



A Longitudinal Study of Conflict and Inner State Talk in Children's Conversations with Mothers and with Younger Siblings

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A Longitudinal Study of Conflict and Inner State Talk in Children’s Conversations with Mothers and Younger Siblings.

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Abstract

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6 This study examined developmental change and variation across social context in the quality
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8 of children's conversations, with a dual focus on (a) conflict and (b) inner state talk (IST).
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10 Each measure was coded as a proportion of total talk, using transcripts from 57 3- to 6-year-
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12 olds, filmed at home at two time-points (12-months apart) in two distinct contexts (dyadic
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14 play with younger siblings and unstructured routine interactions with mothers). Frequencies of
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16 conflict and IST did not change between time-points. However, IST changed in function, such
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18 that the proportion of IST within explanations increased over time. At each time-point: (1)
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20 children talked about inner states (especially others' inner states) more often with younger
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22 siblings than with mothers; and (2) conflict was more strongly associated with talk about
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24 children's own inner states within conversations with mothers (mean $r = .46$) than with
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26 younger siblings (mean $r = .02$). Together, these findings highlight the need to consider both
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28 conflict and IST as relationship-specific constructs.
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6 Mothers and with Younger Siblings.
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8 The preschool years are marked by rapid advances in children's abilities to recognize
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10 and interpret their own and others' inner states (Wellman & Liu, 2004). Over the past three
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12 decades research in children's 'theory of mind' has been prolific but heavily reliant on
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14 experimental assessments such as the false-belief test (Wimmer & Perner, 1983); for meta-
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16 analytic reviews, see Milligan, Astington, & Dack, 2007; Wellman, Cross, & Watson, 2001.
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18 This reliance on experimental methods has led to a narrow focus on children's understanding
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20 of epistemic states (e.g., belief, knowledge), rather than the broader set of inner states (e.g.,
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22 desires, feelings) that, as documented in Bretherton and Beeghly's (1982) seminal
23
24 observational study, are so prominent in children's everyday talk. This narrow focus belies the
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26 broad impact of theory of mind skills on children's social interactions; an impact which, as
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28 illustrated in a longitudinal twin study (Ronald, Happé, Hughes, & Plomin, 2005), can be both
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30 positive (e.g., through prosocial acts and sensitive displays of empathy) and negative (e.g.,
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32 through deceit and provocation).
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38 Although dwarfed by the volume of experimental research on children's understanding
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40 of mind, observational studies have made a valuable contribution to the field. In one
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42 pioneering study, Bartsch and Wellman (1995) documented the age of onset for children's
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44 reference to distinct inner states: a clear finding from this study was that children refer to
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46 desires (especially their own desires) at least six months before they refer to epistemic inner
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48 states. Subsequently, the same age-related sequence of acquisition was demonstrated using
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50 experimental tasks (Wellman & Liu, 2004). More recently, observational research has
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52 revealed interesting ontogenetic changes in the *function* of inner state reference. For example,
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54 in her report of a detailed study of 6 children observed twice a month for 18 months, Budwig
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56 (2002) highlighted an interesting shift around the age of 2 in children's use of desire terms:
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IST with younger sibs and mothers

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3 before the age of 2 children typically referred to desires as a request for the caregiver to act on
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5 their behalf, whereas older children referred to desires as a means of seeking permission to act
6
7 themselves. As Budwig (2002) puts it, from age 2 “the children have a burgeoning awareness
8
9 that desire alone is not enough to motivate human action... [but] have come to realise the
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11 social connectedness of action as well.” This observational finding from very young children
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13 both heralds and contrasts with the experimental finding that, in their explanations of emotion,
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15 4- to 5-year-olds focus on simple goals, whereas children aged 7 and up also take account of
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17 social transgressions (Lagattuta, 2005). Thus adding an observational approach to
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19 experimental work reveals an interesting *décalage* between children’s initial understanding of
20
21 mind and their subsequent reasoning.
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27 Alongside the developmental perspective that frames the above studies, the past
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29 decade has seen a rapid growth of interest in variation in theory of mind (Dunn & Cutting,
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31 1999; Hughes et al., 2005; Hughes & Leekam, 2004; Repacholi & Slaughter, 2003). Here,
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33 observational studies have been useful in demonstrating that early variation in the frequencies
34
35 with which children (Hughes & Dunn, 1998) and their caregivers (Ruffman, Slade, & Crowe,
36
37 2002) refer to inner states predict children’s later performance on theory of mind tasks. As
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39 well as supporting the external validity of children’s task scores, such research suggests that
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41 social contexts characterised by high frequencies of inner state talk (IST) may serve as
42
43 developmental wellsprings, by fostering children’s growing understanding of their own and
44
45 others’ minds. For example, Dunn and colleagues have shown that conflict episodes are not
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47 only emotionally salient for children, but also rich in reference to children’s own and others’
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49 inner states; each of these features helps explain why conflict can be a fertile context for
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51 developing children’s understanding of mind (Dunn, Slomkowski, Donelan, & Herrera,
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53 1995).
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3 An additional insight to come from observational studies is that children's
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5 understanding of mind appears to be relationship-specific. For example, 4-year-olds show a
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7 more advanced understanding of the causes of anger in mothers than in friends, coupled with
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9 a more advanced understanding of the causes of sadness in friends than in mothers (e.g.,
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11 Hughes & Dunn, 2002). These differences in performance mirror children's real life
12
13 experiences. For example, while young children regularly display behaviours that are likely to
14
15 elicit maternal anger (e.g., refusal to comply with a reasonable request, upsetting a sibling)
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17 they are motivated to avoid provoking anger in friends. Conversely, young children frequently
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19 display feelings of sadness (and share these feelings with friends), yet societal norms
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21 constrain adult displays of sadness in the presence of a young child. Thus children's
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23 relationship-specific understanding of emotions highlights the fact that social functioning is,
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25 by definition, not a solo performance (Astington & Baird, 2005).
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31 In this paper we build on this theme of relationship specificity and focus on two salient
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33 features of children's social interactions, conflict and IST, for which we examine both
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35 developmental changes and differences across interactions with mothers vs. younger siblings.
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37 Theoretically, this comparison is interesting, because it provides a view of how children
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39 interact with more vs. less competent social partners. From a traditional Vygotskian
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41 perspective, more competent social partners scaffold children's interactions, creating a 'zone
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43 of proximal development' in which children may display more advanced skills than are
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45 otherwise observed. However, other theoretical perspectives highlight the pedagogical value
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47 of enabling children to assume the role of teacher. For example, this principle is a core tenet
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49 within Montessori's philosophy of education: "There is nothing that makes you learn more
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51 than teaching it yourself" (Montessori, 1989, p. 69, cited in Lillard, 2005).
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57 Methodologically, the key challenge for demonstrating relationship specificity is the
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59 need for parallel observations of children's conversations with different social partners.
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3 Despite the recent rapid increase in studies of children's IST, most include observations with
4 only one social partner. As a result, remarkably little is known about how children vary their
5 use of IST with different partners. In one exceptional study, Dunn Brown, and Beardsall
6 (1991) showed that 3-year-olds talked about emotions more often with their mothers than with
7 their siblings, but one year later the same children talked about cognitive states more often
8 with friends or siblings than with mothers (Brown, Donelan-McCall, & Dunn, 1996). More
9 recently, Hughes, Lecce and Wilson (2007) reported that four-year-olds talk about emotions
10 and desires more frequently in conversations with siblings than with friends. In addition,
11 Jenkins and colleagues' (Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003) study of 4-year-olds
12 showed that the presence of an older sibling was associated with increased exposure to (and
13 engagement in) talk about cognitive states.
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29 Taken together, the above findings suggest that, by age 4 at least, conversations with
30 siblings (as opposed to other conversational partners) are especially high in IST. Why might
31 this be so? One explanation hinges on the role that siblings play as caregivers and teachers.
32 Compared with older peers, older siblings are especially effective tutors (e.g., Azmitia &
33 Hesser, 1993), displaying teaching strategies (e.g., attention focusing, providing meaning,
34 fostering confidence) that are typically observed in mother-child interactions (Klein,
35 Feldman, & Zarur, 2002). Interestingly, Klein et al (2002) also found that the older sibling's
36 accurate perception of the younger child's competence explained unique variance in task
37 performance. These findings provide general support for the view that older siblings actively
38 engage in tutor and caregiver roles. Our aim in the current study is to provide a more detailed
39 analysis by comparing mean frequencies and modal forms of children's IST with younger
40 siblings *vs.* mothers. Specifically, we hypothesized that the role of caregiver / tutor motivates
41 children to refer to inner states more frequently with younger siblings than with mothers.
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60 Likewise, we hypothesized that, in conversations with younger siblings, a greater proportion

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3 The 57 families in this study had all given informed consent to participate in an ongoing
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5 longitudinal study of social development in 140 families with 2-year-olds (Ensor & Hughes,
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7 2008; Hughes & Ensor, 2005, 2007). Selection for the current study depended upon each
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9 family: (i) having at least two children aged 2 or older (and with an age gap of less than 4
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11 years) who (ii) were on camera for at least 15-minutes of the 30-minutes of unstructured
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13 family interaction at each time-point. In total, the filmed sibling pairs included 25 boy-girl
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15 pairs; 19 boy-boy pairs; and 13 girl-girl pairs. Here-forward, we refer to these sibling pairs as
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17 the focal children and their younger siblings. At the first time-point, the mean age for the focal
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19 children was 5 years, 0 months ($SD = 10$ months, range = 3 years, 3 months to 6 years, 11
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21 months) and the mean age for younger siblings was 2 years, 4 months, ($SD = 4$ months, range
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23 = 2 years 0 months to 3 years, 2 months). The second wave of observations was conducted 12
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25 months later (with a window of 2 months either side). Verbal ability was assessed using the
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27 British Picture Vocabulary Scale (Dunn, 1997) for the focal children and the Naming and
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29 Comprehension Subtests of the British Abilities Scale (Elliott, Murray, & Pearson, 1983) for
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31 their younger siblings. For ease of comparison, raw scores from each measure were converted
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33 to age equivalents. Mean verbal ages for the children were 4.5 years ($SD = 1.9$) at the first
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35 time-point and 5.8 years ($SD = 2.1$) at the second time-point.
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43 Reflecting the local population, the sample was ethnically homogeneous (all parents
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45 identified themselves as 'White British'). However, in terms of socio-economic status, the
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47 sample was quite diverse. This is demonstrated by the distribution of mothers' educational
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49 qualifications: 7 mothers had no educational qualifications at all; 20 had only elementary
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51 qualifications (age-16 GCSEs); 14 mothers had secondary qualifications (age-18 A-levels);
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53 and 16 mothers had degrees. Of the 57 mothers, 9 (16%) were lone parents at the first time-
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55 point and 13 (23%) were lone parents at the second time- point. The numbers of families with
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3 2, 3 or 4+ children were 36, 13 and 8 at the first time-point and 26, 22 and 9 at the second
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5 time- point.
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7 *Materials*

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10 The toys for the sibling play sessions consisted of dressing up materials and role-play toys.
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12 Items included 1 fireman's outfit, extinguisher and axe; 1 pirate's hat, jacket, toy hook and
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14 cutlass; 1 fairy wand and 1 ballet tutu; 1 pair of high heels and 1 toy handbag with money; 1
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16 police outfit with walkie-talkie, handcuffs and badge; 1 doctor's case with stethoscope,
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18 thermometer, otoscope, bandage and syringe; 1 cook-set with cooker, blender, pans, plates,
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20 cups, cutlery and food; 1 toolbox with torch, spirit level, tape-measure, pliers, saw and
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22 hammer.
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26 *Procedures*

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29 At both time-points in this study two researchers visited each family for two hours (typically
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31 on a weekday evening). This home visit included observations of sibling play and
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33 unstructured family interaction (randomly ordered across families). Siblings were filmed
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35 playing with a big set of toys and dress-up materials (see materials). Each play session was
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37 scheduled to last 20 minutes, but interruptions and toilet breaks as well as factors such as fatigue
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39 and distress following a sibling dispute meant that the sessions actually varied considerably in
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41 their overall length (at Time 1, mean = 22.98 minutes, $SD = 2.16$ minutes, range = 18-26
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43 minutes; at Time 2, mean = 21.84 minutes, $SD = 1.94$ minutes, range = 15-25 minutes). To
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45 maximise ecological validity, all siblings were allowed to participate in the sibling
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47 observations. The researcher with the camcorder positioned herself discreetly in a corner of
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49 the room and responded as little as possible to comments from family members. Coding was
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51 restricted to conversational exchanges between the youngest pair of siblings, who were on
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53 camera throughout the play session. Unstructured family interactions were filmed for 30-
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55 minutes at each time-point during meal preparation and / or a meal; researchers followed the
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IST with younger sibs and mothers

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3 younger sibling (both within and outside the house) and again did not participate in family
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5 interaction. Families received £20 as a token of thanks for their time. Following the home
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7 visits, the videos were transcribed professionally. Researchers then checked that the speakers
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9 and partners, the division of speech into turns and the content of speech were correct, and
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11 added any non-verbal contextual information needed to understand the speech.
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14 15 16 *Coding*

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18 *IST*. Transcripts from both the sibling-play and the unstructured family interaction were coded
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20 using Brown, Donelan-McCall and Dunn's (1996) scheme, for references to three categories
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22 of mental states: cognitions, desires and feelings. References to cognitive states included
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24 terms used to denote thoughts, memories or knowledge of the mother, child, sibling or a third
25
26 party. The most common cognitive terms recorded were: *think, know, forgot, mean* and
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28 variations. Other cognitive terms that occurred were: *assure, believe, concentrate, distract,*
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30 *expect, figure, guess, idea, ignore, imagine, interest, learn, pretend, recognise, trust,*
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32 *understand, wonder* and variations. The desire terms observed were: *fancy, keen, hope, want,*
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34 *wish, would like, would love* and variations commonly used to capture both desires and goals.
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36 For example, 'want' was coded when the term referred to a goal-directed behaviour.
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38 References to feelings included those that referred to an emotional state. The feeling terms
39
40 noted were: *cross, disgust, enjoy, excited, fed up, frightened, fun, grumpy, happy, like, love,*
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42 *pleased, proud, scared, surprise, upset, worried* and variations. For example, 'like' was only
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44 coded when the term referred to a state of enjoyment and not when it indicated 'to want to
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46 have'. References to mental states that were repetitive (either within or across utterances)
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48 were excluded as were any *IST* terms that were directed at the researcher. All other speaker
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50 turns that included a reference to an inner state were coded according to the speaker and
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52 partner and referent (own vs. other/shared). These turns were also coded for the function of
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54 *IST*: question, contrastive, explanation, or other. Coding a turn with *IST* as a contrastive
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3 depended on explicit reference to the contrast between different beliefs, or between belief and
4 reality (e.g., “You thought I was dead, but I’m not, I’m alive”). IST turns coded as
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6 explanations typically included explanations of actions, or conflict resolution (e.g., “I didn’t
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8 mean to do it / I didn’t do it on purpose” or clarification of a misunderstanding (e.g., “I
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10 thought you had finished with that toy”).
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15 *Conflict.* The transcripts were divided into conversational turns; a turn was defined as the
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17 utterances of one speaker bounded by another speaker’s utterances (Shatz & Gelman, 1973)
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19 or a significant silence (usually 5 seconds or more). Adopting procedures from previous
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21 studies (J. Dunn & Cutting, 1999) conflict turns were defined as conversational turns that
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23 included a disagreement, prohibition, threat or insult.
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26 27 *Reliability*

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29 Conflict and IST coding were each completed by two of the authors (RE and AM), who also
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31 independently coded 20% of randomly selected transcripts from both the sibling-play and the
32
33 unstructured family interactions at both time-points. Inter-rater agreement, established using
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35 Cohen’s kappa was excellent for both IST and conflict turns: $k \geq .83$ at each time-point.
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38 39 Results

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41 We first present preliminary results (descriptive statistics for each time-point - see Table 1),
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43 gender differences and correlations across-time and context (see Table 2). Next we address
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45 the three study questions: (i) Do mean rates of conflict or IST vary across time or
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47 conversational partners (ii) Do the functions of children’s IST show developmental change?
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49 (iii) Is there an association between conflict and IST; if so does this association depend on
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51 either the referent (i.e., talk about own vs others’ inner states) or the conversational partner?
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54 55 *Preliminary results*

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57 *Descriptive statistics.* Table 1 presents descriptive statistics for all study measures.
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60 Visual inspection of the IST totals shows that, within conversations with younger siblings,

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3 children referred to others' inner states at least as often as to their own inner states: 12% vs.
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5 8% at Time 1 and 14% vs. 7% at Time 2. By contrast, in their conversations with mothers, the
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7 children referred more frequently to their own vs. others' inner states: 14% vs. 2% at Time 1
8
9 and 11% vs. 4% at Time 2. (As an aside, mothers referred *less* frequently to their own inner
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11 states than to others' / shared inner states: 7 vs. 21% at Time 1 and 9% vs. 20% at Time 2).
12
13 Visual inspection of the focal children's conflict totals indicated that conflict with mothers
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15 rose from 5% of the total talk at Time 1 to 11% of the total talk at Time 2.. Formal analyses of
16
17 these differences across time-points and contexts are given below. To avoid false positives as
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19 a result of multiple comparisons (3 measures examined across time and across context), we set
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21 the criterion for statistical significance at $\alpha = .01$ (results for which alpha fell between .05
22
23 and .01 are described as marginal). With the exception of child to younger sibling conflict at
24
25 Time 1, which on average was marginally higher for boys than for girls: $t = 2.22, p < .05$, there
26
27 were no significant difference between girls and boys. In view of the relatively small sample,
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29 and in the interests of simplicity, gender is therefore only included in the analyses of conflict;
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31 all other analyses are based on the sample as a whole.
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39 *Correlations with verbal ability.* In order to check for effects of background variation
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41 in verbal ability, we examined correlations between receptive vocabulary scores at each time-
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43 point and each of the 8 main IST measures (own / other; with mother / sib; at each of the two
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45 time-points). Of these 16 correlations, none were significant and just 2 were marginally
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47 significant (based on our conservative alpha values, given above). Specifically, vocabulary
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49 scores at Time 1 were positively correlated with concurrent frequencies of reference to others'
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51 inner states in conversations with siblings: $r = .31, p < .05$, and negatively correlated with
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53 Time 2 frequencies of reference to own inner states in conversations with mothers: $r = -.27, p$
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55 $< .05$. Verbal ability was also unrelated to all four conflict measures, and to IST within
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3 distinct functions (explanations, questions etc). These null findings emphasise the social
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5 nature of our discourse measures.
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8 *Correlations across partners and time.* Across-partner correlations were all non-
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10 significant at each time-point: $r \leq .13$, *ns*. That is, children who showed frequent IST / conflict
11
12 with younger siblings were not more likely than other children to show frequent IST / conflict
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14 with mothers. Table 2 also shows the correlations between measures over time. These
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16 approached significance for conflict: mean $r = .26$, $p < .05$, but were non-significant for IST:
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18 mean $r = .01$, *ns*. That is, variation in children's IST (as a proportion of total talk) showed
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20 little stability over time.
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24 *(i) Do mean rates of conflict or IST vary across time or conversational partners?*
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27 *Conflict.* We used a repeated-measures ANOVA to examine mean proportions of
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29 children's conflict turns across the two time-points and conversational partners (younger
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31 sibling, mother), with gender entered as a between-subject factor. The results showed no
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33 significant main effects or two-way interactions: $F(1, 52) \leq 3.81$, *ns*, but a marginal three-
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35 way interaction between time, partner and gender: $F(1, 52) = 4.17$, $p < .05$. Post-hoc paired t-
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37 tests showed that the increase in conflict over time was carried by a rise in boys' conflict with
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39 mothers: $t = 2.86$, $p < .01$ (all other t-values < 1.76 , *ns*).
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44 *IST.* We used a repeated-measures ANOVA to examine differences in mean
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46 proportions of children's IST, by time-point (Time 1, Time 2), conversational partners
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48 (younger sibling, mother) and referent (own vs. others' / shared). The results showed no effect
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50 of time: $F(1, 52) = 0.17$, $p = .68$; a significant main effect of partner (more IST with younger
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52 sibling than with mother): $F(1, 52) = 10.30$, $p < .01$; and a marginal main effect of referent
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54 (more talk about own than others' / shared inner states): $F(1, 52) = 4.32$, $p < .05$. There was a
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56 marginal interaction between referent and time: $F(1, 52) = 4.88$, $p < .05$. However, post-hoc
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58 paired t-tests showed no significant difference between time-points in the frequencies of
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3 children's talk about either their own or others' inner states: $t < 1.72$, *ns*. There was also a
4
5 significant interaction between referent and partner: $F(1, 52) = 52.19$, $p < .01$. Here, post-hoc
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7 t-tests showed that, at both time-points, children's conversations with mothers showed more
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9 references to own inner states (and fewer references to others' inner states) than did their
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11 conversations with younger siblings: $t > 2.69$, $p < .01$.

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15 *(ii) Do the functions of children's IST show developmental change?*

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17 To address this question we used two separate repeated-measures ANOVA to examine
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19 whether there was any effect of time or referent on the proportion of children's total IST to
20
21 siblings that occurred within: (i) explanations; and (ii) questions (contrastives were too
22
23 infrequent to be analysed). These analyses were restricted to children who referred to an inner
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25 state at least once at each time-point, and so the degrees of freedom are reduced.
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29 With regard to explanations, our results showed a significant effect of time: $F(1,42) =$
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31 27.61 , $p < .01$; and a marginal effect of referent: $F(1,42) = 5.45$, $p = .02$, but no significant
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33 interaction. Post-hoc paired t-tests showed that the proportion of IST that occurred within
34
35 explanations increased significantly over time for talk about both own inner states (0.5% to
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37 7.2%; $t = 3.82$, $p < .01$) and others' / shared inner states (1.2% to 14.9%; $t = 3.88$, $p < .01$).
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39 Thus, although explanations accounted for only a small percentage of IST, there was a
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41 striking increase over time in this use of IST (in total, from 1.7% to 22.1%).
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46 With regard to questions, our results showed a marginal effect of time: $F(1,42) =$
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48 5.56 , $p = .02$; and a highly significant effect of referent: $F(1,42) = 102.71$, $p < .01$; and a
49
50 marginal interaction: $F(1,42) = 5.42$, $p = .03$. Post-hoc paired t-tests showed that the
51
52 proportion of IST that occurred within questions was significantly greater for talk about
53
54 others' inner states than for own inner states at both Time 1 (34% vs. 0.3%; $t = 8.97$, $p < .01$)
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56 and at Time 2 (23% to 0.2%; $t = 8.16$, $p < .01$).
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60 *(iii) Is there an association between conflict and IST?*

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3 For children's conversations with their mothers at both time-points, as shown in Table 3,
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5 conflict turns were positively associated with references to their own inner states: mean $r =$
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8 .48, $p < .01$; but unrelated to references to others or shared inner states: mean $r = -.05$, *ns*. That
9
10 is, children who engaged in frequent conflict with their mothers were also more likely to refer
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12 to their own (but not to others' or shared) inner states. The difference between these mean
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14 correlations was statistically significant: $z = 2.98$, $p < .01$.

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17 In conversations with their younger siblings, references to children's own inner states
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19 were unrelated to conflict at either time-point: mean $r = .01$, *ns*; but references to
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21 others'/shared inner states showed developmentally dynamic correlations with conflict: $r =$
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24 .44, $p < .001$ at Time 1, $r = -.24$, $p < .05$ at Time 2, $z = 3.73$, $p < .01$.

25 26 27 *Results summary*

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29 This longitudinal study examined children's interactions with younger siblings and mothers at
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31 two time-points (12-months apart) and yielded three sets of results. The first of these
32
33 concerned differences across time and partners in children's conflict and inner state talk (IST).
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35 Repeated measures ANOVAs demonstrated no main effect of age for either conflict or IST.
36
37 There was no partner contrast in conflict but children showed more frequent IST with younger
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39 siblings than with mothers – this contrast was especially marked for talk about others' inner
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41 states (predominantly others' desires). The second set of results concerned changes across
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43 time in the conversational functions of IST. Across time there was a significant increase in the
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45 proportion of IST appearing within explanations and a marginal increase in the proportion of
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47 IST appearing within questions. Our third set of findings concerned relations between conflict
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49 and IST. For interactions with mothers, frequencies of conflict and children's talk about their
50
51 own inner states were positively correlated at both time-points. In contrast, for children's
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53 conversations with younger siblings at Time 1, conflict was positively correlated with
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55 reference to others' inner states at Time 1. Consistent with this relationship-specific pattern of
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3 associations, correlations across social context (i.e., conversations with mother vs. younger
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5 sibling) were non-significant for both conflict and IST at both time-points.
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8 Discussion

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10 This longitudinal study of children's interactions with caregivers and younger siblings
11 addressed three questions. First, do children's engagement in conflict and IST change over
12 time or differ across relationships? Our results showed no change over time (for either
13 measure), but a difference across relationships (for IST only). Second, does the function of
14 IST show developmental change? In support of this proposal, we found that children's IST
15 within explanations increased over time. Third, is there an association between conflict and
16 IST (and if so, does this association depend on IST referent or conversational partner)? Here,
17 our results indicated distinct associations between IST and conflict for each conversational
18 partner, depending on the referent of IST. Below, we discuss our findings in relation to each
19 question in more detail.
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33 *Changes over time and differences between relationships*

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35 Our results showed no significant main effect of time on either IST or conflict although
36 conflict showed an interesting but unpredicted three-way interaction between time-point,
37 gender and relationship. Specifically, there was no increase over time in sibling conflict (for
38 either boys or girls), but a significant increase in boys' (but not girls') conflict with mothers.
39 This age-related increase in boys' conflict with mothers is interesting, and supports findings
40 from previous studies (e.g., Hughes & Dunn, 2000). Future work exploring the nature and
41 resolution of these conflict episodes may be of interest, particularly given the finding that, for
42 3-year-olds, mothers' and siblings' conflict strategies predicted children's conflict resolution
43 with their friends at age 6 (Dunn & Herrera, 1997).
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57 With regard to differences between relationships, our findings showed a main effect
58 for IST (but not conflict), as well as a significant interaction between referent and
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3 relationship. That is, children showed more IST in their conversations with younger siblings
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5 than mothers and this contrast was especially strong for children's talk about others' / shared
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7 inner states. One way of interpreting this contrast is to note that children's IST typically
8
9 focused upon the inner states of the junior partner in each conversational context (i.e., their
10
11 own inner states within conversations with mothers, and the other's inner states in
12
13 conversations with younger siblings). This interpretation both supports and extends Budwig's
14
15 (2002) finding that talk about desires between young children and their mothers
16
17 overwhelmingly centred on the child's desire (accounting for 90% and 87% of children's and
18
19 mothers' talk about desires, respectively). Specifically, our findings demonstrate that, in
20
21 appropriate contexts (such as interactions with a younger sibling), children are able and
22
23 willing to engage in non-egocentric discussions about others' inner states. In this respect,
24
25 siblings appear well equipped to act as caregivers and tutors. Of course, in many different
26
27 cultures older siblings are as influential as parents in the socializing process (Zukow, 1989);
28
29 indeed, in non-western societies children and adolescents spend more time with siblings than
30
31 with parents (Whiting & Edwards, 1988; Updegraff, McHale, Whiteman, Thayer, & Delgado,
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33 2005).

41 It is also worth noting that the relationship specificity observed in children's IST in
42
43 this study can be interpreted from both competence and performance perspectives. Insofar as
44
45 they indicate flexibility in IST, differences with different conversational partners also reflect
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47 children's competences (e.g., the awareness that the same goal is best achieved in different
48
49 ways with different social partners). According to the performance perspective, variation in
50
51 IST reflects not only underlying variation in children's competencies (as suggested by
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53 associations with experimental measures of social understanding - Brown & Dunn, 1996;
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55 Brown et al., 1996; Dunn, et al., 1991a; Hughes & Dunn, 1998), but also social factors (e.g.,
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3 partner influences on both the quantity and quality of IST) and motivational factors (e.g.,
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5 using IST to establish / maintain interactions with a preferred social partner).
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8 *Age-related changes in the function of IST.*
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10 Our results demonstrated ontogenetic change in the function of IST. Specifically, there
11 was a 10-fold increase in the proportion of IST that occurred within explanations (from 2% to
12 22%). This striking increase was largely accounted for by children's explanations at Time 2 of
13 how to play a game, as illustrated by the two examples below, which come from separate play
14 sessions in which children were pretending to be policemen:
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22 *"We need to put this on you then people know that you've got a phone, yeah?"*
23

24 *"Baba, when I blow my whistle it means you're one of me. OK?"*
25
26

27 In contrast, children's IST at Time 1 occurred predominantly within matter of fact statements
28 (e.g., *"Let's sort you out. You need a hat on. Here you go"*). There was also a marginal
29 increase in children's IST within questions, as illustrated by the Time 2 examples below:
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33 *"Michael give me your hand, I'm going to be, do you want to be a princess?"*
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36 *"Do you want to wear these shoes?"*
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39 It is worth noting that the younger siblings were all 2-year-olds at Time 1 and 3-year-
40 olds at Time 2; the intervening developmental period is accompanied by dramatic increases in
41 children's abilities to join in games of shared pretend play between the ages of 2 and 3 (for a
42 recent review, see Lillard, 2007). Thus, it is possible that the functional shift in the study
43 children's use of IST was driven by developmental changes in their conversational partners.
44 Also of note is that the functional shift observed in the present study provides an interesting
45 parallel to the shift noted by Budwig (2002) in younger children's instrumental vs. permissive
46 use of desire terms. Further work is needed to track whether the proportion of IST within
47 explanations continues to increase with age, or whether this explanatory function is replaced
48 by yet another communicative function: for example, as younger siblings take on a yet more
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3 equal role within these sibling interactions, conflict and / or co-operation may each become
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5 more prominent.
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7 *Associations between conflict and IST*

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10 Our findings from this study indicate robust correlations at both time-points between
11
12 frequencies of conflict and children's IST in their interactions with mothers. Note that in these
13
14 conversations, children referred almost exclusively to their own inner states. It may also be
15
16 helpful to identify common sources of conflict in these conversations; the two most frequent
17
18 causes of conflict were: (i) children disregarding a mother's request or prohibition; and (ii)
19
20 disagreements over what the family should eat for supper. These common causes of conflict
21
22 are likely to be associated with IST in somewhat different ways: in the first case, children
23
24 often referred to their (lack of) knowledge or intention in their attempts to justify their
25
26 behaviour (e.g., "I didn't know; I didn't mean..."), whereas in the second case children
27
28 typically referred to their desires or preferences (e.g., "I don't like..."; "I wanted to have....").
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31 For children's conversations with younger siblings, our findings were more complex. In
32
33 particular, conflict was positively correlated with talk about *others'* inner states at Time 1, but
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35 not at Time 2. This shift may relate to gains in the younger siblings' verbal competence (and
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37 consequent reduction in the need for the study children to articulate their younger siblings
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39 thoughts and desires).
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46 Longitudinal findings from another study may also shed light on the lack of stability
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48 over time in IST, conflict and the association between these two key aspects of children's
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50 social interactions. Herrera and Dunn (1997) reported that mothers' and siblings' conflict
51
52 strategies showed specific predictive relations with children's later success in managing
53
54 conflict. In particular, when mothers and siblings considered the child's needs, the children
55
56 themselves later displayed constructive disagreement and resolution techniques. This
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58 'learning through conflict' may explain why children who showed high levels of conflict at
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3 Time 1 did not continue to show elevated conflict at Time 2 and talk about others' inner states
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5 was positively correlated with sibling conflict at Time 1. Over time, this constructive
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7 approach might be expected to reduce conflict; consistent with this view, talk about others'
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9 inner states was negatively correlated with sibling conflict at Time 2.
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12 *Limitations of the study.*

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14 Previous studies demonstrate that variations in children's awareness of inner states are
15
16 predicted by a variety of family interactions, including: co-operation (Dunn, Brown,
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18 Slomkowski, Tesla, & Youngblade, 1991); connected communication (Slomkowski & Dunn,
19
20 1996); pretend play (Nielsen & Dissanayake, 2000; Youngblade & Dunn, 1995); parenting
21
22 style (Ruffman, Perner, & Parkin, 1999) and talk about conflict, causality, thoughts and
23
24 feelings (Jenkins et al., 2003); (Ruffman et al., 2002). Taken together, the above findings
25
26 extend this theme by indicating that such patterns of association also differ across
27
28 conversational partners. Here, however, a caveat is warranted. Specifically, although children
29
30 were observed with younger siblings and with mothers during the same home-visits at each
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32 time-point (such that ratings were equally affected by general factors, such as place, time of
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34 day and fatigue), there were inevitably differences between the two observational contexts. In
35
36 particular, the sibling play sessions involved a big bag of props for pretend play (e.g., toy
37
38 food, dress-up outfits etc); these props were often the focus of both conflicts (e.g., disputes
39
40 over toy possession) and explanations (e.g., how to make a toy work). In contrast, the child-
41
42 mother interactions were recorded around the preparation of the evening meal; typically
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44 mothers engaged in this task without asking for (or receiving) assistance from the children.
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46 These different contexts were used to reflect differences in the nature of children's everyday
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48 interaction with siblings vs. mothers (i.e., siblings engage in more play, whilst mothers engage
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50 in more caregiving behaviors). Nevertheless, it is important that future work should assess
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whether the relationship-specific results observed in the current study are replicated when these contextual differences are minimised.

IST with younger sibs and mothers

Table 1:

Means (Standard Deviations) of Inner State Talk (IST) and conflict as a proportion of total turns, by speaker, partner and time-point

	Type	Referent	T1: OS-YS	T1: OS-M	T2: OS-YS	T2: OS-M
IST/turns	Cognition	Own	.020 (.050)	.030 (.046)	.027 (.039)	.028 (.043)
		Other/shared	.015 (.039)	.009 (.023)	.026 (.044)	.013 (.024)
	Emotion	Own	.018 (.069)	.026 (.037)	.004 (.011)	.014 (.026)
		Other/shared	.011 (.027)	.005 (.014)	.006 (.015)	.010 (.028)
	Desire	Own	.044 (.070)	.083 (.096)	.035 (.054)	.070 (.076)
		Other/shared	.090 (.128)	.007 (.022)	.106 (.137)	.012 (.029)
	ALL	Own	.084 (.113)	.141 (.120)	.068 (.075)	.112 (.091)
		Other/shared	.118 (.147)	.021 (.036)	.142 (.141)	.035 (.046)
	TOTAL		.198 (.172)	.159 (.125)	.203 (.156)	.147 (.103)
Conflict			.105 (.174)	.053 (.084)	.117 (.180)	.113 (.134)

Key: OS= Older sibling; YS = Younger sibling; M = Mother

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Table 2:

Stability Over Time for Conflict & IST

* p < .01; + p < .05		Partner	Measure (Propn. Total talk)	Correlation
Stability	Time 1-Time 2	Younger sibling	Conflict turn	.28 ⁺
			Ref. to own inner states	.19
			Ref to others' inner states	-.09
		Mother	Conflict turn	.26 ⁺
			Ref. to own inner states	.19
			Ref to others' inner states	-.04

IST with younger sibs and mothers

Table 3:

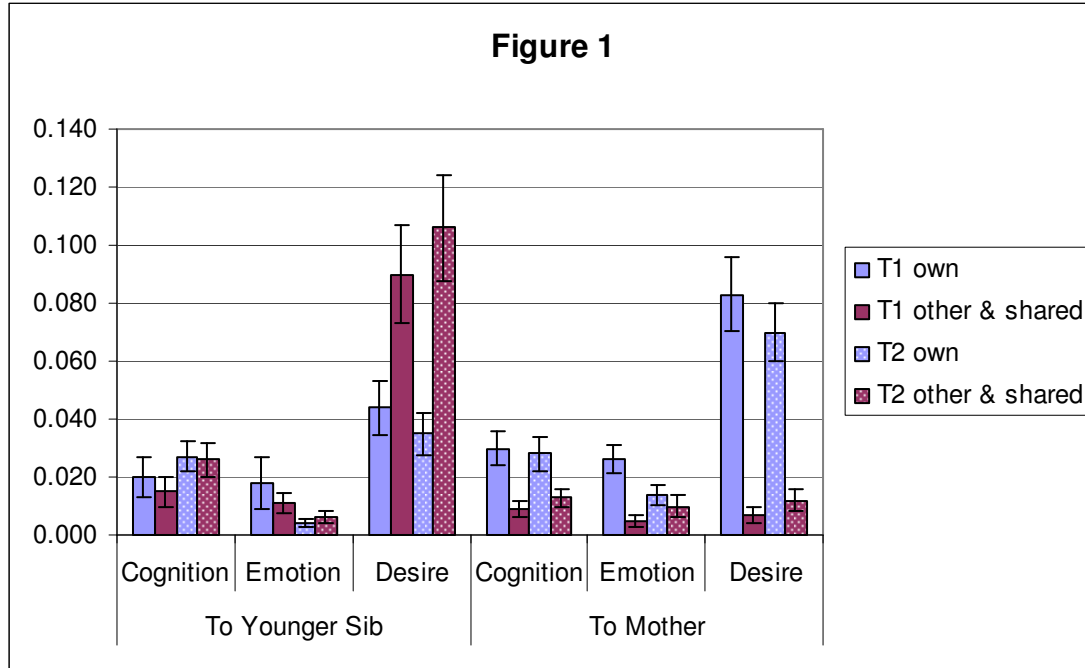
Within-child concurrent correlations between conflict turns and Inner State Talk (IST)

IST	Partner	Referent	Time 1 Conflict	Time 2 Conflict
Time 1	Younger sibling	Own	.06	-.01
		Other / Shared	.44**	-.02
	Mother	Own	.54**	-.03
		Other / Shared	-.13	-.21
Time 2	Younger sibling	Own	-.01	-.04
		Other / Shared	-.10	-.24 ⁺
	Mother	Own	.06	.38**
		Other / Shared	-.07	.06

Figure Captions

Figure 1

Mean Proportions of Inner State Talk (IST), by Type, Time-point and Social Context.



References

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