile-ACC	PTCP-	put-PTCP

'And the hippo she has put next to the crocodile.'

(German Participant 14, X-Hippo).
(X=experimental item. See appendix).

Constructions of this form follow the same structure as *(13)* and also have the object in the sentence initial position. However, they are in present perfect, which puts the verb that carries all the semantic content at the end position of the sentence.

S-V-O-LOC-V

(15)	*Sie*	*hat*	*den*	*Mülleimer*	*rechts*	*neben*	*den*
	3SG	PRF-3SG	the-ACC	wastepaperbasket-ACC	right	next to	the-ACC

Tisch	*ge-stell-t.*
table- ACC	PTCP-put-PTCP

'She has put the wastepaperbasket on the right side next to the table'

<div align="right">(German Participant 1, X-Wastepaperbasket).
(X=experimental item. See appendix).</div>

Constructions of this form follow the "default" type in German. However, in the data they did not occur often and only in the present perfect.

LOC-V

(16)	*Und*	*in-s*	*Regal*	*ge-stell-t.*
	and	in-ART	shelf-ACC	PTCP-put-PS-SG

'and put it on the shelf'

<div align="right">(German Participant 12, X-Videobox).
(X=experimental item. See appendix).</div>

This construction uses the past participle (Partizip II) and usually follows a description of the taking event. Taking and placing event are connected with the coordinating conjunction "und" (and). It is a variation of the construction as shown in *(15)*. Those utterances are often not complete sentences in their own right. They are constructions in which the subject was in the sentence initial position in the description of the picking up event. Subject and object are thus not mentioned again because they were already introduced.

O-LOC-V

(17)	*Danach*	*hat*	*sie*	*eine*	*leere*
	after	PRF-3SF	3SG	a-ACC	empty-ACC

Videoschachtel auf-ge-		*hob-en*	*und*	*dann*	*auch*	*die*
videobox-ACC up-PTCP		pick-PTCP	and	then	also	the-ACC

Videokassete ähm-	***und***	***die***	***Videokasette***	***dann in die***
videotape-ACC uhm	and	the	videotape-ACC	then in the-ACC

Schachtel	***ge-stell-t.***
box-ACC	PTCP-put-PTCP

'After that, she picked up an empty videobox and the videotape-uhm-and put the tape in the box.'

This construction is similar to the one in *(16)*, also following the description of the taking event, but mentioning the object again.

LOC-V-S-O

(18)	*In*	*diese*	*Tasche*	*stopf-t*	*sie*	*ein*	*T-shirt*	*und*	*ein*
	in	this	bag-ACC	stuff-PRS-SG	3SG	a-ACC	t-shirt-ACC	and	a-ACC

Handtuch.
towel-ACC

In this construction the location is in the sentence initial position, followed by the finite verb in the second position and subject and object.

V-(S)-O-LOC

(19)	*Und*	*stellt*	*die*	*Schüssel*	*auf*	*den*	*rechte*
	and	put-PRS-SG	the-ACC	bowl-ACC	on	the-ACC	right

(pause)	*auf*	*die*	*rechte hintere*	*Ecke*	*des*
(pause)	on	the-ACC	right back-ACC	corner-ACC	the-GEN

Schreibtischs.
desk-GEN

'And puts the bowl on the right- on the right back corner of the desk'

The verb in the first position requires a coordinating conjunction, or an adverbial construction in German. Utterances of this type were thus subsequently followed by temporal adverbials *dann* 'then', *dieses Mal* 'this time' or conjunctions like *und* 'and'. Without mentioning of the agent (the grammatical

subject), the sentence is not complete. Constructions of that form always followed an utterance that included information about the agent.

V-(S)-O-LOC-V

(20)	*Jetzt*	*hat*		*sie*	*ähm*	*ein*		*so*	*Plüschtiernilpferd*
	ADV	PRF-3SG		3SG	uhm	a-ACC		like	toy hippo-ACC

	ähm	*rechts*	*neben*	*das*		*Krokodil*	*ge-stell-t.*
	uhm	right	next to	the-ACC		crocodile	PTCP-put-PTCP

'Now she put a toy hippo uhm on the right side next to the crocodile'

(German Participant 6, X-Hippo).
(X=experimental item. See appendix).

Constructions of this form follow the same structure as in *(19)*. They are in the present perfect, which again means that the verb carrying the semantic information is in the last position of the sentence.
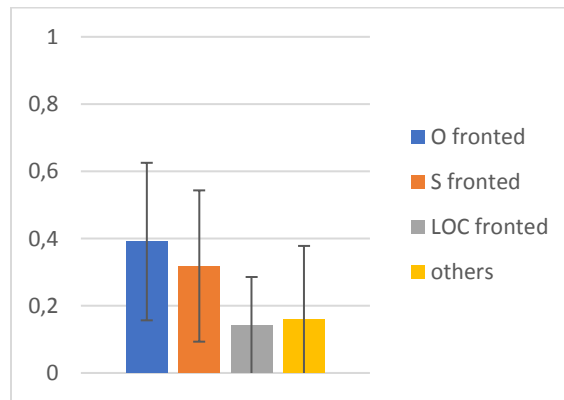
Figure 6: mean proportion sentence structures in German

4.1.4 Verbs in the Mandarin Chinese data

The verbs used in the Mandarin data were the following:

放*fang4* 'put'，搭*da1* 'hang over', 绹*tao2* 'twist', 'bind', 滚*gun3* 'roll', 粘*zhan1* 'stick', 'glue', 贴*tie1* 'stick', 'glue', 踢*ti1* 'kick', 装*zhuang1* 'pack into', 扔*reng1* 'throw', 扣 *kou4* 'place upside down, 立*li4* 'stand', 靠*kao4* 'lean', 拨*bo1* 'to push with the hand', 伸 *shen1* 'extend', 塞*sai1* 'to squeeze', 揉*rou2* 'crumple', 中*zhong4* 'hit', 在*zai4* 'to be', 垂*chui2* 'hang over vertically', 戴*dai4* 'wear', 丢*diu1* 'throw', 摆*bai3* 'arrange', 推*tui1* 'push', 是*shi4* 'to be', 挂*gua4* 'hang', 脚*jiao3* 'foot' (used as verb), 铺*pu1* 'spread'.

The general verb 放 *fang4* 'put' was used even most frequently, accounting for .85 of all utterances (see table 3).

Table 3: Mean proportion (SD) verbs Mandarin Chinese

Fang	Others
.85 (.05)	.15 (.05)

Figure 6 shows the mean proportions of the verb constructions in Chinese. Verb compounds occurred rarely in the data (mean .064, *SD* .079). Instead, the general verb 放*fang4* 'put' that was subsequently followed by a locative phrase accounted for the vast majority of the data (mean .74, *SD* .12). Instances like in *(21)* in which the result of the placing action was specified preceding the putting action occurred very rarely. In few instances as shown in *(22)* 放 *fang4* 'put' was preceded by an adjective that would indicate the manner of placing (mean .038, *SD*: .034). Instances in which the general verb 放 *fang4* 'put' was followed by the co-verb 到 *dao4* 'arrive' accounted for the third largest proportion (mean .079, *SD* .072). Other constructions such as intransitive constructions or constructions that used a more specific verb than 放*fang4* 'put' accounted for the rest (mean .11, *SD* .085).
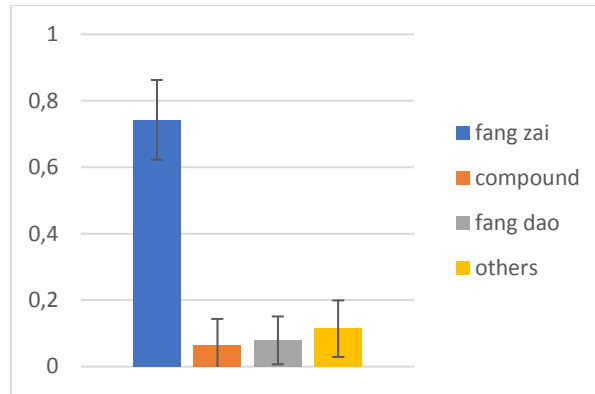
Figure 7: Mean proportion verb constructions in Mandarin Chinese

(21)	把	书		放	在	桌子	上。
	bǎ	*shū*		*fàng*	*zài*	*zhuōzi*	*shàng*
	BA	book-SG/PL		put	at	table	on

'She put the books on the table.'

(Chinese Participant 8, X-Books).
(X=experimental item. See appendix).

There were variations of the 放*fang4* 'put' 在*zai4* 'at' construction.

(22)	她	把	它	横		着	放	在	了	刚才		的
	tā	*bǎ*	*tā*	*héng*		*zhe*	*fang*	*zài*	*le*	*gāngcái*		*de*
	3SG	BA	3SG	horizontal		DUR	put	at	PFV	before		DE

	那个	红酒瓶		的	旁边。
	nàge	*hóngjiǔ*		*de*	*pángbiān*
	this	wine bottle		DE	next to

'She placed it so that it ended up in a horizontal position next to the wine bottle that was mentioned earlier.'

(Chinese, Participant 5, X-Bottle2).
(X=experimental item. See appendix).

In this construction, the outcome of the action is mentioned in the first verb phrase. The posture verb together with the durative particle describe the end configuration of the object after the action took place. The action that leads to that outcome is mentioned in the second verb phrase subsequently.

(23)	她	把	瓶子	平	放	着	放	在	红酒	的
	tā	bǎ	píngzi	píng	fàng	zhe	fàng	zài	hóngjiǔ	de
	3SG	BA	bottle	flat	put	DUR	put	at	winebottle	DE

那一	层。
nèi	céng
this	layer

'She puts the bottle in a flat way on the winebottle's storey.'

(Chinese, Participant 5, X-Bottle2).
(X=experimental item. See appendix).

In this verb construction, the first verb clause indicates the manner of putting (flat) while the second verb clause expresses the putting in a more general way.

4.1.5 Utterance types in the Mandarin Chinese data

The large majority of utterance types in Chinese were active (mean .98, *SD* .05). Intransitive utterances only accounted for a small proportion (mean .02, *SD* .06) (see figure 7).
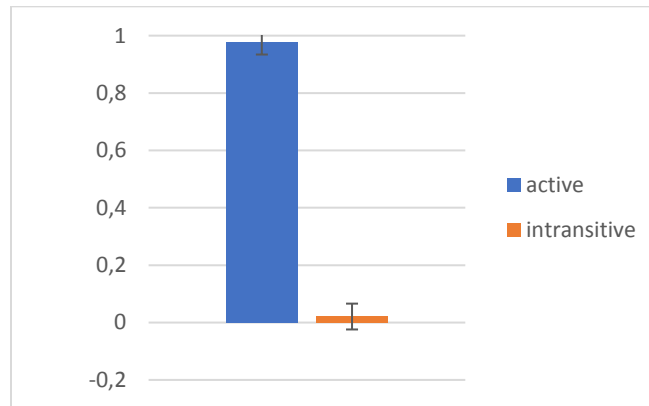
Figure 8: Utterance types in Mandarin Chinese

4.1.6 Sentence constructions in the Mandarin Chinese data

Regarding the sentence constructions that were used in target utterances of experimental items in Mandarin Chinese, BA-constructions occurred most often (mean .52, *SD* .25) followed by topic-comment constructions (mean .28, *SD* .22) and SVO constructions (mean .17 *SD* .20). A fourth construction also occurred and is listed for the sake of completion although it rarely occurred (mean .013, *SD* .021) (see figure 8).

Within the BA-constructions, utterances were included in which BA was mentioned in the picking up event but not mentioned again for the placing event (as in 22). However, whole BA-constructions made the majority (mean .84, *SD* .06).

BA-constructions

(24) 然后　　　她　把　它　**放**　**在**　**书桌**　　**上**。
　　　ránhòu　*tā*　*bǎ*　*tā*　*fàng*　*zài*　*shūzhuō*　*shàng*
　　　ADV　　　3SG　BA　3SG　put　　at　　desk　　　on

'She puts it on the table.'

(Chinese, Participant 13, X-Hippo).
(X=experimental item. See appendix).

This was the construction that occurred most often in the data. Here the subject is explicitly mentioned, and the particle 把 *ba3* takes the object as its argument. The general verb 放 *fang4* 'put' is followed by a locative phrase that indicates the end position of the object.

(25) 然后　　　把　它　拿 起来,　　　很　　小　　的,　**放**　**在**
　　　ránhòu　*bǎ*　*tā*　*náqǐlái*　　*hěn*　*xiǎo*　*de*　*fàng*　*zài*
　　　then　　BA　3SG　take-rise-come,　very　small　DE　put　at

　　　书桌　　　　上面。
　　　shūzhuō　*shàngmiàn*
　　　desk　　　on

'Then (she) picks it up, it is very small, (and) puts it on the desk.'

(Chinese, Participant 6, X-Crocodile).
(X=experimental item. See appendix).

Topic-comment construction

(26) 那个　足球　　就　放　在　了　书桌　　　下边　　呢。
　　　nèige　*zúqiú*　*jiù*　*fàng*　*zài*　*le*　*shūzhuō*　*xiàbian*　*ne*
　　　this　football　then　put　at　PFV　desk　　under　　particle

'(Regarding) that football, she just puts (it) under the desk.'

(Chinese Participant 7, X-Football1).
(X=experimental item. See appendix).

This is a topic-comment construction as defined in 2.2.3.4 The topic includes information about the figure while the comment gives information about the motion and location.

SVO construction

(27)

那个	女生	拿起	了	一	个	玩具,	好像	像
nèige	*nǔshēng*	*náqǐ*	*le*	*yì*	*ge*	*wánjù*	*hǎoxiàng*	*xiàng*
this	woman	take-rise	PFV	one	CL	toy	probably	like

河马	pause	那一	种-	很	小	灰色	的	**放**	**到**	**了**
hémǎ	*pause*	*nèi*	*zhǒng*	*hěn*	*xiǎo*	*huīsè*	*de*	*fàng*	*dào*	*le*
hippo	pause	this	sort	very	small	grey	DE	put	arrive	PFV

书桌	**上**。
shūzhuō	*shàng*
desk	on

'This woman picks up a toy, it seems to be a hippo - pause- very small, grey. (and) puts (it) on the desk.'

(Chinese Participant 6, X-Hippo).
(X= experimental item. See appendix).

In SVO constructions subject and object are frequently omitted in the placement event itself. This is the case because the placement event description subsequently follows the picking up description. Because Mandarin Chinese is a pro-drop language the NP arguments of a verb can be omitted when it is known in discourse (Chang, 2003). Among the rarely occurring SVO constructions, this one accounted for the majority of cases (mean .60, *SD* .43). The majority of SVO constructions was produced by the same participant.

Locative inversion

(28)

桌子	上	放	了	书。
zhuōzi	*shàng.*	*fàng*	*le*	*shū*
desk	on	put	PVF	books

'On the table, that's where she put the books.'

(Chinese participant 6, X-books).
(X=experimental item. See appendix).

In this construction, the location is followed by verb and object. Such a construction can only occur with an aspect marker after the main verb (Pan, 1996).
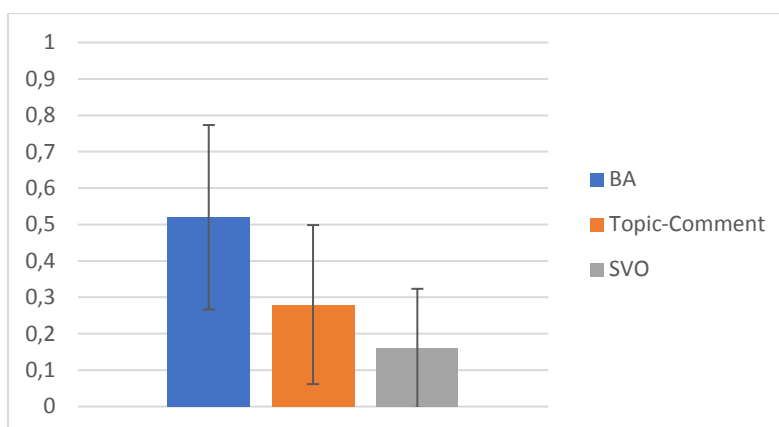
Figure 9: Mean proportion sentence structures in Mandarin Chinese

4.2 Gesture analysis

The analysis of gestures provides information for both languages about handshapes that occurred in our study. It furthermore provides information about the temporal alignment of gestures with speech in both languages. Lastly, it presents results for a within-language comparison that compared handshapes and alignment with speech for different sentence constructions.

4.2.1 Handshape

For analyses of gesture, the gestures in total were counted per participant. The proportion of relaxed, flat tense hand, and grasping hand was then calculated for each participant. Figure 9 shows the mean proportion of handshapes in German and Mandarin Chinese. For German the mean proportion for flat tense hand was the highest (mean .48, *SD* .22), followed by grasping hand (mean .28, *SD* .19) and lastly relaxed hand (mean .28, *SD* .17). For Mandarin Chinese grasping hand was most frequent (mean .45, *SD* .20) followed by flat tense hand (mean .42, *SD* .16) and relaxed hand (mean .14, *SD* .10).
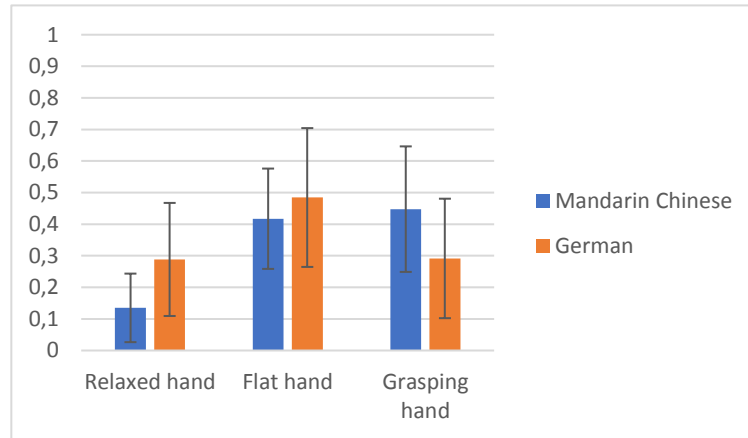
Figure 10: Mean proportion of handshape in German and Mandarin Chinese

4.2.2 Temporal alignment of gesture with speech

For temporal alignment with speech, in a first step all differences that occurred in alignment with speech were captured (e.g alignment with agent, verb, locative; alignment with verb+locative). This procedure was used for both languages. However, since some categories ended up with almost no data, those alignments were treated as outliers because they did not present a general tendency in the data pattern. The categories were thus merged leading to the following five categories in German: Alignment with location, with verb, with location plus verb, with location plus others, and with others. In German most gestures aligned with locative expressions (mean .55; *SD* .20), followed by others (mean .26, *SD* .12) and verb (mean .12, *SD* .098) (see figure 10).
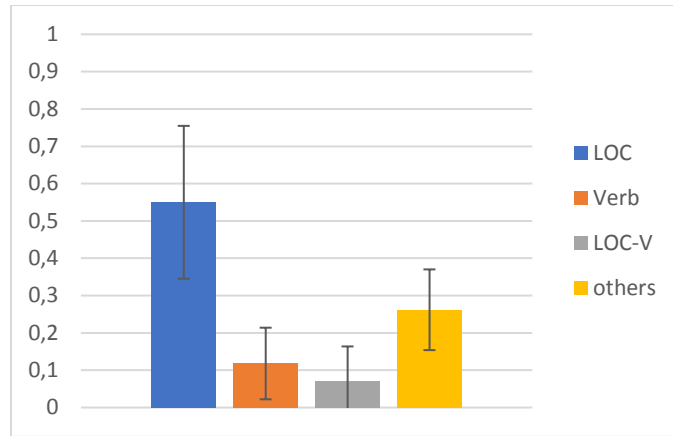
Figure 11: Mean proportion gestural alignment in German

In Mandarin Chinese the categories of alignment with speech were: alignment with location, with verb, with verb and location, with object plus others, and others. Here a similar pattern occurred. Gestures aligned with locative expressions most of the time (mean .32, *SD* .10), followed by alignment with others (mean .23, *SD*: .06), and with verb (mean .19, *SD* .06) (see figure 11).
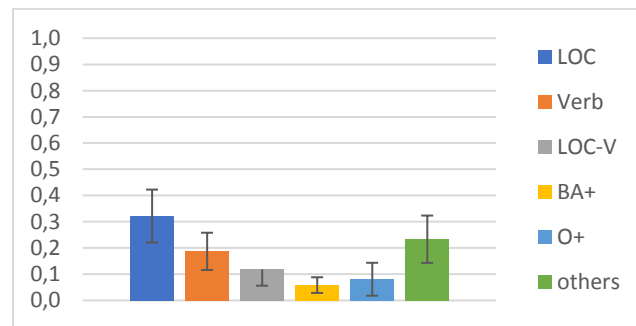
Figure 12: Mean proportion gestural alignment in Mandarin Chinese

4.2.3 Analysis for different construction within languages

Next, we analysed handshapes and alignment with speech that occurred with different sentence constructions in both languages. In order to answer the subordinate research question and to determine whether the sentence construction within the language would influence handshape and alignment of the gestures, the proportions of handshape and alignment for different sentence constructions was calculated. However, only the overarching distinction into sentence construction was used for analysis (e.g. BA-construction, topic-comment construction, SVO construction in Mandarin Chinese). This was because gestures did not occur with each utterance. Data on gestures and speech together is thus a lot

smaller than data on speech alone. If all differences that occurred in speech had been accounted for in speech- and gesture analysis, the data set would have been too small to allow for valid conclusions.

For German, the handshape that occurs most frequently differs between object-, location-, and subject-fronted sentences (see figure 12). In object-fronted sentences the flat tense hand occurs most often, in location-fronted sentences the grasping hand incorporating an object occurs most often, and in subject-fronted sentences the relaxed hand expressing path occurs most often.
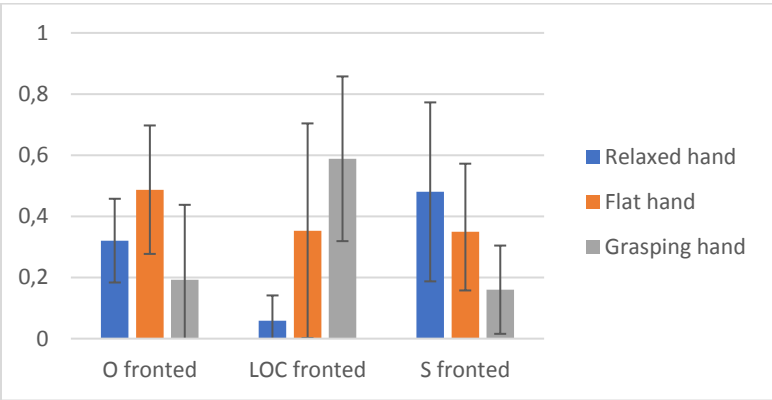
Figure 13: Mean proportion of handshape occurring with different constructions in German

For Mandarin Chinese, the analysis shows that SVO structures seem to behave differently with regard to the handshape that occurs with them. In the BA-construction as well as the topic-comment construction the grasping handshape is dominant. However, in the topic-comment structure relaxed handshapes expressing path only are more prominent than in the other constructions. In the BA-construction they occur least often (see figure 13).
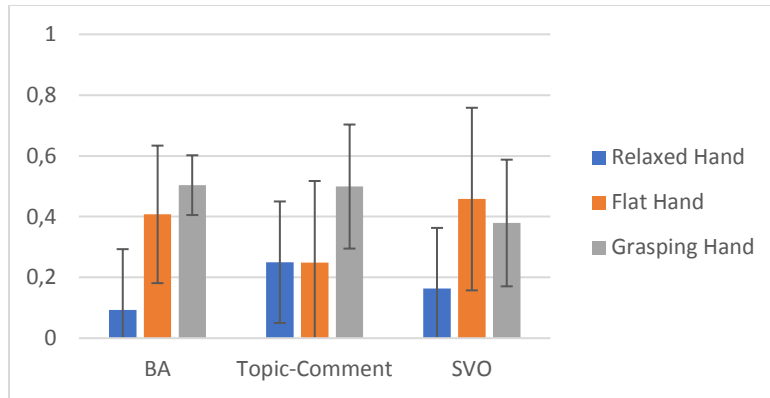
Figure 14: Mean proportion of handshape occurring with different constructions in Mandarin Chinese

Regarding the relationship between different constructions with alignment of gestures in the German data, it is notable that gestures overall align with Locatives. In utterances in which location is fronted, there is no alignment with any other speech category (verb or verb and location). Otherwise alignment patterns look similar (see figure 14).
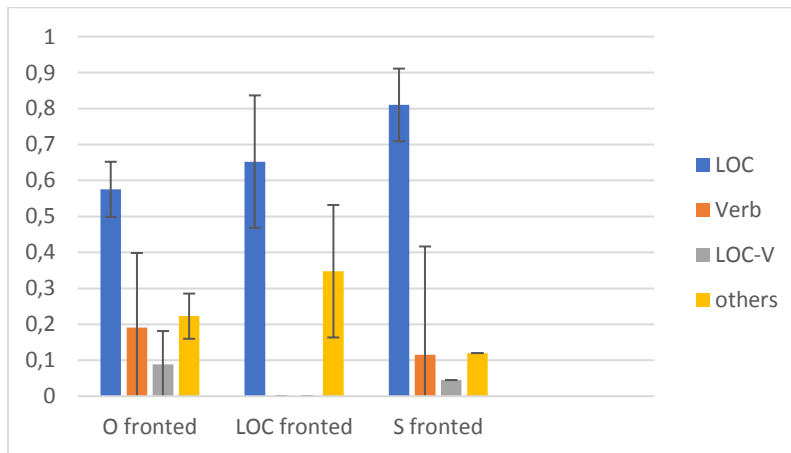
Figure 15: Mean proportion of temporal alignment with speech for different constructions in German

Regarding the connection between utterance types with alignment of gestures, it seems that in Chinese topic-comment structures alignment with location is the most frequent. Regarding the BA-construction gestures that align with verb plus locative are frequent compared to other structures. Another slight difference is that there is no alignment with object in SVO structures. Given the fact that the object is dropped most of the times in SVO structures in our data, this is logical. Otherwise, alignment patterns look similar between utterance types (see figure 15).
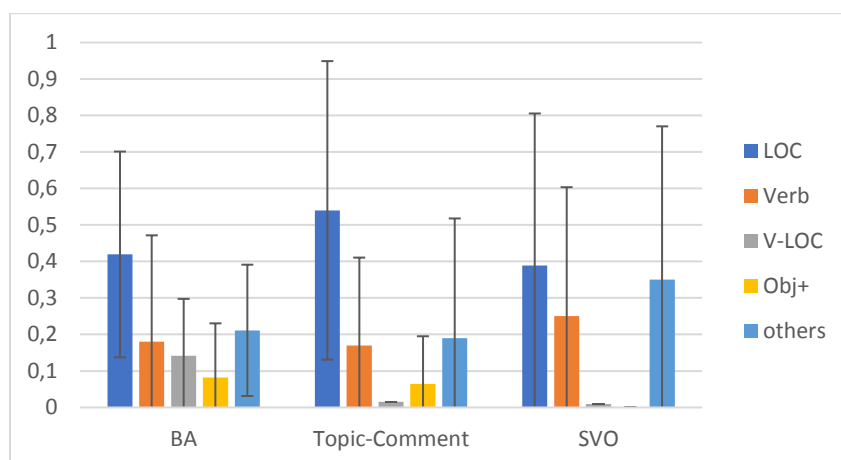
Figure 16: Mean proportion of temporal alignment with speech for different constructions in Mandarin Chinese

5. Discussion

5.1 Interpretation of results

The aim of our study was to investigate whether there are differences in event construal for Mandarin Chinese and German speakers in the domain of placement events, and if so how differences are influenced by verb semantics and sentence structure between and within languages. The main research questions therefore were:

Do Mandarin Chinese and German differ in their event construal of placement events? More specifically:

Do gesture behaviours in Mandarin Chinese and German differ as a function of differences in verb semantics and sentence construction?

The results show for speech that German speakers predominantly use posture verbs to express placement events. Mandarin Chinese speakers predominantly use a general verb that is not part of a verb compound but is followed by a locative phrase. Both languages mainly used active utterance types, but differed in sentence construction. German showed a high variance of word order within the sentences fronting either object, subject or location. In Mandarin Chinese, the BA-construction was used most frequently. Turning to gestures, German speakers predominantly used a flat tensed hand expressing a focus on surfaces or locations, while Mandarin Chinese speakers most frequently used the grasping handshape focusing on the object being placed. Regarding the temporal alignment of gestures, both languages most

42

frequently aligned gestures with locative expressions. The findings partly met the predictions. The prediction for German were that gestures align with locative expressions. This prediction was met. The second prediction however, that German speakers predominantly use path only-gestures, was not met.

In German, the posture verbs are used most frequently. Within the posture verbs, *stellen* 'stand' and *legen* 'lay' are used most frequently. The distinction Berthele (2012) makes for the three posture verbs, was reflected in our data. The strong tendency towards use of the active verb forms in German can partly be explained by the instructions that were given which explicitly asked, 'what did the woman do?'. The question itself was stated in the active form and thus seemingly primed answers that use the same structure. In contrast, regarding sentence structures there was a lot more variation between German speakers. However, each participant only made use of two or three of the available structures. This can also be explained by the unnatural setting that was quite restrictive in the topic of conversation. Still, the results are very interesting in the sense that they show that German shows stark flexibility of sentence structure not only theoretically but that participants made use of that flexibility in spoken language. Turning to Mandarin Chinese, the verb 放*fang4* 'put' was used most frequently. This is in accordance with previous studies about placement events in Mandarin Chinese (Chen, 2010).

However, verb compounds of the sort that was outlined in section 2.2.3 only rarely occurred. Instead, the construction that most frequently occurred consisted of the general verb 放*fang4* 'put' subsequently followed by a locative phrase. This is <u>not</u> in line with previous findings on how Mandarin Chinese speakers talk about placement events. However, we propose that in Mandarin Chinese there are different ways to encode placement events as introduced in 2.2.3. Whether and how the use of those forms is limited to certain contexts should be empirically investigated in a future study. It seems that verb compounds are used more frequently to describe removal events than to describe placement events. The examples in Chen (2010) as well as examples in the current data furthermore seem to suggest that if occurring in a placement event, they mostly occur with 进*jin4* 'enter' in the V2 position. Furthermore, they occur more often in cases where there is no locative phrase. Such phrases are typically not placement events but motion events in a more general way that do not specify information about the ground (goal). Although the general verb 放 *fang4* 'put' was used most frequently, the data shows that Mandarin Chinese also provides means to refer to the end configuration of the object in relation to the surface. Such information can be expressed in a second verb phrase that specifies the result of the placing event. Furthermore, in Mandarin Chinese speakers referred to the manner of putting (e.g. flat).

However, those cases only rarely occurred in the data. Again, it would be interesting to further investigate if such utterances are used more frequently in other contexts and with other stimuli. It should also be noted at this point that the terminology to describe Mandarin Chinese differs strongly between scholars. This is probably due to difficulties that arise when trying to map a terminology that was primarily established to describe Western languages onto languages like Mandarin Chinese. Hopefully, the suggestion about how to describe placement events in Mandarin Chinese is still regarded as sensible. The analysis of utterance type for Mandarin Chinese showed, that the use of the active form was dominant as well. This is also interpreted as possibly having come about as a result of how the initial instructions had been expressed. Regarding the sentence constructions, BA-constructions were used most frequently. In Mandarin Chinese, the participating speakers were more flexible in their use of structures within participants than in German. This might partly be due to the fact that Mandarin Chinese speakers engaged in more conversation that was not part of the task per se which may have led to a more natural flow of conversation than was the case for German participants. The dominance of BA-utterances was not surprising given previous analyses of placement events in speech (Chen, 2010). However, it is interesting to note that 17% of those BA-utterances were followed by simple verb location constructions that did not need a second mentioning of the agent nor the object. The same was true for SVO structures, that also dropped subject and object (mean: .60, *SD* .43). This contributes to our understanding of Mandarin Chinese as a pro-drop language.

Turning to gestures, an interesting picture emerges. Whereas for the alignment with speech both languages behave similarly, there is a small difference in the use of handshape between the languages. The most frequently used handshape varies between the two languages. In German, the flat hand, expressing surfaces or locations, occurs most frequently, while in Mandarin Chinese the grasping hand, expressing object information, occurs most frequently. Furthermore, in German, the relaxed handshape, expressing only path, accounts for a larger proportion of gestures than in Mandarin Chinese. In German, the relaxed hand and the grasping hand occur almost equally often. In Mandarin Chinese on the other hand, the relaxed hand occurs least often.

The gesture analysis has implications for how the two languages seem to conceptualize placement events. German native speakers most frequently use a flat hand, seeming to reflect attention to the location, the end configuration of the figure itself or the surface (this cannot be ultimately determined). In contrast, Mandarin Chinese speakers most frequently use a grasping hand, seeming to reflect attention to the figure and the actual manual handling of the object. Event construal is argued to be shaped by

linguistic properties of the respective language. In the current data the linguistic properties in placement events that occurred most strongly and thus presumably contribute to event construal were, for Mandarin Chinese, the use of a light verb, and for German the use of posture verbs. For Mandarin Chinese the use of the BA-construction was also dominant in the data pattern. As explained, German posture verbs are used dependent on the figure's properties and the end configuration of the figure in relation to the ground. The frequent use of the flat hand that can either refer to the end configuration of the object, the surface or both thus seems to show that an important focus of German speakers is the end configuration of the object, and ultimately that verb semantics shape event construal in that sense. In Mandarin Chinese, the general verb does not include semantic information about the figure or its end configuration to the ground. Furthermore, the BA-construction stresses the manipulation of the figure (without any implications about the spatial properties of that figure). The grasping handshape can therefore be interpreted as Mandarin Chinese speakers putting a focus on the manual handling of the object in their conceptualization of the placement event which could be influenced by the general verb or the BA-construction.

There is a strong tendency in both languages towards an alignment with locatives. However, there is still a slight difference between the two languages. While German speakers barely ever align their gestures with objects, in Mandarin Chinese this occurs more frequently. This is true for the BA-construction and the topic-comment construction.

Turning to the within-language results it should be stated that the within-language analysis only has a limited explanatory power since dividing the data up in sentence constructions only left us with a very small data set for each construction. Further, the standard deviation was very high. Conclusions should thus be treated very carefully.

As the within-language analysis for Mandarin Chinese shows, the grasping hand is most frequently used in BA-constructions as well as in topic-comment constructions. This could be because the BA-constructions put a focus on the object and because its original meaning of "to hold" is not yet fully bleached in modern Mandarin Chinese. The results in gesture suggests that a focus on the object is also true for topic-comment structures in Mandarin Chinese. However, a difference between the occurring gestures within BA-constructions and topic-comment structures concerns the occurrence of path only gestures. They are used more often in topic-comment structure, where they make the second largest proportion. In BA-constructions information about path only occurs very rarely. The within-language

analysis furthermore shows that the structure for which gestural behaviour is most different, is the SVO-structure in Mandarin Chinese. Remarkably, this structure shows the closest similarity to the German data (compared to mean proportion of handshape over all utterance types). In the Chinese data, the flat hand is the most frequently used handshape in SVO structures, which is not true for other structures. Although the alignment of gestures is similar in both languages, there are still some interesting points to consider in the within-language analysis. In German, the utterances in which location is fronted seem to be different from the other constructions. Here the grasping handshape occurs a lot more often than in instances where object and subject are fronted. Utterances with fronted location usually follow an utterance in which the picking-up was mentioned subsequently. They only mention the location and the verb. The grasping handshape in this case might be a visual reminder of the object that is not mentioned again. It is in those cases complementary to speech. In Mandarin Chinese, the differences in alignment of gestures are not that obvious. A slight difference seems to occur in the BA-construction where we see that gestures more often align with verb-location in speech in comparison to other structures. In topic-comment constructions alignment with location occurs most frequently and in a higher proportion compared to the other structures. Recalling that in topic-comment structures the grasping hand was prominent, and aligning with locative expressions was prominent, the findings could be interpreted in light of McNeill & Duncan's (2000) suggestion that gestures build a frame for topic-comment structures. The handshape of the gesture refers to the topic (the figure), whereas alignment occurs with new information (location). Gestures thus build a frame from topic to comment. In the current data this might even be true for BA-constructions, where the grasping handshape occurs most frequently, and gestures most often align with locative expressions.

To summarize, our study seems to suggest that there are slight differences in event construal of placement events between Mandarin Chinese and German speakers. In Mandarin Chinese, the figure that undergoes motion seems to be more important in event construal than this is the case for German speakers. The gesture analysis shows that Mandarin Chinese speakers attend to information about figure as well as location. German speakers attend to information about location and end configuration in relation to the ground. The within-language analysis showed that object incorporation in the form of the grasping hand occurs most often in the BA-construction in Mandarin Chinese. In German, the grasping handshape occurs most often when location is fronted.

5.2 Discussion of the design of the study

A critical discussion of the method that was used in our study is important for future research to avoid weaknesses that occurred in this study. First of all, none of the participants that took part in the study was a monolingual in the sense that they had never been exposed to another language. As studies on bilingualism in the visual modality show, the second language of a speaker can influence speech and gestures in their native language (Brown & Gullberg, 2008). In that respect, the data that was elicited might not represent how monolingual speakers of the respective languages would behave in speech or in gesture. The fact that all participants are living in a Swedish speaking environment where they are exposed to languages other than their native language regularly might have even strengthened such biases. Unfortunately, due to temporal and financial limitations it was not possible to travel to the respective countries to recruit monolinguals. However, a future study might improve in that sense. It would be interesting to see if there are strong differences in comparison to our study.

Concerning the setup of the study, the visual protection was used to prevent the participants from pointing to the picture of the empty room. However, it might have increased the feeling of being in an unnatural communicative situation. Furthermore, it might not have been totally obvious for the participant that the confederate would still be able to see all their movements and thus could have led to a decrease in gestural behavior. Still, we tried to set up the visual protection in a way that allowed the participant to fully see the confederate who was not covered by the visual protection. The cameras also contributed to the unnaturalness of the setting. This is a classic case of the observer's paradox, where it might be the case that participants' language use varied from their normal use of language because they were aware of the fact that their language was in focus of the study. However, we hope that this was not as much the case for gestures, since participants did not anticipate that gestures would be the main subject of investigation. Thus, in regard to gestures we hopefully avoided the observer's paradox. Since inferential statistics are not included in the current study, the results can only be seen as trends. An inferential statistical analysis is needed to test the robustness of the conclusions that have been drawn.

5.3 Conclusion and outlook

Overall, our study contributes to the body of empirical work within the field of event construal studies by adding information about Mandarin Chinese speakers' gesture in a sub-domain of motion events that has not been investigated empirically before. The study shows that speech-accompanying gestures can provide interesting results that complement our understanding of language structures, verb semantics, as

well as event construal. It has been shown that there is a slight difference in handshapes between Mandarin Chinese and German speakers. For alignment with speech there was no big difference between the two languages. In sum, the results of this study suggest a slight difference in event construal of placement events between the two languages investigated, in that Mandarin Chinese speakers attend to information about end or goal location as well as figure, whereas German speakers attend to information about goal location and end configuration of the object. The findings are in line with previous studies on placement events that have suggested that differences in verb semantics result in crosslinguistic differences in event construal. Since Mandarin Chinese speech data showed that speakers use different ways to encode placement events, future studies should address how the use of those structures is constrained. Furthermore, it would be interesting to explore whether the slight differences that were shown in handshape and alignment between SVO and topic-comment structures in Mandarin Chinese hold true for a bigger data set. In this respect, the current study cannot provide sufficient answers, because the BA-construction was used in the majority of cases. Thus, the conclusions about SVO and topic-comment structures are based on a very small data set. It would also be necessary to conduct a study with monolinguals to exclude effects that might arise due to the other languages participants speak. We hope that future studies will take these findings into consideration and can build on observations that were made in this thesis.

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Materials

"Placement event clips, the Messy task, version 1, designed by Marianne Gullberg, 2002, the Multilingualism project, Max Planck Institute for Psycholinguistics."

Marianne Gullberg and Peter Indefrey (2003), Language Background Questionnaire. Developed in The Dynamics of Multilingual Processing. Nijmegen, Max Planck Institute for Psycholinguistics.

Appendices

Appendix 1: Meta data of participants. M = male; F = female; G = German; M = Mandarin Chinese.

Participant	age	Gender	education	handedness	multilingual	in Sweden since	Swedish level 0-5	other languages	Native language
1	35	M	PhD	right	no	7 years	2	English	G
2	26	M	Bachelor	right	no	19 months	3	English, French	G
3	26	F	Bachelor	right	no	8 months	0	English, Spanish	G
4	24	F	Bachelor	left	no	7 months	0	English	G
5	23	F	Bachelor	right	no	7 months	2	English, French, Spanish	G
6	22	F	Bachelor	right	no	7months	1	Dutch, English, French, Italian	G
7	20	F	Abitur	right	no	7months	1	English, Latin, Greek	G
8	28	M	Bachelor	right	no	6 months	0	English, French, Spanish	G
9	22	F	Abitur	left	no	2,5 years	3	English, French	G
11	50	F	Master	right	no	23 years	5	English, Danish, French, Italian, Spanish, Persian	G
12	26	F	Bachelor	right	no	7months	0	English, French, Spanish, Danish, Kiswahili	G
13	28	F	Bachelor	right	no	19 months	0	English, French	G
14	23	F	Bachelor	right	no	7 months	0	English, French, Spanish	G
15	33	F	PhD	right	no	6 months	1	English, French	G
17		F	Bachelor	right	no	8months	0	English, French, Spanish	G
18	25	F	Bachelor	right	no	7 months	2	English, French, Spanish	G
19	29	M	Bachelor	right	no	16 months	0	English, Japanese	M
20	26	F	Bachelor	right	no	7 months	0	English	M
21	28	F	Master	right	no	7 months	0	English	M
22	23	F	Bachelor	right	no	8 months	0	English	M
23	30	F	PhD	right	no	5,5 years	1	English	M
24	62	F	Bachelor	right	no	27 years	3	English	M
25	24	F	Bachelor	right	no	18 months	1	English	M
26	35	M	Bachelor	right	no	5 years	2	English	M
27	26	F	Master	right	no	2,5 years	1	English	M
28	27	F	Master	right	no	8 years	5	English	M
29	25	F	Bachelor	right	no	12 months	0	English	M
30	29	F	Master	right	no	5 years	3	English	M
31	30	F	Bachelor	left	no	2 years	0	English	M

Based on: Marianne Gullberg and Peter Indefrey (2003), Language Background Questionnaire. Developed in The Dynamics of Multilingual Processing. Nijmegen, Max Planck Institute for Psycholinguistics.

Appendix2: Languge background questionnaires

Language background questionnaire German

Fragebogen zum Sprachhintergrund

Name: Datum:

Hier finden Sie Fragen zu Ihrer Ausbildung, Ihrem Beruf sowie Ihrem Sprachgebrauch. Bitte beantworten Sie diese Fragen so genau wie möglich.

Alter:
Geschlecht:

Was ist Ihr höchster Bildungsabschluss (z.B. Abitur, Universitätsabschluss)?

Was ist Ihr Beruf? (z.B. Student, Lehrer):

Sind Sie Rechts- oder Linkshänder?

Seit wann leben Sie in Schweden?

Was ist Ihre Muttersprache?

Sind Sie mehrsprachig aufgewachsen?

Bitte listen Sie andere Sprachen auf, mit denen Sie vertraut sind. Für jede Sprache geben Sie außerdem an, wie gut Sie diese auf folgernder Skala beherrschen:

nicht gut   1   2   3   4   5   sehr gut

Sprache	Sprechen	Hören	Schreiben	Lesen	Grammatik	Aussprache
1						
2						
3						
4						

Bitte geben Sie für die aufgelisteten Sprachen an, in welchem Alter und wo Sie die Sprachen gelernt haben. Außerdem, ob sie sie durch formalen Unterricht (z.B. in der Schule) oder durch informales Lernen (zB. Zuhause, von Freunden) gelernt haben.

Sprache	Land	Alter	Formaler Unterricht: ja/nein	Dauer des Unterrichts	Informal: ja/nein	Dauer des informalen Lernens
1						
2						
3						
4						

Bitte geben Sie für die aufgelisteten Sprachen an, wie sehr Sie mit folgenden Aussagen übereinstimmen auf folgender Skala:

stimme nicht zu   1   2   3   4   5   stimme zu

Sprache	Ich spreche diese Sprache gerne	Ich finde es wichtig, diese Sprache gut zu sprechen
1		
2		
3		
4		

Im Allgemeinen, wie sehr *mögen* Sie es neue Sprachen zu lernen?

überhaupt nicht   1   2   3   4   5   sehr

Im Allgemeinen, wie *leicht* fällt es Ihnen neue Sprachen zu lernen.

nicht leicht   1   2   3   4   5   sehr leicht

Wenn Sie andere Anmerkungen über Ihre Sprachbenutzung haben, die Sie für relevant halten, bitte schreiben Sie darüber hier:

Based on: Marianne Gullberg and Peter Indefrey (2003), Language Background Questionnaire. Developed in The Dynamics of Multilingual Processing. Nijmegen, Max Planck Institute for Psycholinguistics.

Language background Questionnaire Chinese

语言使用历史调查问卷

姓名: 日期:

以下问题旨在了解您的教育背景、职业以及语言使用习惯。请您尽可能准确地回答每一个问题。

您的认真回答对我们非常重要，感谢您的合作！

年龄:

性别:

您的教育水平是什么？(例：高中，大学)：

您的职业是什么? (例：学生, 老师，律师):

您惯用左手还是右手?

您的母语是什么?

您在瑞典居住多久了?

您是在多语言的环境下长大的吗？

请在下表第一列中列出所有您可以使用的语言。并请针对右列的每个使用维度按 1-5 分从低到高对您的语言使用水平进行评分

语言	口头表达	听力理解	书面表达	阅读理解	语法	发音

语言	国家	年龄	正式授课 是 / 否	正式学习 时长	非正式学习 是 / 否	非正式学习 时长
1						
2						
3						

针对上面列出的语	4						

言，请在下表中列

出您学习这门语言的地点和年龄，并选择相应的学习形式：是通过正式授课（例如：在学校或通过课程学习）还是非正式学习（例如：在家，在工作场合或通过朋友习得）

针对您所列出的语言，请针对以下说法按 1-5 分就您的同意程度进行评分。

同意　1　　2　　3　　4　　5　　不同意

总的
来 说 ，
您是
否喜
欢学
习新
的语
言?

语言	我喜欢使用这门语言	在使用这门语言时我感觉自信	我认为能良好运用这门语言很重要
1			
2			
3			
4			

不喜欢　1　　2　　3　　4　　　5　　喜欢

总的来说，您觉得学习新的语言是否容易?

很难　　　1　　2　　3　4　　　5　　　简单

如有关于您语言使用能力的任何补充说明，请在以下进行说明：

Appendix 3: Consent forms

Consent form German

CENTRE FOR LANGUAGES & LITERATURE
LUND UNIVERSITY

LUND
UNIVERSITY

PO BOX 201, 221 00 Lund, Sweden

Einverständniserklärung
Zur Teilnahme an der wissenschaftlichen Studie

Ich erkläre mich hiermit einverstanden, dass die heute erhobenen Aufnahmen von mir (Ton und Video), von Vera Trojansky und Marianne Gullberg für die folgenden Zwecke verwendet werden dürfen:

(Bitte die zutreffenden Boxen "☐" markieren, wenn Sie Ihr Einverständnis geben.)

☐ 1. Analyse für wissenschaftliche Forschung

☐ 2. Als Illustration der oben erwähnten wissenschaftlichen Forschung in Seminaren, Vorlesungen, auf Konferenzen und in wissenschaftlichen Veröffentlichungen.

    ☐ als unbewegte Fotografien;

    ☐ als Videoclips.

Meine Anonymität ist garantiert. Unter keinen Umständen wird meine persönliche Identität jemandem außer den oben erwähnten Wissenschaftlern preisgegeben (es werden bspw. keine Namen in Präsentationen der Aufnahmen verwendet).

Ich weiß, dass ich die Möglichkeit habe, meine Teilnahme an dieser Studie jederzeit und ohne Angabe von Gründen abzubrechen, ohne dass mir daraus Nachteile entstehen.

Name   Unterschrift   Datum

Nummer des Teilnehmers: _____

Based on: Marianne Gullberg and Peter Indefrey (2003), Language Background Questionnaire. Developed in The Dynamics of MultilingualProcessing. Nijmegen, Max Planck Institute for Psycholinguistics.

Consent form Mandarin Chinese

CENTRE FOR LANGUAGES & LITERATURE
LUND UNIVERSITY

PO BOX 201, 221 00 Lund, Sweden

知情同意书

我特此准许瑞典隆德大学语言及文学中心的 Vera Trojansky, Marianne Gullberg 将今天的录音及录像资料用于以下用途：

（如您同意以下用途，请勾选对应的方框）

❑ 1. 用于以科学研究为目的的分析

❑ 2. 用于专业研讨会、讲座、会议以及出版物中对上述科研项目的说明
　　❑ 用作图片注释
　　❑ 用作示例短片

我已知晓我的身份信息会得到保密。在任何情况之下，我的个人信息都不会被透露给任何第三方（例如：在进行示例展示时，参与者真实姓名会被隐去）。

姓名　　　　　　　　　　　签名　　　　　　　　　　　日期

_____

参加者编号：

Based on: Marianne Gullberg and Peter Indefrey (2003), Language Background Questionnaire. Developed in The Dynamics of Multilingual Processing. Nijmegen, Max Planck Institute for Psycholinguistics.

Appendix 4: Instructions

Instructions Confederate German
Die Person Ihnen gegenüber wird gleich 8 kurze Videoclips sehen. Nach jedem Clip wird sie beschreiben was passiert ist. In jedem Clip werden vier Aktionen durchgeführt. Durch diese Aktionen landen Objekte an unterschiedlichen Orten.
Sie haben ein Bild des leeren Raumes vor sich, in dem die Aktionen durchgeführt wurden. Ihre Aufgabe ist es, die Objekte in das Bild einzuzeichnen (ihre Endposition). Wenn eine Beschreibung nicht klar ist, können Sie Fragen stellen.

Instructions participant German
Sie sehen gleich 8 kurze Videoclips. In jedem Clip werden vier Tätigkeiten ausgeführt. Jeder Clip wird nur einmal gezeigt.
Ihre Aufgabe ist es, den Clip anzuschauen und danach der Person, die Ihnen gegenübersitzt, zu beschreiben was passiert ist. Neben sich finden sie eine Wortliste zur Gedächtnisunterstützung.

Die Person gegenüber hat ein Bild von dem leeren Raum und soll anhand der Beschreibungen, die Sie geben in dieses Bild hineinzeichnen, was mit den Objekten im Clip passiert ist.
Nachdem Sie die Aktionen beschrieben haben und die Person gegenüber diese eingezeichnet hat, können Sie zum nächsten Clip übergehen.

Instructions Confederate Mandarin Chinese
坐在您对面的人要观看八盘 短片。每次看完一盘之后，他会告诉您短片的内容。每一盘短片中有四个行动。通过这四个行动，物品被搬到不同的地方。您面前有一个空房间的画面。请您把物品画在它最后被摆放的位置。如果描述不清楚，请您尽管问候。

Instructions participant Mandarin Chinese
您会观看八盘小短片。每一盘短片中有四个行动。通过这四个行动，一个房间里的物品会被搬到不同的位置。每一个短篇，您只会看一次。看完第一盘短片之后，请您把短片的内容描写给坐在您对面的人。这个人有一副空房间的画面。他会按照您的描写把物品画在它最后被摆放的位置。您的搭档画完之后，请您看下一盘短片。

Based on: "Placement event clips, the Messy task, version 1, designed by Marianne Gullberg, 2002, the Multilingualism project, Max Planck Institute for Psycholinguistics."

Appendix 5: Picture of the empty room
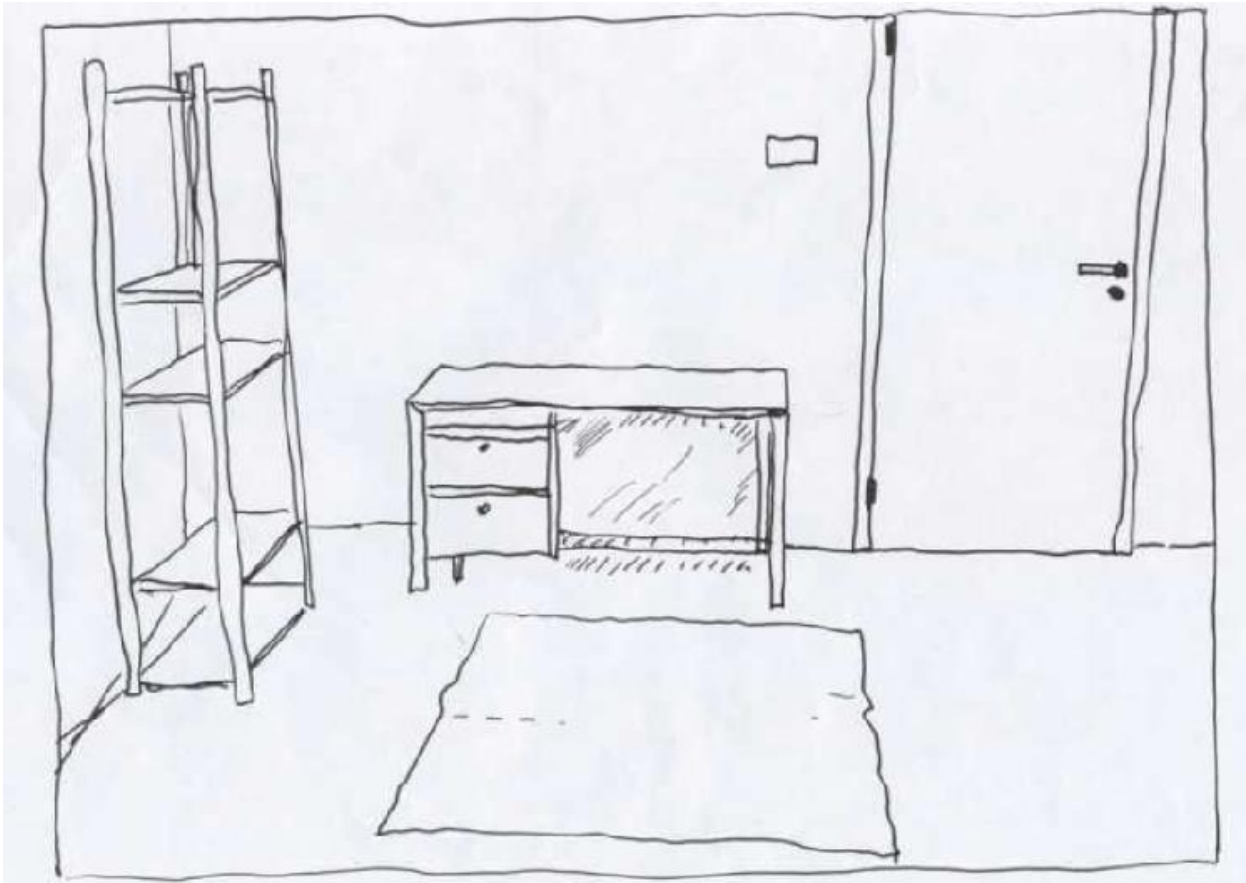
Taken from: "Placement event clips, the Messy task, version 1, designed by Marianne Gullberg, 2002, the Multilingualism project, Max Planck Institute for Psycholinguistics."

Appendix 6: Stimuli

Description	status/orient
Wastepaperbasket_stand_floor	Vertical
Hanger_hang_shelf	*filler*
Chair_stand_u_table/floor	Vertical
Tablecloth_lie_table	Horizontal
Bananas_lie_bowl	Horizontal
Bowl_stand_table	Vertical
Crocodile_lie_table	Horizontal
Rope_hang_post	*filler*
Clock_hang_wall	*filler*
Football1_lie_u_chair/floor	Horizontal
Football2_lie_drawer	Horizontal
Alarmclock_stand_table	Vertical
Hippo_sit_table	Vertical
Books_stand_shelf	Vertical
Comic books_lie_shelf	Horizontal
Bottle1_stand_shelf	Vertical
Trousers_lie_drawer	Horizontal
Bear_stand_table	Vertical
Pingpongball_hang_wall	*filler*
Toyhat_bear	*filler*
Sweater_hang_chair	*filler*
Videotape_lie_box	Horizontal

Videobox_stand_shelf	Vertical
Papers_lie_wastepaperbasket	*filler*
Towel_tshirt_lie_bag	Horizontal
Bag_stand_floor	Vertical
Bottle2_lie_shelf	Horizontal
Shirt_hang_hanger/shelf	*filler*
Hat_head	*filler*
Keyring_hang_neck	*filler*
Chewinggum_u_table	*filler*

Taken from: "Placement event clips, the Messy task, version 1, designed by Marianne Gullberg, 2002, the Multilingualism project, Max Planck Institute for Psycholinguistics."

Appendix 7: word lists

List of words German

Mülleimer
Kleiderbügel
Stuhl
Tischdecke

Bananen
Schüssel
Krokodil
Seil

Uhr
Fußball
Fußball 2
Wecker

Nilpferd
Bücher
Comicbücher
Flasche

Hose
Bär
Tischtennisball
Kleiner Hut

Pullover
Videokassette
Videoschachtel
Papiere

T-shirt
Handtuch
Tasche
Flasche 2

Bluse
Hut
Schlüsselanhänger
Kaugummi

Based on: "Placement event clips, the Messy task, version 1, designed by Marianne Gullberg, 2002, the Multilingualism project, Max Planck Institute for Psycholinguistics."

List of words Mandarin Chinese

字纸篓
衣架
椅子
桌布

香蕉
碗
鳄鱼
绳索

钟表
足球
第二足球
闹钟

河马
书
漫画
瓶子

裤子
熊
乒乓球
小帽子

毛衣
录像
录像箱子
文件

体恤
毛巾

包
第二瓶子

衬衫
帽子
钥匙环
口香糖