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From co-actions to intersubjectivity throughout Chinese ontogeny: A usage-based analysis of knowledge ascription and expected agreement

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Abstract

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This study is based on a novel model of analysis proposed in (Author 2018) that combines results from experimental research in theory of mind (ToM) (Goldman 2006; Apperly 2010; Wilkinson & Ball 2012) with the notion of intersubjectivity in usage-based linguistics (i.a. Verhagen 2005; Nuyts 2012; Traugott 2012). The present approach to intersubjectivity is based on a mismatch between interaction as mere 'co-action' vs. interaction as spontaneously communicated awareness of an(other) mind(s). We provide two case studies centred on the first language acquisition of the aspectual/evidential marker 过 *guo* and the sentence-final particle 吧 *ba* in Mandarin. A combination of multiple correspondence analysis and mixed effects logistic regression of spontaneous use of the two markers indicates that, beyond expressions of joint attention, children's ToM ability progressively underpins 'ad-hoc' generalised instantiations of extended intersubjectivity. Extended intersubjectivity underpins the socio-cognitive skill to overtly problematise what a general persona would act, feel, know, or potentially think in a specific context (Author 2018). This usage-based model further supports the evolutionary hypothesis of a shift from triadic to collective intentionality (cf. Tomasello 2019: 7).

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From co-actions to intersubjectivity throughout Chinese ontogeny: A usage-based analysis of knowledge ascription and expected agreement

Abstract

This study is based on a novel model of analysis proposed in (Author 2018) that combines results from experimental research in theory of mind (ToM) (Goldman 2006; Apperly 2010; Wilkinson & Ball 2012) with the notion of intersubjectivity in usage-based linguistics (i.a. Verhagen 2005; Nuyts 2012; Traugott 2012). The present approach to intersubjectivity is based on a mismatch between interaction as mere 'co-action' vs. interaction as spontaneously communicated awareness of an(other) mind(s). We provide two case studies centred on the first language acquisition of the aspectual/evidential marker 过 *guo* and the sentence-final particle 吧 *ba* in Mandarin. A combination of multiple correspondence analysis and mixed effects logistic regression of spontaneous use of the two markers indicates that, beyond expressions of joint attention, children's ToM ability progressively underpins 'ad-hoc' generalised instantiations of extended intersubjectivity. Extended intersubjectivity underpins the socio-cognitive skill to overtly problematise what a general persona would act, feel, know, or potentially think in a specific context (Author 2018). This usage-based model further supports the evolutionary hypothesis of a shift from triadic to collective intentionality (cf. Tomasello 2019: 7).

1. Introduction

This study combines experimental research focusing on theory of mind (ToM) from cognitive psychology (Premack and Woodruff 1978; Goldman 2006; Apperly 2010) with the concept of intersubjectivity in usage-based linguistics (i.a. Verhagen 2005; Traugott 2012; Nuyts 2012). We first discuss strengths and weaknesses in the literature from both domains. We then bring to the fore the desiderata for a gradient and cross-disciplinary approach, with applications in linguistic analysis hinging on pragmatic competence and cognitive psychology, but also forensic, and social sciences. The present model is based on an operational distinction between the 'behaviour-oriented' notion of co-actionality (cf. Reich 2011; Author 2016a, 2017b, 2018) and the 'ToM-oriented' one of intersubjectivity. Co-actional behaviour hinges on target-oriented joint projects (i.a. Clark 1996) that involve at least two agents. By default it underpins all those linguistic co-actions that may be performed without marked functions signalling Speaker/writer's (Sp/w) awareness of Addressee/reader's (Ad/r) emotions or beliefs. This distinction is specifically relevant from a

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cognitive perspective as it has been shown that communication occurring as co-actional engagement may occur in both low and high levels of the autistic spectrum (Happe 1995; Grant et al. 2004; Bowler and Benton 2005). In a similar fashion, infants and children younger than 3–4 have shown abilities to successfully engage in dialogic and/or behavioural activities involving joint attention before being able to pass false-belief tests (O’Neill 1996; Moll and Tomasello 2007). We thus provide a new applied corpus-based approach tackling ToM as a gradient mechanism, shifting from mere co-actional joint attention to more inferential construing of specific or general personas’ minds. This framework tackles ToM development as an increasingly complex ability to relate to other personas’ emotions and beliefs which can be observed through the child’s spontaneous interaction.

A fundamental element for the operationalisation of the gradient model is **polysemy**. Linguistic constructs diachronically develop new polysemies that are increasingly oriented towards the communicated awareness of the addressee, or any other mind who is not directly involved in the conversation (cf. Traugott & Dasher 2002; Author 2017a). In a similar fashion, the gradient model predicts that increasingly intersubjectified polysemies of the same item are going to be progressively acquired and spontaneously mastered at comparatively later stages of ontogenetic development (cf. Ellis & Larsen-Freeman 2006; MacWhinney 2006; Traugott 2009 on the ‘applied turn’ of diachronic analysis). In Author (2018) the gradient model is put into play with a special emphasis on the First Language Acquisition (FLA) of increasingly intersubjectified polysemies hinging on generic reference of *such* (e.g. *What do why do they have to have such long nails?* Childes/Macwhinney/79b1 4; 9 ; *There’s no such thing as it went that way.* Childes/Hall/Mig 4; 6) in British and American English. One of the main aims of the present study is to extend the model proposed in Author (2018) to other languages, and to verify the cross-linguistic applicability of this framework.

A preliminary illustration of the mismatch between merely co-actional and intersubjectified polysemies of the same form is the imperative construction 你看 *níkàn* ‘look’. Used as a command, 你看 *níkàn* ‘look’ simply establishes joint attention between two or more interlocutors, however it does not express the speaker’s concern about the addressee’s epistemic or emotional state of mind as a result of the utterance. On the other hand, when the same form is used at sentence periphery, as a pragmatic marker (cf. Chen & Pu 2006; Author forthcoming), it then becomes intersubjectively marked:

- (1) CHI: 你看这儿!
nǐ kàn zhèr!
‘Look here!’

1 (2) 你看，咱们这题目起什么好？

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3 nǐkàn zánmen zhè tí mù qǐ shénme hǎo ?

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6 ‘In your opinion which topic should we consider for this?’

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8 Wang Shuo / Bianjibu de Gushi

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10 (Chen & Pu 2006: 4)

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13 In (1) 你看 *nǐkàn* ‘look’ is already mastered by a 2 year old child and corresponds to the simplest
14 realisation of the corresponding speech act (e.g. to direct the addressee’s attention to something
15 present during the here-and-now of the speech event). 你看 *nǐkàn* ‘in your opinion’ in (2) is rather
16 different, it does not refer to a physical object in space and it can be grammatically and semantically
17 omitted. It functions as a surplus of meaning that is additional to the propositional content of the
18 utterance, with the distinctive function of markedly express a concern about the addressee’s epistemic
19 stance about some state of affairs. It is reasonable to expect a child younger than 4 to be able to utter
20 the former expression (1), while it is not farfetched to assume that the latter usage in (2) will be
21 ‘cognitively’ mastered at a later stage of language acquisition and ontogenetic development.

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32 In this paper we discuss the results of two case-studies of increasing mastery to express
33 intersubjectified polysemies. These are centred on ontogenetic Mandarin L1 data from the CHILDES
34 database. The first analysis tackles the relationship between intersubjectivity and knowledge
35 ascription. We focus on different usages of the post-verbal marker 过 *guo*, which originally used to
36 be merely employed as a main verb expressing the meaning of *passing through* (Chappell 2001;
37 Author 2013). The same word then acquired new polysemic functions expressing aspectual
38 completivity (cf. Bybee et al. 1994), personal experience (in the form of an experiential perfect, cf.
39 Comrie 1987, Dahl & Hedin 2000) and finally a new intersubjectified function of knowledge
40 ascription based on interpersonal evidentiality (cf. Author 2013, 2015, 2017a; Guardamagna 2016,
41 2017; Van Olmen 2017), thus marking a past event as a piece of shared knowledge within a
42 community. In our corpus-based study we show that the latter meaning is mastered at a comparatively
43 later stage of FLA. This new meaning combines with a number of formal and behavioural features
44 that become necessary when the awareness of (an-)other mind(s) that goes beyond mere co-actionality
45 is overtly communicated.

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¹ See table 4 in section 4.2 for more information about the CHILDES corpora that have been used in this study.

Our second case-study is focused on the sentence final particle 吧 *ba*, which in turn originates from co-act proposals occurring in the physical domain (e.g. *Let's do p*). The particle subsequently acquired new polysemies underpinning epistemic intersubjective reasoning and expected agreement on behalf of Ad/r or a general third party (e.g. *We can all agree upon p*) (cf. Author 2017b). From a corpus-based analysis of the profiles of each usage of 吧 *ba* it is possible to assess that epistemic functions of the particle are mastered by the child after the fourth year of age, viz. after a critical stage where a ToM mechanism starts to increasingly develop ontogenetically. The data-driven shift from co-actionality to extended intersubjectivity supports Tomasello's claim of abilities of shared intentions and shared knowledge and shared socio-moral values emerging in human evolution between collaborative partners first operating triadically in contexts of joint intentionality, and then later among individuals as members of a cultural group in acts of collective intentionality (cf. Tomasello 2019: 7).

The article is structured as follows: section 2 illustrates the so-called 'false-belief' paradigm from experimental research of theory of mind in cognitive psychology. Section 3 discusses the corresponding notion of intersubjectivity in cognitive linguistics and pragmatics and suggests the desiderata for a hybrid model of analysis that may combine results from experimental research in cognitive psychology and corpus-based analytic methods drawing on the linguistics' literature. Section 3.1 moves one step further and provides a fundamental distinction between co-actionality and codified intersubjectivity. The former underpins any form of engagement with a peer based on behavioural joint attention and subject-oriented per-locutionary effects. The latter is more complex, as it is overtly conveyed grammatically or discursively through an extra-propositional 'surplus of meaning'. This codified effort distinctively tackles the addressee's potential reactions to the utterance (immediate intersubjectivity) and/or the social dimension of what is said (extended intersubjectivity), e.g. whether *p* may be considered as plausible or true by other members of society. Section 4 puts the gradient model of intersubjectivity into play as it looks at children's progressive mastery of different polysemies of 过 *guo* and 吧 *ba*, ranging from meanings expressed in from of co-actions to more intersubjectified and extra-propositional attempts to encode other minds' knowledge and expected agreement.

2. ToM in cognitive psychology

ToM (Theory of mind) regards to the ability to make inferences about another person's mental states. Neurotypical children around four start to develop the ability to 'read' other people's minds and make

1 inferences about their decisions. They thus begin to make assumptions about people's knowledge,
2 beliefs, feelings, and intentions to interpret their behaviour (Onishi and Baillargeon 2005; Surian et
3 al. 2007; Kovács et al. 2010). Crucially, most of ToM research from cognitive psychology has
4 traditionally relied on different versions of so-called 'false-belief' tasks (Wimmer and Perner 1983;
5 Baron-Cohen et al. 1985; Perner et al. 1987). Consider the false-belief scenario below :

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10 *Before Sally leaves for lunch, she hides her ball in the basket. While she is away eating, her big sister*
11 *Anne plays a trick on her and moves her ball from the basket to the box. When Sally returns, where*
12 *will she look for her ball? To succeed on the task, the participant needs to attribute a belief to Sally*
13 *that she (falsely) believes the ball is in the basket and, on the basis of that false belief, will search in*
14 *the basket, not in the box where the ball is really located and where the participant actually knows it*
15 *to be. While many find this task trivial, not every-one passes: children who are 3 years old or younger*
16 *(Wellman et al. 2001) and children with autism (Baron-Cohen et al. 1985) fail to attribute a false*
17 *belief, answering that Sally will search where the object really is, not where she thinks it is.*
18 *Explaining these developmental and neuropsychological findings turns on understanding how the*
19 *underlying neurocognitive mechanisms work.*

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28 (Cohen et al. 2015: 50)

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32 While this behavioural method has generated compelling results, yet most of research centred on
33 ToM has not been moving beyond slight variations of this paradigm (viz. different versions of 'lab-
34 bound' false-belief and perspective-taking task; trait judgements; social animations; judgements on
35 photos of eyes or other non-verbal material). Such 'stimuli-driven' approach led to a heated debate
36 concerning the nature of ToM (cf. Goldman 2006) and the ontogenetic stages in which a ToM is
37 acquired. Nevertheless, it is important to note that much of the existing literature often provides
38 conflicting results. Controversies have been arising about the phenomenological nature of ToM
39 (whether based on a simulation or a folk-psychological theorizing mechanism), the ontogenetic stage
40 in which ToM emerges (e.g. roughly at the age of 4 or 2 years earlier?), whether a distinction between
41 implicit and explicit ToM is acceptable (Perner and Ruffman 2005; Butterfill and Apperly 2013) and
42 the degree to which it underpins autism (cf. Stich and Nichols 1997; Apperly et al. 2008; Apperly
43 2010; Wilkinson and Ball 2012 for specific overviews of the ToM 'impasse'). It has been noted that
44 some controversies may be due to experimental limitations in distinguishing between behaviour-
45 based vs. mental state-based mechanisms of action monitoring (cf. Apperly 2010). For instance, it is
46 debatable whether different versions of perspective-taking tasks can shed clear light on whether 2-
47 year-old infants can predict the incoming action of an agent with a false-belief due to an 'implicit'

1 understanding of the agent's false-beliefs or simply due to behavioural cues linking an agent to a
2 subsequent action (cf. Povinelli and Giambrone 1999; Perner and Ruffman 2005: 215; Penn and
3 Piovinelli 2007). Similarly, the very setting of experimental labs is in turn an inhibitor for addressing
4 ToM as a gradient mechanism, as the experimenter is unavoidably him/herself 'another mind '(cf.
5 Author 2018).
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8 It is thus not surprising that new desiderata to address ToM in cognitive psychology are
9 increasingly welcomed (Apperly 2010; Wilkinson and Ball 2012; Schaafsma et al. 2015; Author
10 2018c), not least because ToM cannot be exclusively tested through simulation tasks, thus being
11 implicitly addressed as a spectator-based theory. This study emphasises the importance of tackling
12 ToM as a mechanism that occurs spontaneously (i.e. not triggered by a stimulus in a lab) during
13 interaction. It equally stresses the importance of accounting for the spatial and contextual conditions
14 that contribute to the linguistic encoding of ToM mechanisms (e.g. whether the speaker knows the
15 addressee; whether she/he is in his/her presence; whether she/he is accounting for a specific or general
16 third party (3rdP); whether the addressee is being involved in a co-action or is simply a listener, and
17 so on).
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27 28 **3. Intersubjectivity in pragmatics and cognitive linguistics** 29 30 31

32 The notion of intersubjectivity in linguistics is often associated with the one of ToM (Premack and
33 Woodruff 1978; Goldman 2006; Apperly 2010). Nevertheless, research on intersubjectivity and
34 intersubjectification is also controversial. One of the crucial issues currently under debate concerns
35 speakers 'marked intentions to account for the emotions/beliefs of other minds and propositional
36 meanings that inherently include a deictic positioning of the speaker with respect to other personas in
37 space. As an illustration, deictic elements such as *this* or *that* semantically encode joint attention
38 among interlocutors (cf. Ferrari and Sweetser 2012). This naturally leads to the question of whether
39 spatial deictics should be considered as markers of intersubjectivity. Some frameworks hold this view
40 (Diessel 2006; Breban 2010; Ghesquierre et al. 2012). In other cases, it is noted that 1–2-year-old
41 infants do indeed learn and actively use deictics before being able to pass ToM false-belief tasks.
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50 From the angle of cognitive grammar, Langacker (1987, 1990, 1991) suggests that the use of
51 pronouns such as *I*, *we*, or *you* foregrounds the speaker's communicative setting (what he defines as
52 the ground) to identify the referent. From this perspective, the conceptualisers 'awareness of the here-
53 and-now of the speech event is expressed by deictics that implicitly establish spatial relationships
54 among speakers and objects. Similarly, demonstratives and determining elements like *such* and *zulk*
55 are elsewhere also considered intersubjective, serving to create a 'joint focus of attention '(Diessel
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2006: 465) by which the speaker negotiates discourse referent tracking for the hearer (Ghesquierre and Van de Velde 2011).

Both Langacker's implicit account of the ground and the 'joint-attention approach' differ considerably from Traugott's approach to intersubjectivity. The latter focuses on meanings that code attention to the social self of the hearer (Traugott and Dasher 2002). In Traugott's framework, less-intersubjective constructions tend to progressively develop new polysemies with new intersubjectified functions. Pragmatic marking (PM) uses of *actually* or *in fact* are in fact often intersubjective. On one hand they merely express connectivity between p and q, on the other they can be used as 'PM hedge' to soften or mitigate what is said and foresee the addressee's possible objections.

Verhagen (2005) tackles intersubjectivity as a form of cognitive coordination between speaker and hearer. From this angle, intersubjective constructions foreground the hearer as active conceptualiser of the speaker's utterances. A case in point are connective functions of *but* or *moreover*, which are often used to accommodate Ad/r's projected expectations through an interaction. Nuyts (2001a, 2001b, 2012) proposes that intersubjectivity involves modal meanings 'presented as being shared between the assessor and a wider group of people, possibly (but not necessarily) including the hearer' (Nuyts 2012: 58), as in forms such as *it is likely*, *unfortunately*, and so on. Drawing on that, Author (2013, 2017a, 2017b, 2018) distinguishes meanings that are specifically aimed at addressing the Ad/r's potential reactions to what is said, from meanings that include a more or less general 3rdP, who conceptually functions as the social bearer of the utterance. The former are defined as immediate intersubjective (I-I) and diachronically precede further reanalysed functions encoding extended-intersubjectivity (E-I). In interactional linguistics, the notion of 'shared understanding' (Linell and Lindstrom 2016) through communicative exchanges is addressed as context-dependent turn-parts of repair, reaction, or expansion to achieve a socially shared cognition (Schegloff 1991, 1992).

The study of intersubjectivity in pragmatics and cognitive linguistics often depends on specific authors' definitions and scopes of enquiry. The same notion may alternatively boil down to DMs like *actually* or *clearly*, connectives such as *but* or *and*, personal pronouns like *I* or spatial deictics such as *this* or *that* or interactional strategies of repair. Yet, if most linguistic phenomena in a way or another can be arguably defined as intersubjective, what is the distinctive applicability of this concept?

Paradoxically, much of the controversies hinging on this concept are often detached from its correspondent notion of ToM in cognitive psychology, with little concern given to 'applied' research (cf. McCafferty 1998; Mori & Hayashi 2006 for applications of intersubjectivity in SLA). In this

1 sense, it is crucial to find a way to exploit the important insights that we can get from the linguistics
2 literature on intersubjectivity and combine them in a model that can be operationally applied in
3 neighbouring disciplines, e.g. cognitive psychology, forensic, and social sciences. In Author (2018)
4 are discussed the desiderata for a cross-disciplinary paradigm. Among them, it is proposed to account
5 operationally for a gradient 'surplus approach' to address whether the problematisation of (an-)other
6 mind(s) is overtly codified as redundant structure (Rizza 2009) or additional element to the mere 'co-
7 actional' (cf. Reich 2011; Author 2016b, 2017b, 2018) meaning of the utterance. From this
8 perspective, the intersubjective dimension underpins all those linguistic elements that are 'un-
9 necessary' for the simplest propositional realisation of a communicative act (entailing a basic 'co-
10 action'), but which are needed to communicate the awareness of a specific addressee or a general third
11 party's potential reactions to the utterance.
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21 **3.1 Co-actions vs. communicated intersubjectivity**

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25 The gradient model is based on the distinction between the notions of co-actionality and
26 communicated intersubjectivity (cf. Author 2017b, 2018). The former refers to linguistic acts as co-
27 act proposals (cf. Reich 2011, 2012; Author 2016a 2016b, 2017a, 2017b 2018; Author 2018) and
28 accounts for linguistic behaviour underpinning any shared activity or joint project (cf. Clark 1996)
29 with a peer. Co-actional engagement thus has to do with 'interested' target-oriented speech events
30 involving at least two agents and can be performed without marked functions signalling the awareness
31 or an Addressee's emotions, knowledge or potential reactions to the utterance.
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39 As an illustration, an agent may be interested in reaching the salt on a dining table with the
40 help of someone sitting nearby. Whatever the utterance chosen by the Speaker, the two interlocutors
41 will be involved in the co-action having to do with Addressee passing the salt to the Speaker. Yet, the
42 Speaker may opt for different strategies and constructions to achieve what s/he wants: for example,
43 *Pass me the salt; Could you please pass me the salt?; Salt!* These are all co-act proposals (cf. Reich
44 2011; Author 2016b; 2018), as they hinge on joint attention and a shared activity among agents.
45 Nevertheless not all of them encode a surplus of meaning that is distinctively centred on the
46 Addressee's state of mind, viz. not all of them communicate a process of 'thinking about thought'
47 (Apperly 2010: 76). While 'humans all have a competence to make sense of the observed behaviour
48 of others, a competence shared with many other animals' (Schaafsma et al. 2015: 65), yet mere co-
49 actional interaction is shown to be possible in both low and high levels of the autistic spectrum (Happe
50 1995; Grant et al. 2004; Bowler and Benton 2005). Infants and children younger than 3 show abilities
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to engage in dialogic activities involving joint attention (O'Neill 1996; Moll and Tomasello 2007).

1 However, 'simply knowing that someone's mental state differs from one's own is not necessarily the
2 same as being explicitly aware of what the other person's mental state is '(c.f. Bradford et al. 2015:
3 23; Schneider et al. 2015). Explanations of successful performance in object-choice tasks based on
4 social-cognitive capacities such as shared intentionality (Tomasello, 2008) and bodily mimesis
5 (Zlatev, 2008; Zlatev et al. 2013) assume that these capacities precede language, in both hominid
6 evolution and child development.
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12 As an overtly expressed surplus of meaning, intersubjectivity hinges on different degrees of
13 complexity: from the communicated awareness of one specific interlocutor's mind, to the
14 communicated awareness of a generic member of society and their likely reactions to the utterance
15 (cf. Author 2017a, 2017b, 2018). Foolen emphasises that "the process of recontextualizing Pragmatics
16 to cognition is clearly a significant aspect of the present dynamics in the field" (2019: 39). On the one
17 hand, intersubjectivity is an overtly communicated dimension that hinges on cognitive abilities and
18 the overt encoding of a ToM mechanism. At the same time, it underpins developmental and social
19 pragmatic competence, as it ultimately boils down to two (both cognitively developed and socially
20 acquired) communicative capacities:
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- 28 i. *Make the addressee aware that you are aware of how s/he may react to what you are*
29 *saying.*
- 30 ii. *Make the addressee aware that you are aware of how most people in (your) society may*
31 *react to what you are saying.*

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36 The first is the **immediate intersubjective** capacity (I-I). It is based on intersubjective awareness that
37 is limited to the mind of the actual persona that is present during the here-and-now of the speech
38 event. The second is the **extended intersubjective** capacity (E-I). This is comparatively more
39 complex, as it is not limited to the marked intersubjective awareness of one single interlocutor. It
40 rather hinges on collective intentionality (cf. Tomasello 2019) and the understanding of social
41 conventions and moral obligations. Extended intersubjectivity underpins social cognition and is thus
42 centred on how a generic social persona is expected to react as a result of what is being said. While
43 it reasonable to assume that the I-I precedes the E-I developmentally (cf. Author forthcoming), the
44 present study will be exclusively focused on the 'broader' developmental shift from co-actionality
45 (viz. intersubjectively unmarked interaction) to extended intersubjectivity and collective
46 intentionality.
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56 57 58 **4. From co-actional joint-attention to extended intersubjectification** 59 60 61 62 63 64 65

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Research in language change and semasiology shows that intersubjectified (viz. addressee-oriented) polysemic functions of a lexeme or construction tend to develop at comparatively later stages of semantic/pragmatic reanalysis (i.a. Traugott 2003, 2012; Narrog 2012; Author 2017a 2017b). In the case of the two constructions of interest of this paper, relatively recent intersubjectified meanings hinge on generic knowledge ascription (this is the case of the Mandarin particle 过 *guo*) and expected agreement (as for the Mandarin sentence final particle 吧 *ba*). The aim of these two case studies is to verify whether and to which degree supposedly intersubjectified functions of a lexeme/construction are indeed mastered and spontaneously uttered at comparatively later stages of ontogenetic development.

4.1 The FLA of the polysemic usages of 过 *guo*

This section focuses on the FLA of the polysemies of 过 *guo* and the comparatively late mastery of usages that underpin evidential functions of generic knowledge ascription and extended intersubjectivity. In particular, it aims to show that the child's mastery of different polysemies of 过 *guo* reflects a progressive shift from usages aimed at co-actional engagement during the here-and-now to new usages aimed at problematising whether a statement can be considered true or reliable by other people.

The Mandarin particle 过 *guo* is polysemic (cf. Li and Thompson 1981; Yeh 1996; Dai 1997; Smith 1997; Xiao & McEnery 2004; Lin 2006, 2007; Chen 2008; Wu 2008; Li 2011 and others). It can thus be employed in a variety of usages (cf. Cao 1995; Dai 1997; Chappell 2001; Chen 2008; Author 2013, 2015), each of which corresponds to different stages of semantic reanalysis (cf. Croft 2003: 232; Traugott & Trousdale 2010:19–44). 过 *guo* originates from a lexical verb, meaning literally *to get through, to pass by a place*, yet when it occurs post-verbally it may be used as a completive (cf. Bybee et al. 1994; Author 2015), viz. expressing actional completion of dynamic verbs of spatial movement (e.g. 递过 *diguò* 'to hand over') or actional completion of durative verbs (e.g. 吃过 *chiguò* 'to finish eating'). The post-verbal 过 *guo* can also be used as an experiential marker, thus marking the past experience of the syntactic subject (e.g. 我去过北京 *wǒ qùguo běijīng* 'I have been to Beijing before'). Finally, in Author (2013, 2015) it is shown that the post-verbal 过

1 *guo* during the last 200 years developed a new intersubjectified meaning, hinging on interpersonal
 2 evidentiality (IE). IE has to do with constructions or strategies aimed at marking a piece of
 3 information as shared knowledge within a community of practise (e.g. 世界上存在过恐龙 *shìjiè*
 4 *shàng cúnzài guo kǒnglóng* ‘It is known that the world was once populated by dinosaurs’).

5
 6 There are a number of criteria to operationally distinguish among completive, experiential and
 7 evidential usages of 过 *guo*. As given in table 1, syntactic subject animacy, grammatical co-
 8
 9 occurrence with the post-verbal perfective 了 *le* (cf. Li & Thompson 1981) and four more features
 10
 11 are at stake when 过 *guo* is employed as a completive:
 12
 13
 14
 15
 16
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18
 19 **过 *guò* as a completive**

- 20
 21 - Indicates the completion of an action.
 22
 23 - It occurs exclusively with dynamic verbs.
 24
 25 - Employed as a verbal complement.
 26
 27 - It can co-occur with the perfective post-verbal 了 *le*.
 28
 29 - It cannot co-occur with the adverbial 曾经 *céngjīng* ‘once’ or 从来 *cónglái* ‘never’.
 30
 31 - It cannot co-occur with inanimate subjects.
 32
 33 - It cannot co-occur with absolute-state predicates.
 34
 35
 36
 37

38
 39 Table 1

40
 41 过 *guo* as a completive (adapted from Author 2015: 86)

42
 43
 44
 45 Table 2 includes the criteria for assessing whether 过 *guo* is employed as an experiential perfect, such
 46 as reference to a syntactic subject’s past experience, ungrammatical co-occurrence with the post-
 47 verbal perfective marker 了 *le*, felicitous co-occurrence with aspectual discontinuity such as 曾经
 48 *céngjīng* ‘once’ or 从来 *cónglái* ‘never’.
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57
 58 **过 *guò* as an experiential**

- 59
 60 - Profiles the syntactic subject’s past experience.
 61
 62
 63
 64
 65

1 - Employed as a perfect in contexts where the syntactic subject has been through some experience
2 before.

3 - Frequently used with dynamic verbs.

4
5 - Used generally in the first person, in negated statements or in second person questions (cf. Dahl
6 1985; Dahl & Hedin 2000).

7
8
9 - It cannot co-occur with the perfective post-verbal 了 le.

10
11 - It cannot co-occur with the adverbial 曾经 céngjīng 'once' or 从来 cónglái 'never'.

12
13 - It cannot co-occur with inanimate subjects.

14
15 - It can co-occur with absolute-state predicates (rare).

16
17
18 - Not felicitous when co-occurring with IE adverbials such as, 据了解 ju liǎojiě 'it is understood that', 好
19 像 hǎoxiàng 'apparently', 众所周知 zhongsuozhōuzhī 'as everyone knows'.

20
21
22
23 Table 2

24
25 过 guo as an experiential (adapted from Author 2015: 87)

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28
29 Finally, in table 3 are given the diagnostics for identifying interpersonal evidential usages of 过 guo.

30
31 Among those, a tendency to occur with adverbials referring to generic knowledge ascription, such as
32 据了解 jù liǎojiě 'it is understood that', 好像 hǎoxiàng 'apparently', 众所周知 zhongsuozhōuzhī 'as
33 everyone knows'.

40
41 **过 guò as an evidential**

42
43 - Profiles the speaking subject's (cf. Benveniste 1971; Traugott 2003; Langacker 2008) acquired
44 information.

45
46
47 - Employed in contexts characterised by an epistemic or presentative stance (cf. Mushin 2001; Faller
48 2002), that is, the speaker/writer markedly 'introduces' a particular piece of knowledge s/he has
49 acquired somehow.

50
51
52 - Frequently occurs declaratively in the third person.

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54
55 - It can co-occur with the perfective post-verbal 了 le.

56
57 - It can co-occur with the adverbials 曾经 céngjīng 'once' or 从来 cónglái 'never'.

58
59
60 - It can co-occur with inanimate subjects.

- It can co-occur with absolute-state predicates (rare).

- Felicitous when co-occurring with IE adverbials such as 据了解 *ju liaojiě* 'it is understood that', 好像 *haoxiàng* 'apparently', 众所周知 *zhongsuǒzhōuzhī* 'as everyone knows'.

Table 3

过 *guo* as an interpersonal evidential (adapted from Author 2015: 87)

Interpersonal evidential usages of 过 *guo* often intersect with inanimate subjects and verbs of appearance, such as 出现 *chūxiàn* 'to appear', 发生 *fāshēng* 'to happen' and similar. Such contexts in Chinese often do not include a syntactic subject. Evidential polysemies of this kind profile a piece of information being marked as shared knowledge within a community. This is in contrast with experiential perfect forms, where an animate syntactic subject is marked as having been through some past experience. Consider the three examples below, respectively including a completive, an experiential and evidential usage (each usage is given in angle brackets '<>'):

<completive>

(1) 哎，早，早饭吃过了吧？

āi, zǎo, zǎofàn chī guò le ba

'Ehi, good morning, had breakfast yet haven't you?'

Callhome data / ma_0721.xml²

<experiential>

(2) 我没去过日本，不知道什么样？

wǒ méiqù guo rìběn, bù zhīdào shénmeyàng

'I never went to Japan, I have no clue about it (shops in Japan).'

Callhome data / ma_0669.xml

<evidential>

(3) 本土就没有发生过战争。

běntǔ jiù méiyǒu fāshēng guo zhànzhēng

² Callhome corpus of spontaneous telephone conversations. <https://ca.talkbank.org/access/CallHome/zho.html> (Last accessed 19/08/19).

‘There has never been a war in this territory.’

CCL Kouyu / Li Ao Duihualu³

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3
4 In (1) 过 *guo* marks the actional completion of the dynamic verb ‘to eat’. The context of *having*
5 *breakfast* in (1) hinges on a conventional activity that we repeat every day and as such cannot convey
6 the syntactic perfect past experience as in **I have once had breakfast* or a piece of shared knowledge
7 as in the evidential *guo* **it is known that I had breakfast*. In fact, the usage of (1) can grammatically
8 collocate with the view-point aspectual marker 了 *le* (expressing perfectivity) and contextually cannot
9 co-occur with adverbials expressing aspectual discontinuity and shared knowledge, which are
10 respectively characteristic of experiential and evidential polysemies of 过 *guo*, e.g. 曾经 *céngjīng*
11 ‘once’, 从来 *cónglái* ‘never’ or 据了解 *jù liǎojiě* ‘it is understood that’.
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23 Things are different in (2), where 过 *guo* is used as experiential perfect. In this case, 过 *guo*
24 does not simply indicate that a specific action ‘has been completed’. Rather, it expresses that some
25 animate subject has been at least once through some past experience. The mismatch between (1) and
26 (2) can be tested with the insertion of adverbials such as e.g. 曾经 *céngjīng* ‘once’ or 从来 *cónglái*
27 ‘never’, which indeed emphasise the speaker’s per-locutionary effects of communicating whether s/he
28 has been to Japan before, rather than indicating whether the action of reaching Japan has been
29 completed.
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37 The final usage in (3) is grounded in social cognition and social epistemology (cf. Goldman
38 & Whitcomb 2011). Here the speaker is neither indicating if an action has been completed, nor is s/he
39 referring to some animate subject’s previous past experience. Rather, s/he is reporting a piece of
40 shared information, paraphrasable as *it is known that p*. In the shift from experiential to interpersonal
41 evidential usages of 过 *guo*, there is an element of persistence (Hopper 1991) of aspectual
42 discontinuity to the present, viz. the results of the event have not been continued up to the time of
43 speech. In fact, similar to the usage in (2), the evidential 过 *guo* in (3) is equally felicitous with
44 adverbials of aspectual discontinuity such as 曾经 *céngjīng* ‘once’ or 从来 *cónglái* ‘never’.
45 Nevertheless, what now is encoded as a surplus of meaning is a marked intention of knowledge
46 ascription, with the communicated intersubjective awareness that *p* is a piece of information which is
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61 ³ Peking University synchronic and diachronic corpus of Mandarin.
62 http://ccl.pku.edu.cn:8080/ccl_corpus/index.jsp?dir=xiandai (Last accessed 19/08/19).
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equally shared by other members of society and which can be potentially confirmed by a general third party. In fact, what is in profile at this stage is not whether *someone has been through some experience*, but rather whether *it is known and potentially confirmed that something happened*. Different from (2), the usage of 过 *guo* in (3) is contextually compatible with evidential adverbials emphasising shared knowledge, such as 据了解 *jù liǎojiě* ‘it is understood that’, 好像 *hǎoxiàng* ‘apparently’, 众所周知 *zhòngsuǒzhōuzhī* ‘as everyone knows’.

In Author (2013, 2015) it is argued that the shift from (1) to (3) occurs diachronically in the form of semasiological change and as a process of intersubjectification. What the next section aims to show is that from a usage-based angle the intersubjective dimension of (3) is similarly spontaneously mastered at comparatively later stages of ontogenetic development.

4.2 A multiple correspondence analysis of the FLA of 过 *guo*

Knowledge ascription is a hot topic in Chinese FLA. It is noted that cross-cultural and language-specific factors might be at play in the ToM of Chinese children who may receive more emphasis on *knowing* relative to *thinking* (Wellman et al. 2006). In conversation with young children, Chinese parents comment predominantly on “knowing” (Tardif & Wellman 2000), whereas U.S. parents comment more on “thinking” (Bartsch & Wellman, 1995). In Chinese preschools and homes, there is great emphasis on acquiring practical knowledge, e.g. tie one’s shoes, write Chinese characters, and recite songs and poems (H. Li & Rao, 2000; Tobin, Wu, & Davidson, 1989). English-speaking preschoolers must also master new knowledge, but the Chinese emphasis on knowledge acquisition at an early age is remarkable (Kessen, 1975; Tobin et al., 1989).

In this section we provide the results of a corpus-based analysis on the progressive mastery of the different polysemic functions of 过 *guo* from the Chinese version of the CHILDES corpora⁴. In particular, we are interested in verifying whether interpersonal evidential usages are indeed acquired at comparatively later stages of ontogenetic development. Behavioural research in cognitive psychology suggests that around the fourth year of age a Theory of mind mechanism starts to be increasingly at play in children’s interactions (i.a. Apperly 2010; Schaafsma et al. 2015). We thus aim at assessing whether the ‘supposedly’ intersubjective dimension of evidential usages of 过 *guo* is indeed spontaneously mastered at comparatively later stages of FLA.

⁴ Project webpage: <https://chilides.talkbank.org>. Last accessed: 15/08/2019.

The Child Language Data Exchange System (CHILDES) is a central repository for first language acquisition data. It includes contents in 26 languages from 130 different corpora. For this analysis we selected our data from Mandarin corpora including Child-Child or Child-Carer/Parent spontaneous interaction and divided them into two ages spans, respectively from 0 to 36 months (0 to 3 years) and from 37 up to 72 months (4 to 6 years). The corpora included in our survey, with respective documentation are reported in table 4:

Corpus	Activities	Project website
AcadLang	<i>Kindergarten; show an apple and a ball to a toy called "little lamb"</i>	https://childes.talkbank.org/access/Chinese/Mandarin/AcadLang.html
Beijing	<i>Home, yard; read a picture book, kick a ball, play with toys, eat, ride a plastic tricycle</i>	https://childes.talkbank.org/access/Chinese/Mandarin/Beijing.html
Chang1	<i>Home; create a story with toys, play with toys</i>	https://childes.talkbank.org/access/Chinese/Mandarin/Chang1.html
Chang2	<i>Home; tell a personal anecdote</i>	https://childes.talkbank.org/access/Chinese/Mandarin/Chang2.html
Frogs/Chinese	<i>Kindergarten; look at a picture book about a frog in it and create a story about it (Mercer Mayer's wordless "frog story" picture book entitled "Frog, where are you?")</i>	https://childes.talkbank.org/access/Frogs/Chinese-Chang.html ; https://childes.talkbank.org/access/Frogs/Chinese-Guo.html ; https://childes.talkbank.org/access/Frogs/Chinese-Tardif.html ; https://childes.talkbank.org/access/Frogs/Chinese-Zhou.html
LiZhou	<i>Kindergarten; role play (making phone calls, cooking, seeing a doctor), peer talk</i>	https://childes.talkbank.org/access/Chinese/Mandarin/LiZhou.html
TCCM	<i>Home; draw pictures and describe, role play (seeing a doctor), help cooking, play with toys, read a book, watch photos and describe</i>	https://childes.talkbank.org/access/Chinese/Mandarin/TCCM.html
Tong	<i>Home; eat, play with toys, tell a story, make drawings</i>	https://childes.talkbank.org/access/Chinese/Mandarin/Tong.html
Xinjiang	<i>Kindergarten; show an apple and a ball to a toy called "little lamb", tell a story about animals</i>	https://childes.talkbank.org/access/Chinese/Mandarin/Xinjiang.html
Zhou1	<i>Home; draw, play with toys</i>	https://childes.talkbank.org/access/Chinese/Mandarin/Zhou1.html
Zhou2	<i>Kindergarten; play blocks and discuss</i>	https://childes.talkbank.org/access/Chinese/Mandarin/Zhou2.html

1	Zhou3	<i>Home; write numbers and characters, read a book, tell a story, play with toys, eat, draw pictures</i>	https://chilDES.talkbank.org/access/Chinese/Mandarin/Zhou3.html
2			
3			
4	Zhou Dinner	<i>Home; dinner conversation</i>	https://chilDES.talkbank.org/access/Chinese/Mandarin/ZhouDinner.html
5			
6			
7	Zhou Narratives	<i>Kindergarten; read a picture book and describe, read a book with both pictures and characters; Hungry Caterpillar and Robber stories</i>	https://chilDES.talkbank.org/access/Chinese/Mandarin/ZhouNarratives.html
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Table 4.
CHILDES corpora included in the survey

We then retrieved all the utterances spontaneously uttered by the child that included 过 *guo* either occurring as a main verb or in post-verbal position. The two subcorpora respectively included 67,388 (0 3 Y) and 189,715 words (4 6 Y). At this point we started our annotation, which was based on the diagnostics listed in tables 1, 2 and 3 listed in 4.1 and accounted for functions of 过 *guo* being used as main verb, as a completive, as an experiential or as an evidential. The annotation also included person and verb-type (e.g. whether the main verb was a verb of movement, stative, a verb of saying or a mental verb) as possible co-variants (cf. Howard et al. 2008 on conversational correlates of ToM and mental verbs). The process of annotation was carried out by two independent researchers and cross-checked with a 93% level of accuracy. Remaining collocates have been disambiguated after a third round of annotation from a third annotator. Given the disparity of data among the two age-spans, we then normalised the annotated occurrences of the 0 3 Y dataset so as to match the overall size of the 4 6 Y one. This led to 173 annotated occurrences of 过 *guo* for the 0 3 Y dataset in contrast with the 439 collocates in the 4 6 Y one⁵.

At this point we started our analysis. We first plotted a multiple correspondence analysis (c.f. Nenadic and Greenacre 2007) of the mutual attraction between age person and usage across our two datasets on a two-dimensional plane. In correspondence analysis modelling, associations among variables are shown by calculating the chi-square distance between different categories of the variables and between observations. These associations can thus be visualised graphically as a map,

⁵ More specifically, in the 4 6 Y sub-corpus (189,715 words) a raw total of all the 439 occurrences of 过 *guo* were annotated. Given the smaller size of the 0 3 Y corpus (67,388), all the 62 annotated strings of 过 *guo* from the 0 3 Y corpus have then been normalised based on the size of the 4 6 Y corpus.

which eases the interpretation of the structures in the data. The closer the distance between variables, the stronger the statistical correspondence. Conversely, the further two variables are apart, the stronger the repulsion. To date, we are not aware of other applications of multiple correspondence analysis (MCA) to spontaneous developmental data. However, it is not farfetched to suggest that the holistic representation of developmental mastery of specific forms that can be obtained with MCA models can clearly become extremely insightful and beneficial for FLA research.

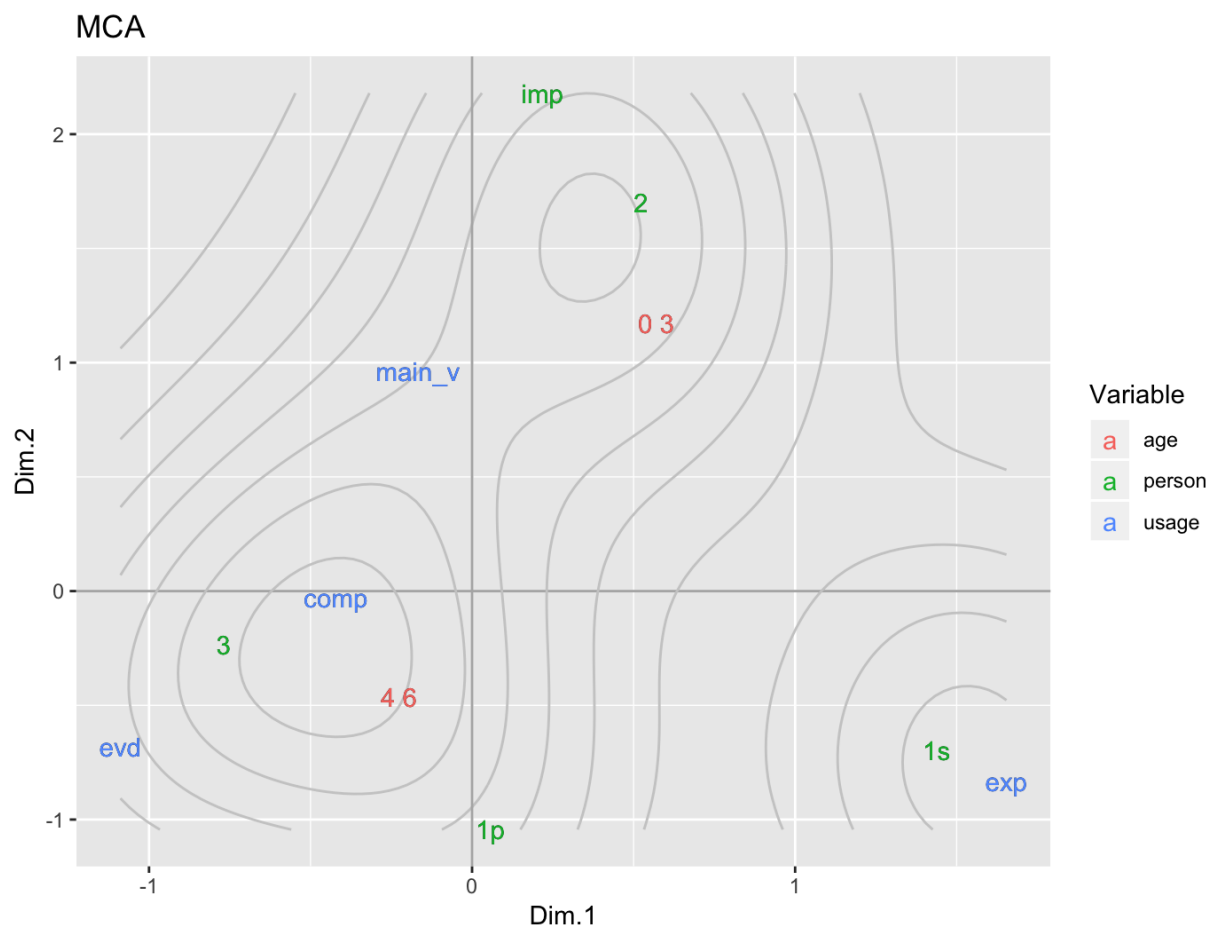


Figure 1

Multiple correspondence analysis of the usages of 徃 *guo* across 0-3 Y and 4-6 Y age spans

From figure 1 above it is already possible to note clear division between the two age spans, respectively 0-3 Y at the top right, and 4-6 Y at the bottom left of the plot⁶. The cluster around 0-3 Y includes 徃 *guo* used as a main verb of movement (*to pass through, to move through*), collocating with second person or impersonal constructions. This suggests that at this stage children still struggle

⁶ The two-dimensional solution described can be assessed with `mjca()` function in the R `ca` package. The summary suggests that two first dimensions capture 80.6 % of inertia (i.e. variance) which is a reliable result for the visualisation of the data on a two dimensional plane (cf. Levshina 2015: 382)

with spontaneous employment of 过 *guo* as a grammatical particle expressing events that are not related to the here-and-now of a speech event. That is, children at this stage still do not employ 过 *guo* to express past experience or evidentially marked information. They rather seem to be able to use 过 *guo* in contexts of action and play, where a direct interlocutor is referred to or where no reference to a piece of information is ascribed to the proposition. Consider the example below:

<main verb>

(1)

CHI2: qī [*] fèn [: 吃饭 chīfàn] 去。

chīfàn qù

‘Going to eat.’

CHI: 你过来！

nǐ guòlái !

‘Come here!’

CHILDES / Beijing / LinLin / 2;00

<main verb>

(2)

CHI: 阿姨，过来！

a yí , guòlái !

‘Auntie, come here!’

MOT: 阿姨要把鞋脱掉吧？

a yí yào bǎ xié tuōdiào ba

‘Auntie needs to take off her shoes first, isn’t it?’

CHILDES / Zhou1 / Shenwen Yi / 2;08

Both (1-2) are contexts, where a co-action is at play between a child and his/her direct interlocutor. The polysemy of 过 *guo* at play at this stage of development hinges on engaging in some practical action aimed at achieving some clear per-locutionary effects, i.e. *eating together with a friend* or *playing with the auntie who has just arrived*. The same applies to completives, which are a post-verbal grammatical particle that similarly marks the actional completion of a dynamic verb. Both

main verb and completive usages of 过 *guo* are telic and instantaneous. This confirms the so-called aspect hypothesis (Shirai 1991, Shirai and Andersen 1995, Li and Bowerman 1998, Li and Shirai 2000) according to which children first use past or perfective marking on achievement and accomplishment verbs, eventually extending its use to activity and stative verbs. Prevalence of co-actional interaction around the 0 3 Y area also supports Tardif and Wellman's (2000) study on Mandarin-speaking children, which in turn shows that at 21 months of age, approximately 2% of their utterances contained a mental state verb, and by the age of 27 months, this figure increases to 5% of all utterances. At an early age, children understand mental states only in connection with on behavioural queues and ensuing actions, while they do not begin to understand representation itself and hence thoughts and beliefs until a later stage (Bartsch and Wellman 1995, Gopnik and Wellman 1994).

From the plot, it is thus possible to notice how completives are indeed closer to the 4 6 Y age-span and comparatively distant from the 0 3 Y area. In fact, the 4 6 Y is characterised by a shift to third and first plural person combined with completive polysemies, and most crucially with evidential usages, in turn extremely far from 0 3 Y.

<evidential>

(4)

CHI: 我妈妈说过小偷是这样走的。

wǒ māma shuō **guo** xiǎotōu shì zhèyàng zǒu de

'My mother once said that thieves left this way.'

CHILDES / ZhouNarratives / Fu Zhiyan / 4;0

<evidential>

(5)

CHI: 他常常听说过，妈妈讲给他的。

tā chángcháng tīngshuō **guo**, māma jiǎng gěi tā de

'He has been hearing about this before, it was my mother who told him.'

CHILDES / ZhouNarratives / Zhang Yuhan / 4;0

<evidential>

(6)

CHI: 后来他们，他们从来没有要用过他们的财宝。

hòulái tāmen tāmen cónglái méiyǒu yào yòng **guo** tāmen de cáibǎo

‘From then on they, (it is known that) they never wanted to use their treasure.’

CHILDES / ZhouNarratives / Chi Junran / 6;0

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4 In (4-6) above 过 *guo* is no more used as a main verb of movement, but rather as a post-verbal
5
6 grammatical marker of evidentiality. In the case of (4), the proposition p [*the thieves left this way*] is
7
8 marked as a piece of information that can be confirmed by a third party, namely Zhiyan’s mother (cf.
9
10 Author 2013, 2017a 2017b on extended construals of intersubjectivity). The evidential stance adopted
11
12 by the child [*my mother once said that*] with the usage of 过 *guo* constitutes a surplus of meaning that
13
14 would not be necessary for the mere perlocutionary effects of communicating p [*the thieves left this*
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16 *way*]. Rather, the child in this case finds necessary to mark the proposition as a piece of shared
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18 knowledge, hinging on the extended intersubjective awareness that the hearer will consider p more
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20 reliable if it can be confirmed by a third party. Something similar is at stake in (5), as the child
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22 problematises someone else’s knowledge with the verb 听说 *tīngshuō* ‘hear-saying’ combined with
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24 the evidential 过 *guo*. Finally, in (6) the child is concerned with a third party’s (some thieves) will
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26 and intentions. Rather than simply stating whether the thieves used the treasure or not, s/he is rather
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28 concerned about what the thieves ever wanted to do with it. This construal is again expressed with
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30 the post-verbal 过 *guo* particle, thus overtly marking that this inference could be potentially confirmed
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32 by other people who are aware of this story (cf. Chappell 2001; Author 2013, 2015 on evidential
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34 extensions of inferential usages of 过 *guo*). Even in this case, the mismatch with (1-2) is evident in
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36 that the interlocutor is not spatially construed as a potential partner for some behavioural activity in
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38 the bare form of a co-action. Rather, s/he is conceptualised as another mind that might require some
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40 epistemological grounding to consider p as a reliable piece of information. It has been argued that
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42 increasingly sophisticated mechanisms of shared attention indeed involve a triadic structure, whereby
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44 the resulting meaning acquires a social dimension and is likely to become ritualised grammatically
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46 or idiosyncratically (cf. Moore & D’Entremont 2001).

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48 Both (4-5) are highly grammaticalised usages, as they go beyond physical movement
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50 occurring during the here-and-now of the discourse, normally expressed by 过 *guo* as a main predicate
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52 or a completive marker. Similarly, they also go beyond experiential perfect construals, as in nor (4-
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54 5) is the child concerned about the syntactic subject’s past experience. Experientials of the latter kind
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56 appear at the bottom-right of figure 1, and not surprisingly are strongly associated with first person
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pronouns as to express propositions such as [*I have once/never done p*], as given in (7-8) (cf. Chen & Shirai 2010 about the early acquisition of experiential functions of 过 *guo*).

<experiential>

(7)

CHI: 这个我没有玩过。

zhè ge wǒ méiyǒu wán guo

‘I have never played this before.’

CHILDES / Zhou2 / Zhou Jing / 4;06

<experiential>

CHI: 我看过青蛙。

wǒ kàn guo qīngwā

‘I have seen frogs before.’

CHILDES / ChineseZhou / Zhang Yuhan / 4;06

4.3 A mixed effects logistic regression of the FLA of 过 *guo*

Logistic regression accounts for relationships between a categorical response variable with two or more possible values and one or more predictors (cf. Levishna 2015: 253). In mixed effects logistic regression, group-specific random effects can be added to a model in order to account for within-group associations. Mixed models can handle both balanced and unbalanced datasets and that can also be applied when several layers of grouping are present in the data; these layers can either be nested or crossed (cf. Speelman et al. 2018:1).

In the case of 过 *guo*, we fitted a model with ‘age’ (0 3 Y and 4 6 Y) as a binomial response variable, ‘usage’ as a fitted predictor, and presence of a syntactic ‘subject’ as a random effect (cf. Baayen et al. 2008; Hilpert 2013 for mixed effect models with diachronic linguistic data). This allowed us to see whether specific polysemies of 过 *guo* would trigger the spontaneous usage of the particle during a distinctive stage of ontogenetic development. Our results are reported in table 5:

Random Effects

Groups	Name	Variance	Std. Dev.
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subject	(Intercept)	0.567	0.753	
Fixed Effects				
	Estimate	Std.Error	Z value	Pr(> z)
(Intercept)	1.7247	0.6515	2.647	0.00812 **
usagecomp	-0.7584	0.4171	-1.818	0.06901 .
usageexp	-0.2648	0.4521	-0.586	0.55799
usagemain_v	-1.3614	0.4270	-3.189	0.00143 **

Table 5.

Mixed effects logistic regression of polysemic usages of 过 *guo* across ages 0 3 Y and 4 6 Y

The column *standard deviation* in the random effects section indicates the variability from the predicted values due to the random effects added to the model (viz. presence of subject in this case), thus reflecting the fact that every utterance has some unexpected factors that affect usage in addition to the fixed effects. In the *fixed effects* section, under the Estimate column, the coefficients *usagecomp*, *usageexp* and *usagemain_v* indicate the slope for the categorical effects of polysemic usages of 过 *guo*. In this case, the intercept (evidentials) occurring during 4 6 Y age-span is compared with all the other usages. Crucially, there is a significant ($p < 0.005$) correlation of evidential usages of 过 *guo* during the 4 6 Y age span (1.7) in comparison with all other usages. Similarly, there is a significantly ($p < 0.005$) negative correlation (-1.4) of 过 *guo* used as a main verb during 4 6 Y as opposed to 0 3 Y.

This result confirms what is given in Figure 1: children seems to start using the particle to express knowledge ascription and intersubjective awareness after the 4th year of age. Conversely, earlier usages during the 0 3 Y age-span are rather characterised by contexts of co-actional engagement, whereby the employment of 过 *guo* as a main verb tends to be used with a spatial meaning hinging on immediate per-locutionary effects that are related to the here-and-now of the speech event.

4.4 The FLA of the polysemic usages of 吧 *ba*

1 The Mandarin sentence final modal particle 吧 *ba* originates from the completive marker 罢 *-ba*,
2 originally signalling the actional completion of an action or an event (cf. Chao, 1968:807; Sun, 1999).
3 In its modern usage, the modal 吧 *ba* is non obligatory and polysemous (i.a. Lü 1980; Hu 1981; Wang
4 1984; Lu 1984; Shie 1991; Zhang 2013). Li and Thompson (1981) and Qu and Li (2004) suggest that
5 the main usage of 吧 *ba* is the one of “soliciting agreement”, while in a more recent account Xu
6 (2008) describes it as a marker of “weak information transmission, which includes the addressee’s
7 acknowledgment ”(cf. 2008: 188).
8
9

10 Author (2017b) provides a diachronic account of the different polysemies of 吧 *ba*,
11 differentiating from an original directive usage (e.g. *let’s do p*), a tag-question function (e.g. *p, is’t*
12 *it?*), and a comparatively more recent assertive employment of the particle (e.g. *we can agree upon*
13 *p*). Addressed from an evolutionary angle, language change is constantly affected by the speaker’s
14 ‘interested’ attempt to involve the addressee in a ‘co-action’, may it be on a physical or on an epistemic
15 level (cf. Reich 2011; Engel et al. 2013; Author 2016a, 2017b, 2018). Diachronically ‘expected’ co-
16 agency underlies a speaker’s employment of a construction through a diachronic process of semantic-
17 pragmatic reanalysis. In the case of 吧 *ba* a semantic reanalysis occurs from co-actions occurring in
18 a physical context, to co-actions hinging on the epistemic domain. The shift from one usage to the
19 other is illustrated in (8-9) below:
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37 <directive>

38
39 (8) 一听婆子们给道喜, 不觉面红过耳, 说道: “你们去吧, 道什么喜”。

40
41 yī tīng pō zimen ge’ǐ dào xǐ, bù jué miàn hōng guò ěr, shuō dào: “nǐmen qù **ba**, dào shénme

42
43
44
45
46 xi”

47
48 ‘As he heard those women’s congratulatory words, he suddenly flushed and said: “Leave,
49 come on, what sort of congratulations are you offering?”’.

50
51
52 CCL Qing Dynasty (1644--1911) / San Xia Jian

53
54
55
56 <assertive>

57
58 (9) 班固所谓象意, 大概是说的前一类会意字吧。

59
60 bāngù suǒ wèi xiàngyì, dàgài shì shuō de qián yī lèi huìyìzì **ba**

1
2
3 'We can say that the so-called pictographic meaning defined by Ban Gu can be considered
4 roughly equivalent to the ideographic type of characters that we mentioned before.'

5 CCL Contemporary / CWAC
6
7

8 At the pragmatic level, from (8) to (9) there is a shift from directive to assertive types of speech acts,
9 viz. from physical to new epistemic forms of co-act proposals (CAP). In (8) the speaker gently invites
10 the addressee to leave the room, yet positing his request as a shared activity. A similar form of co-
11 action occurs in (9) where the speaker employs 吧 *ba* inviting the addressee, or any other reasonable
12 mind, to endorse his/her assertion in the form of a shared statement, here paraphrased as *we can say*
13 *that p* (despite the formal register, even the latter can be rendered in English with the discourse marker
14 *come on*). In Author (2017b) it is argued that the latter speech act is realised based on construals of
15 extended intersubjectivity (cf. Author, 2016b, 2016d, 2017). When extended intersubjectivity is at
16 stake, an assumed third party (3rdP) is construed as indirectly supporting a proposition *p*, e.g. the
17 conclusion that *the so-called pictographic meaning defined by Ban Gu can be considered roughly*
18 *equivalent to some ideographic type of characters*. In other words, the speaker in (9) is aware that a
19 mere assertion may result in non-cooperative behaviour (cf. Brown and Levinson, 1987). Yet, through
20 the employment of 吧 *ba* as a surplus of meaning s/he goes beyond merely assessing a statement at
21 the propositional level. S/he rather overtly expresses that *p* could be easily supported by other
22 members of society.
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40 **4.5 Data retrieval and annotation criteria of 吧 *ba*** 41 42 43

44 This section aims at verifying whether the supposedly intersubjective usage of 吧 *ba* in assertions is
45 indeed spontaneously mastered at comparatively later stages of ontogenetic development. The same
46 corpora from the Chinese section of the CHILDES mentioned in section 4.2 have been consulted and
47 the same process of normalisation have been followed. This led to 276 annotated occurrences for the
48 0 3 Y age-span and 282 occurrences for the 4 6 Y age-span. We identified four main speech acts
49 characterising the usage of 吧 *ba*: assertive, directive, tag-question interrogatives and agreements.
50
51
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56

57 We designed our annotation partly drawing on the criteria given in Author (2017b):
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Speech act	Criteria
Directives	<ul style="list-style-type: none"> - Can co-occur with the pre-verbal element 快 kuài 'fast'. - Cannot be preceded by any evaluative predicate.
Tag-question interrogatives	<ul style="list-style-type: none"> - It is followed by a response. - Cannot co-occur with the pre-verbal element 快 kuài 'fast'. - Cannot be preceded by the first person evaluative predicate 我觉得 wǒ juéde 'I think'. - Can be preceded by the second person evaluative predicate 你觉得 nǐ juéde 'you think'.
Agreements	<ul style="list-style-type: none"> - Can only occur as a response to prior turn taking and never occurs in isolation. - Cannot co-occur with the pre-verbal element 快 kuài 'fast'. - Can be preceded by the first person evaluative predicate 我觉得 wǒ juéde 'I think'. - Cannot be preceded by the second person evaluative predicate 你觉得 nǐ juéde 'you think'.
Assertives	<ul style="list-style-type: none"> - Cannot co-occur with the pre-verbal element 快 kuài 'fast'. - Can be preceded by the first person evaluative predicate 我觉得 wǒ juéde 'I think'. - Cannot be preceded by the second person evaluative predicate 你觉得 nǐ juéde 'you think'.

Table 6.

Annotation criteria for the polysemic usages of 吧 ba (adapted from Author 2017b)

The process of annotation was again carried out by two independent researchers and subsequently cross-checked with a 87% level of accuracy. Once again, remaining collocates have been disambiguated after a third round of annotation by a third annotator. As exemplified in example (10), directives are often uttered by the child in contexts of play or other forms of spatial engagement with a peer. As reported in table 6, they are always compatible with the preverbal 快 kuài 'fast, quickly' and cannot be preceded by evaluative predicates, as they do not state an epistemic proposition.

<directive>

(10)

CHI: 那两个大积木呢?

nà liǎng ge dà jī mù ne
'And those big blocks?'

1
2
3 MOT: 那你把它搭起来。

4
5 nà nǐ bǎ tā dā qǐ lái
6
7 'You can hang them over.'

8
9 CHI: 再玩这个吧！

10
11 zài wán zhè ge ba
12
13 'Let's play with this now!'

14
15 CHILDES / Zhou1 / Liu Zonghao / 2;02

16
17
18 Tag-question interrogatives are characterised by a shift from spatial to epistemic usages, as they are
19 requests of confirmation about the state of affairs of p. For this reason, they are followed by an
20 immediate response by the interlocutor.
21
22

23
24
25
26 <interrogative>

27
28 (11)

29
30 CHI: 然后呢，这些太空对吧？

31
32 ránhòu ne , zhè xiē tài kōng ba ?
33

34
35 Then, it should be those ones in the space isn't it?
36

37 INV: 嗯。

38
39 ēn.

40
41 Yes.
42

43
44 CHILDES / ZhouNarratives / Du Zi Rui / 4;0

45
46
47 Agreements, on the other hand, occur as an immediate response after a prior turn-taking. They convey
48 an epistemic meaning and thus can be preceded by first person evaluative predicates such as 我觉得
49 *wǒ juéde* 'I think'.
50
51
52

53
54
55 <agreement>

56
57 (12)

58
59 INV: 可是我要先听你讲啊！
60
61
62
63
64
65

kěshì wǒ yào xiān tīng nǐ jiǎng a !

But I would like to hear you talking first though!

CHI: 那好吧。

nà hǎo **ba**

‘Alright, that’s ok.’

CHILDES / ChineseZhou / Peng Jin / 4;0

Finally, assertives are characterised by similar features as agreements, yet they occur as an independent turn-taking in which the speaker makes statement that is not triggered by a previous question or by some spatial conditions of play/co-actional engagement.

<assertive>

(12)

INV: 我也不清楚，你觉得是什么家啊？

wǒ yě bù qīngchū , nǐ juéde shì shénme jiā a

‘I am not quite sure myself, what sort of house do you think is that one?’

CHI: 我觉得是小偷的家吧，小偷的床这是宝藏。

wǒ juéde shì xiǎotōu de jiā **ba** , xiǎotōu de chuáng zhè shì bǎozàng

‘I think that’s the thieves’ house come on, the thieves’s bed is actually the treasure.’

CHILDES / ZhouNarratives / Fu Zhiyan / 4;0

4.6 A multiple correspondence analysis of the FLA of 吧 *ba*

After the annotation, similar to what we did for 过 *guo*, we plotted a multiple correspondence analysis accounting for the attraction/repulsion among age, illocutionary force (whether 吧 *ba* is used in assertive, directive, interrogative speech acts or in contexts of agreement) and person.

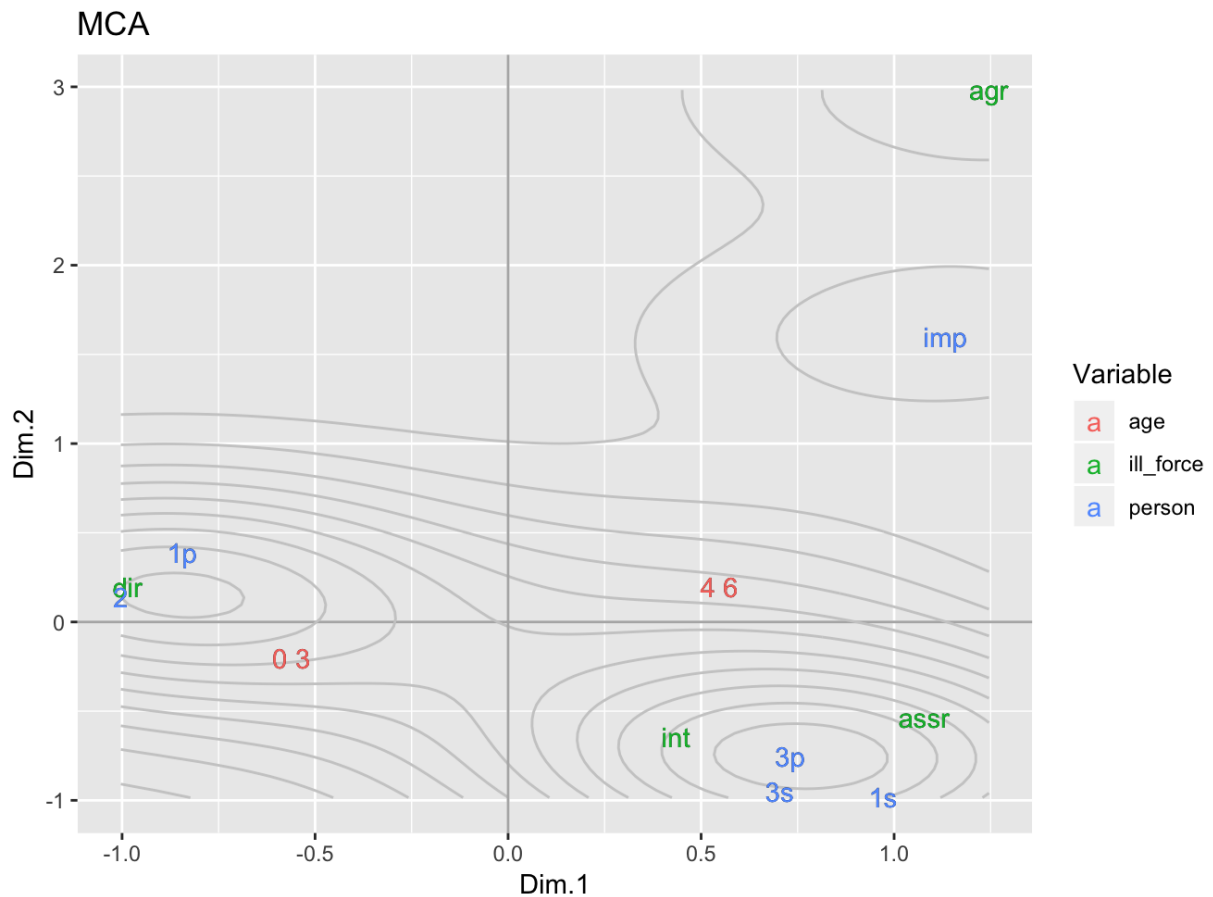


Figure 2

Multiple correspondence analysis of the usages of 吧 *ba* across 0 3 Y and 4 6 Y age spans

On the left-hand side of the plot above it is possible to notice a cluster where the 0 3 Y age-span is strongly attracted to directive usages of 吧 *ba* occurring with second person and first person plurals⁷.

Similar to what emerged with 过 *guo*, even in this case the 0 3 Y area is thus characterised by usages that are closely connected with spatial contexts of co-action, whereby the child proposes to engage in some activity with the interlocutor during the here-and-now of a speech event, in the form of [*let's do p*].

Conversely, interrogative and assertive usages appear next to the 4 6 Y age-span, mostly in combination with third person and first person singulars. Crucially, both interrogatives (requests of confirmation) and assertions underpin propositions occurring at the epistemic level, respectively [*isn't it?*] and [*we can say that p*]. In the former case, the child construes a proposition based on a form

⁷ The two-dimensional solution described can be assessed with `mjca()` function in the R `ca` package. The summary suggests that two first dimensions capture 83.3 % of inertia (i.e. variance) which is a reliable result for the visualisation of the data on a two dimensional plane (cf. Levshina 2015: 382)

of immediate intersubjective awareness, as s/he seeks for confirmation by a specific addressee who is present during the utterance. On the other hand, assertions that are marked with 吧 *ba* are grounded in a more extended form of social cognition, as a general third party is semantically and pragmatically encoded as a form of extra-propositional surplus of meaning. The child here overtly marks his/her assertion as a proposition that could be easily supported by a generic member of society, e.g. *I, you and most other people would agree that p.*

<interrogative>

(13)

CHI: 哦，还是好饿是吧？

ò , háishi hǎo è shì **ba** ?

‘Wow, still very hungry isn’t it?’

CHILDES / ZhouNarratives / Fu Zhiyan / 4;0

<assertive>

(14)

CHI: 后来呀，他跟一个特别小一个小狗玩玩儿。

hòulái ya , tā gēn yī ge tèbié xiǎo yī ge xiǎo gǒu wán wánr

‘Then he played a bit with a very small dog.’

CHI: 玩儿了就是，嗯嗯，玩儿了一上午吧。

wáner le , jiùshì ēnēn , wáner le yī shàngwǔ **ba**

‘They played kind of, yes, we can say that they the whole morning.’

CHILDES / Chinese_Tardif / 3;11

In (13) above the child asks her parent, as a specific mind, to confirm the truthfulness of his/her inference. This usage is contextually dependent on the immediate intersubjective awareness of one specific persona. Quite differently, the usage of 吧 *ba* in (14) underpins extended intersubjectivity as it does not require a specific interlocutor’s online confirmation. It is rather based on the assumption that the addressee as well as any other interlocutor would be happy with this conclusion. Finally, at the right-hand side of the plot are locate agreement (*agr*) usages of 吧 *ba*, which almost entirely corresponds to the highly entrenched form 好吧 *hǎo ba* ‘it’s ok’. This construction is always

impersonal and is therefore distant from all the clusters where some clear verbal valency is expressed (e.g. 1p, 3s and so on). It is important to note that agreements, different from directives, carry some assertive force, as they express what the child epistemically considers to be potentially favourable or worth accepting. The higher pragmatic similarity between those two is reflected in the graph as agreements appear to be comparatively closer to the cluster of assertions and 4 6 Y in contrast with the one of directives and 0 3 Y.

4.7 A mixed effects logistic regression of the FLA of 吧 *ba*

This final section focuses on the results of a mixed effects logistic regression of the speech acts where 吧 *ba* is employed across the 0 3 Y and 4 6 Y age-spans accounting for person as a random effect.

Random Effects				
Groups	Name	Variance	Std. Dev.	
person	(Intercept)	1.432	1.196	
Fixed Effects				
	Estimate	Std.Error	Z value	Pr(> z)
(Intercept)	1.7666	0.6223	2.839	0.004529 **
ill_forceagr	-2.1534	0.6417	-3.356	0.000791 ***
ill_forcedir	-1.2698	0.6625	-1.917	0.055290 .
ill_forceint	-2.6293	0.4241	-6.200	5.64e-10 ***

Table 7.

Mixed effects logistic regression of the speech acts including 吧 *ba* across ages 0 3Y and 4 6 Y

As reported in table 7, there is a positive coefficient (1.8) of the significant ($p < 0.0005$) correlation of assertive usages (the intercept) of 吧 *ba* during the 4 6 age-span. This increase is in sharp contrast with all the other speech act types, which indicate negative coefficients during the same period: interrogatives (ill_forceint) and agreements (ill_forceagr) show significantly negative coefficients (-1.3 and -2.6) and directives (ill_forcedir) also approaching significant levels of negative values during the 4 6 Y period. This result confirms what is represented in in figure 2 (section 4.6), as supposedly

more intersubjective assertive usages of 吧 *ba* indeed show a significant tendency to be spontaneously uttered by children that reached the fourth year of ontogenetic development. As in the case for the evidential employment 过 *guo*, this study sheds light on the relationship between incrementally intersubjectified usages that develop diachronically and later mastery of the same polysemies at comparatively later stages of ontogenetic development.

6. Conclusions

This paper draws on a novel corpus-based approach to the analysis of intersubjective awareness and theory of mind during spontaneous interaction. It is based on the idea that intersubjectivity is expressed as a form of 'propositionally redundant' surplus of meaning that is additional to subject-oriented perlocutionary effects. Spontaneous dialogic data from a number of Mandarin corpora from the CHILDES database indicate that children master increasingly intersubjectified polysemies of the same construct after the fourth year of age. From both the FLA of 过 *guo* and 吧 *ba*, it is possible to notice a developmental shift from interaction occurring as a form of goal-oriented co-action in space to new usages grounded in social cognition, aimed at expressing knowledge ascription (in the case of 过 *guo*) and expected agreement (in the case of 吧 *ba*). In the former case the child marks *p* as a piece of information that other members of society may confirm and support. In the case of 吧 *ba*, the child 'invites' the addressee to agree with *p*, based on the extended intersubjective awareness that *p* is a statement that anyone else would agree upon. In both cases a form of intersubjectified surplus of meaning is overtly marked in addition to a bare constative speech act of information transmission. The ontogenetic shift from co-actionality to extended intersubjectivity provides usage-based evidence for the assumption that shared intentions, knowledge, and socio-moral values emerging in human evolution between collaborative partners first occur triadically in acts of joint intentionality, and only later among individuals as members of a cultural group (cf. Tomasello 2019: 7) in acts of collective intentionality. More specifically, evidence suggests that the ability to understand shared intentions and knowledge emerged in human evolution between partners originally operating in acts of joint intentionality involving two peers. At a later stage, humans eventually developed the capacity to interact with other individuals as members of a cultural group in acts of collective intentionality. In this regard, it is shown that this evolutionary trajectory is matched by a developmental one (cf. Tomasello 2014; Tomasello 2019: 7), suggesting that throughout ontogeny cognitive coordination between two specific interlocutors occurs at earlier stages than abilities to

1 understand social norms, collective conventions and inferred intentions pertaining to a wider group
2 of minds. This path is reflected by the results of the present study, as polysemies expressing social
3 cognition are acquired at comparatively later stages of FLA both in the case of 过 *guo* and 吧 *ba*.
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