

Correction and Repair: a comparative analysis of a boy with ASD interacting  
with a parent and with an ABA trainer

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Abstract

Applied Behaviour Analysis (ABA) is a widely used therapeutic intervention for children with autism spectrum disorder (ASD) yet there has been little research into the interactional organization of ABA sessions. This study reports a comparative case study of two interactions in which the same child, a 12-year-old boy with ASD, interacts with his father and interacts with an Applied Behaviour Analysis (ABA) trainer. Both interactions occur at home and are drawn from a small corpus (2h) of children with ASD in domestic settings. Drawing on CA to delineate the sequential relationships between the actions of the adult participant and the child, we present a quantitative and microstructural analysis of 156 directive sequences in order to examine the similarities and differences between the two interactions. We first show that the rate of the production of directives, and the use of correction-initiation, is higher in the ABA session. The analysis then demonstrates the applicability of Schegloff, Jefferson and Sacks' (1977) treatment of repair in conversation to some problems that occur in how the child responds to adults' directives. However, we show that whilst some correction-initiations target problems with hearing, speaking, and understanding, some target substantive problems. We identify a practice, *explicating an error*, whereby correction-initiations are expanded to point out the nature of the error. This practice can show that the correction-target is being construed as a substantive error. In such cases, the correction-initiation is not a subtype of repair-initiation in the sense of Schegloff, Jefferson and Sacks' (1977) analysis of repair.

Keywords: Autism Spectrum Disorder, repair, correction, recruitment, Applied Behaviour Analysis

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Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that is characterised by difficulties in social interaction and communication and in repetitive interests and behaviour (American Psychiatric Association, 2013; World Health Organization, 1992, 2018). ASD is generally understood to be due to complex genetic factors and possibly environmental triggers. It is a highly heterogeneous condition; individuals of the same age who are diagnosed with ASD can differ considerably from one another. In addition to their developmental differences, individuals' different experiences of remediation training can result in differences in how they interact and communicate.

Whilst the communication challenges exhibited by children with ASD have been a long-standing focus of research in developmental psychology (e.g. Baltaxe, 1977), a developing literature drawing on the inductive methodology of Conversation Analysis (henceforth, CA) to examine interactions involve people with autism began in the 1990s. CA examines recordings (preferably video recordings) of spontaneously occurring interactions in order to identify the resources that the participants used to accomplish interactions. Early CA research on autism examined echolia (the utterance of previously-heard strings of words, a common feature ASD) in interactions settings (Wootton, 1999; Local & Wootton, 1995; Tarplee & Barrow, 1999) and the organisation of topics in conversation (Dobbinson, Perkins, & Boucher 1998). One focus of recent work has been on testing and assessment (Korkiakangas, Dindar, Laitila, & Kärnä, 2016; Maynard, 2005; Maynard & Turowetz, 2017,. Muskett, Body, & Perkins, 2012). The contribution of CA-based approaches to understanding autism is critically reviewed and discussed by Sterponi, de Kirby, and Shankey (2015).

Support and assistance in interaction: Repair, Correction, and Recruitment

The importance adult support for children was influentially articulated within developmental psychology in terms of Vygotsky's celebrated idea that a child's region of competence can be extended

(into a “zone of proximal development”, ZPD) through support from an adult (or more able peer) (1930-1934/1978, Draper, 2013). Jacoby and Ochs (1995) noted that CA could be used to examine ZPD interactions. In a CA case study of how a learning support assistant (LSA) provide support for a child with autism in classroom setting, Stribling & Rae (2010) draw on CA work on sequence organisation (Schegloff, 2007) as an analytic lever. They show how two-part sequences (involving a teacher’s initiating action, such as a counting instruction) and the child’s response (counting) can be expanded through the participation of the LSA. They show how the LSA monitors how the child responds to the teachers and provides support that is contingent upon what the child can do.

The organisation of repair, specifically the practices of other-initiated repair (the focus of this special collection) are potentially relevant for the analysis of how a co-interactant address problems that occur for a participant with ASD. In their canonical paper, Schegloff, Jefferson and Sacks (1977) (henceforth SJS) propose that “An ‘organization of repair’ operates in conversation, addressed to recurrent problems in speaking, hearing, and understanding.” (SJS, p. 316, Abstract). This analysis involves two major organisational issues. First, problems and potential remedies have a trajectory; there are *repair segments* in interaction which involve the problem, the initiation of repair (i.e. the cessation of the activity in progress such that repair can take place) and the repair itself. Second, different parties can undertake each of these elements. The initiation of repair may be carried out by self (the party who produced the problem) or other; and the repair may be carried out by self or other. It is important to underscore at the outset that the focus of SJS is on an organisation within *conversation* that is geared to addressing (and potentially remedying) *interactional troubles* (problems with speaking, hearing, and understanding). Further, as noted by Barnes and Bloch (2018), whilst the interaction of parties who are visible to each other is multimodal (involving talk and visible action), as Schegloff (2000) underscores, the focus of the SJS analysis of repair is *talk* specifically. This is an important point to note since talk involves specific kinds of interactional accountabilities. For example,

and perhaps most egregiously, (apart from specific kinds of exceptions) talking-in-interaction is overwhelmingly carried out by one party at a time.

Problems can arise in the course of interaction that are not problems of interaction. For example, one class of cases concerns troubles encountered in carrying out practical actions (e.g., opening a can of food and discovering that a can opener is not available). Whilst such a trouble might be a problem *for* interaction and might be addressed *through* interaction, lacking a can opener is not a problem in speaking, hearing, or understanding. The ways in which one party can become involved in providing assistance to another party when they encounter a trouble in a practical course of action, or when a trouble is anticipated, have been influentially articulated under the rubric of *recruitment* (Kendrick and Drew, 2016). Drawing on interactions between co-present adults, Kendrick and Drew (2016) delineate the different ways in which one party may become involved in providing assistance to another party. They propose that such methods constitute a continuum from requests for assistance (where there is a high obligation to assist) to anticipations of need (with a lower obligation to assist). Kendrick and Drew (p. 16) note that recruitment and repair both involve a self/other distinction with respect to addressing troubles but they relate to different kinds of trouble. The troubles that recruitment address, and the potential remedies, lie outside the scope of repair as formulated by SJS, (henceforth SJS-repair).

Although SJS's contribution relates to repair in conversation, and more specifically to talk, a number of studies have extended, or adapted, SJS's contribution to consider embodied actions of various kinds. For example, it informs Suchman's (1987) analysis of human-machine interaction and Koshik's (2002) examination of tutors correcting errors in written language. Similarly, extensions have been made to such critical domains as surgery (Koschmann, LeBaron, Goodwin, Zemel & Dunnington, 2007; Zemel, Koschmann & LeBaron, 2011) and aircraft cockpit interactions (Arminen & Auvinen, 2013). In a longitudinal analysis of a course of physiotherapy treatment, Martin & Sahlström (2010) adapt the analysis of repair and correction to examine the richly multimodal actions

which comprise physiotherapy. They show that over the course of treatment there is a change from other- to self-initiated repair and correction, and from other- to self-repair and correction.

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Insert Figure 1 about here

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A further class of cases which lies outside SJS-repair is where there is a problem with something that is said, but the problem is not one of speaking but rather relates to the content of what is said. As Macbeth (2004) reminds us in his critical assessment of McHoul's (1990) important analysis of the organisation of correction and repair in classroom interaction, some cases of correction (of spoken conduct) do not relate to problems with speaking, hearing and understanding. For example, if a child answers a verbal test-question incorrectly, whilst there is a problem that becomes evident in their talk, this is not an interactional problem of speaking, hearing, or understanding. In the context of reference to "An 'organization of repair' [that] operates in conversation, addressed to recurrent problems in speaking, hearing, and understanding." (SJS, p. 316, Abstract), *correction* is referred to as *subset of repair* (and *correction initiation* as a subset of *repair initiation*). This is made explicit in SJS §2.13.

"Accordingly, we will refer to 'repair' rather than 'correction' in order to capture the more general domain of occurrences. Self- and other-CORRECTION, then, are particular types in a domain more generally formulated by a distinction between self- and other-REPAIR." (p. 363, capitals supplied).

§2.2 goes on to state: "'Self-repair' and 'other-repair' (as well as the 'correction' sub-types) refer to the success of a repair procedure." (p. 363). This sub-type relationship is shown in Fig 1, left hand panel. However, it is important to note that this relationship is being stated within the domain of the organisation of repair as defined by SJS. It is not being claimed that all forms of correction can be subsumed under SJS-repair. As such, whilst some corrections are cases of repair that address problems in speaking, hearing, or understanding, some corrections are not. (See Fig 1, right-hand

panel.) The issue of whether or not an instance of correction is SJS-repair or not might appear to be a rather abstruse definitional matter. However, although the distinction between getting something wrong through a problem with speaking, hearing or understanding on the one hand and being wrong on the other might not always be clear cut, it is of practical significance. In the former, the source of the trouble resides in the production or reception of talk; in the latter, the source of the trouble resides elsewhere. For example, correcting a mishearing is likely to involve different actions than correcting a misapprehension. To summarise, it is necessary to distinguish between different kinds of problems or troubles that can arise in interactional settings. There are (a) interactional troubles (i.e. troubles of interaction such as problems in speaking, hearing, and understanding), (b) troubles that become manifest in interaction (e.g. that a participant has an erroneous belief) and (c) troubles in the practical courses action (e.g. lacking an object that is required to complete a course of action).

### Interactional Repair and autism

The capacity of children with autism to handle repair in talk has been examined in a number of quantitative studies of both spontaneous and experimentally-produced troubles. Studying video recordings of six children with autism aged 2-5 years each, interacting with their mothers at home, Keen (2003) coded “communication breakdowns” and repair attempts made by the child. Keen reports that generally these children do attempt to repair such breakdowns. Using experimental displays of problems, Volden (2004) compared how children with ASD and aged-match controls responded to requests for experimental clarifications (e.g., ‘What?’, ‘I don’t understand’, ‘Tell me another way’) that were produced in the course of an interaction. These were “stacked” such that the experimental co-interactant persisted in apparently not understanding the child. She found similar patterns of response between the two groups, for example using strategies like adding more information as the failure to understand continued. However, she reports that the children with ASD tended to be more likely to respond inappropriately. Ohtake, Wehmeyer, Nakaya, Takahashi, and Yanagihara (2011) examined

how children with autism responded to a range of experimentally produced verbal and nonverbal requests for clarification and report that they repaired more than 80% of them.

Conversation analysis has been used to identify and describe repair-related actions in spontaneous talk. Rendle-Short (2002) presents a single-case study in which a school-aged girl with Asperger syndrome makes a 4-min phone call to a friend and speaks with the friend's mother, then the friend. Part of the analysis suggests that the girl has difficulties in dealing with interactional problems. Whilst carrying out repair is usually thought of as momentarily stopping the progress of the trajectory of interaction in order to address a trouble, drawing on about 16h of data involving a five-year-ten-month-old boy with autism interacting with a variety of family members, Sterponi & Fasulo (2010) question this and argue that the boy shows an orientation to progressivity, that is doing actions that move the interaction along. Dindar, Korikiakangas, Laitila, & Kärnä, (2016) report a study of 7 school-aged children with autism interacting with neurotypical adults in the context of technology-enhanced activity sessions (e.g., using a touchscreen-activated story-telling application). The study shows that these children can draw on verbal and visible resources for initiating repair. However, it also identifies problems that can ensue when the adult co-interactants do not correctly identify the source of the trouble.

### Therapeutic Interaction and autism

Although the interactional capacities and challenges of children with ASD have been examined using frameworks informed by CA in a range of contexts, there is limited analysis of therapeutic interactions. Drawing on participant observation and discourse analysis, Bottema-Beutel (2011) shows how a girl with ASD, in a small-group intervention that includes two typically-developing peers, is able to manage different forms of participation structure, for example reframing a game of charades into a joint performance. Also drawing on participant observation and discourse analysis, Lester (2014) examines audio and video recordings from a clinic that offers group and individual sessions. Her

analysis focuses on discursive practices that therapists use to represent children's behaviour as explainable and functional. Wiklund (2016) draws on CA to examine video recordings of group therapy sessions involving two boys with autism and their therapists. Her analysis concerns repair sequences, focusing mainly on the prosodic properties of turns that are trouble sources. She suggests that the most common causes of misunderstandings involve overly literal interpretations or relate to changes in topic. Fasulo & Fiore (2007) study two boys with autism taking part in a range of therapeutic activities. Whilst some of these activities are quite structured, their analysis focuses on one which is apparently unstructured "Time for Talking" "where the boys sat and talked with their two therapists" (p. 226). The analysis suggests various ways in which the therapists pursue a didactic agenda (for example asking test questions or correcting linguistic errors) that can conflict with the opportunity to engage in conversation.

Applied Behaviour Analysis (ABA) is one of the most popular approaches to training children with ASD (particularly in the USA), yet there are apparently no previous studies of that use CA to examine how this form of therapy actually proceeds. ABA uses principles of learning theory, ultimately derived from Skinner's (1953) analysis of how behaviours are learned as a result of the consequences that they have. Briefly, ABA involves identifying a person's current behaviours and the behaviours that they need to develop a set of relevant skills, and then training those behaviours (Baer, Wolf & Risley, 1968; Cooper, Heron, & Heward, 2019). Based on an assessment of a child's current skills, sessions are conducted with the object of meeting achievable targets. For Autism Spectrum Conditions, the core areas of sensory, language and social communication skills are commonly considered.

One way of exploring how ABA sessions might be similar to, or different than, everyday interaction is to undertake a comparative analysis. One of the few CA studies of children with autism that develops a comparative dimension is Geils & Knoetze's (2008) a case study of Barney, a six-and-a-half-year-old boy diagnosed with Pervasive Developmental Disorder (Autistic Spectrum). Drawing

on an extensive collection of video data collected over several months, they compare Barney's interactions with different family members, and with a visiting volunteer, and propose that different interactive styles have different consequences. They suggest that "co-ordinated interaction" is enhanced by "A playful, activity-based interactive style constituted by non-verbal turns, affection, and short, simple utterances" (p. 200) but that frequent and repetitive questioning constrains the interaction and can lead to the child withdrawing.

Understanding the interactional skills involved in the delivery of ABA can potentially contribute to understanding therapists' skills (Callahan, Foxx, Swierczynski, et al., 2019) and also in the examination of naturalistic developmental behavioural interventions (Schreibman, Dawson, Stahmer, Landa, Rogers, McGee, & McNerney, 2015). Moreover, understanding the skills and practices drawn on by ABA tutors and by parents in interacting with children with ASD is particularly relevant given the evidence that parental interventions at home can be particularly helpful (Kasari, Gulsrud, Wong, Kwon & Locke, 2010; Freeman & Kasari, 2013; Pickles, et al., 2016). More specifically, although the interactional issues that arise when correcting patients in therapy have been considered, (for example with respect to adults with aphasia, Simmons-Mackie & Damico, 2008), there is no corresponding analysis of children with autism.

The present study aims to compare domestic, parental-child interaction with ABA interaction, particularly focusing on situations in which remedial action by the adult becomes relevant, and to examine the interactional organisation of the remediation practices that are used.

## Method

In order to compare the situated ways in which parents and ABA tutors address problems, the present study uses conversation analysis to examine two previously recorded single sessions of activity in which, Ben, a 12-year old boy with autism spectrum disorder, interacts with his father in a construction-kit activity and with an ABA tutor in a range of training activities. These sessions were

collected as part of a set of video recordings, made with consent, and with ethical approval from the researchers' host institution, of four children interacting at home.

In the informal parental session (video duration 8:19 minutes), Ben is seated at a large table, with his father (Dad) to his right. Dad has a construction game in front of him. The game consists of 24 items, each held behind a numbered flap in the box. Each item consists of a small number of plastic components. A pictorial guide on the box shows, in outline, how the pieces should be fitted together. After initially retrieving item 13, the session involves the assembly of item 14. In the ABA session (video duration 23:34 minutes), Ben and Steve, an ABA tutor, are seated facing each other on adjacent sides of the kitchen table. Steve is employed by Ben's parents and has worked with Ben for 2-3 years; he provides after-school sessions around 3 times per week for 2-3 hours. Consequently, Steve and Ben have come to know each other very well. The programme aims to develop functional skills such as shopping. The current table-top session follows an earlier outing in which Ben and Steve visited a number of shops. The session aims to develop skills that are needed for shopping. The session involves talk about people known to Ben, identifying coins, identifying items of food and identifying shops and items purchased from a shopping trip earlier in the day. Objects are handled with respect to some of these topics, (e.g. foodstuffs, coins, photographs of shops and of items on sale). Based on the data available, it is not possible to specify analytically how representative these two sessions are. However, based our knowledge of the family and of ABA sessions in general, we do not judge these sessions to be unusual for Ben and his co-interactants.

Each session was transcribed in full using the detailed Jefferson orthography, supplemented by annotations to show selected visible conduct, e.g., eye gaze, handling of objects (a transcription key is appended). Rather than coding the data in terms of theoretically-derived categories, or in terms of previously specified phenomena (valuable though that can be, e.g., Dingemans, Kendrick & Enfield, 2016), the approach taken here is to analyse each session in its own terms, that is, to identify actions and sequences that are intrinsic to these settings. It is readily apparent that adults' directives are a

major resource in these settings. Consequently, we identified all the directive sequences in the data and examined how they are organised. In particular, we focused on how the adult participants respond to Ben's responses to their directives. On analysis, it is evident that these responses commonly involve various remedial actions, such as other-initiations of corrections. In the course of examining the remedial actions that the adult participants use, the analysis aims to specify whether an interactional trouble is being targeted or whether a different class of trouble is involved. Fragments were selected for presentation in order to demonstrate how adults' remedial actions are designed and responded to.

### Analysis and Discussion

Prior to considering interactional details, a number of similarities and differences between the two sessions can be noted. Both sessions involve Ben sitting, with an adult, at a table that is furnished with objects that are used in the session. In both sessions, the adult participant has primary access to these objects. One difference between the configurations is that in the ABA session, Ben and the tutor are facing each other (an F-formation, Kendon, 1976/1990) whereas in the parental interaction, Ben and his Dad are seated side-by-side and, for the most part, with a shared perspective (a C-formation, Cekaite, 2010, p.7).

Both sessions are primarily structured through the adult producing questions or instructions or more generally *directives*. The term *directive* Ervin-Tripp (1976, drawing on Searles' (1975) adaption of Austin's (1962) treatment of speech acts) refers to the diversity of ways in which one party seeks to get another party to do something. Requests, and directives more generally, in social interaction have been examined in a number of CA studies (e.g. Clayman & Heritage, 2014; Craven & Potter, 2010; Curl & Drew, 2008; Drew & Couper-Kuhlen, 2014; Kent, 2012; Kent & Kendrick, 2016); including their use in family settings has been a specific focus of attention (e.g. Aronsson & Cekaite, 2011; Goodwin & Cekaite, 2014). The use of directives in the parental session has been previous noted by Author(s) (in press).





One difference between the sessions is that whilst they are both fundamentally organised through the adults' production of directives, in the parental session, these open up fairly extended spaces of activity, whereas the ABA session involves a much more quick-fire format in which the tutor directives open up short sequences in which a response is elicited and then evaluated. Sequences involving an initiating action, a responsive action and a sequence-closing third action are highly ubiquitous in classroom settings and have been described in terms of initiation-response-evaluation (or feedback) sequences (Sinclair and Coulthard, 1975) or question-answer-evaluation sequences (Mehan, 1979). Through an analysis of a different setting - enquiries from customers of an electronic goods repair service - Kevoe-Feldman and Robinson (2012) argue that such sequences are essentially three-part sequences. That is, the first action (a test question, an enquiry the status of an electronic repair job) is carried out in order for the response (the second action) to then be assessed or evaluated (the third action). Although Dad occasionally praises or congratulates Ben's accomplishments, Dad's directives are generally concerned with organising, or promoting, Ben's engagement with the construction activity in itself rather than with eliciting that activity for the sake of evaluating it. However, in the ABA session the tutor's directives are designed to elicit actions for those actions to then be evaluated. A further institutional difference is that whilst the adults in each setting produce verbal positive evaluations, in the ABA session rewards of chocolate or of games of high-fives are occasionally provided.

In terms of the overall rate of the production of locally-initial directives (i.e. excluding repeats and partial repeats of directives, but including 8 cases in the ABA session when directives are re-issued following the production of a correct response), the ABA session involves nearly 3 times as many directives per minute as the parental session. In terms of the number of such directives per adult words, the ABA session involves nearly twice as many directives. This difference reflects the different extent to which the father and the ABA tutor control their respective sessions. The high rate of directives in the ABA session corresponds to the formality of this setting and the extent to which the adult party directs the activity. It also reflects the business of training – eliciting responses and evaluating them.

A further example of the differences in the control of the sessions is that whilst both sessions involve spates of physical play, in the ABA session, a game of “kill hand” (in which Ben has to catch Steve’s hand as it scurries over the tabletop) is instigated by Steve, whereas in the parental session, a round of play-fighting is instigated by Ben (Author(s), in press).

#### Repair and Correction in the parental session

As indicated in extract 1, in the construction activity, Dad’s directives primarily require Ben to engage in manual actions rather than in talk. In the two sequences contained in extract 1, once Dad has produced a directive, Ben appropriately engages with the prescribed activity and no remediation of his response is required. However, on occasion, Dad initiates correction of the actions that Ben is carrying out. Extract 3, shows an example.

#### Extract 3 [MR2012 Ben and Dad 03:17-03:31] Put that on there

[*Ben gaze at pieces*

131 ([xxxxxxxxxxx3xxxxxxxx] [xxx4) ((sound effects box))

132 Dad: [ [Crash bang wallop]

[*Dad reaches* ] [*Dad gathers pieces*]

[*for pieces* ]

[*Ben reaches in*

133 Dad: [There [you go ] (.) put that on there?

[*adjusts pieces*]

134 Ben: (scuse)

135 Dad: nuh [no nono that goes] next to it (.) on there

[ *hand-over-hand* ]

[*Ben handles piece with RH→*

136 ([-----1-----2-----3)

137 Dad: Er[m (.) hang on hang on (.)not that way]

[*touches and moves Ben's R hand away* ]

138 Dad: [I think it's meant to go like that

[*handles pieces*

In extract 3, Dad reaches for some of the pieces that are to be assembled whilst a sound effects toy that Ben has triggered plays a theatrical breaking-glass sound effect. Dad comments on this by saying “Crash bang wallop” as he gathers some pieces together (131, 132). Adjusting the pieces, Dad issues a directive “put that on there” (133). Ben proceeds to manipulate the pieces and utters something (134). Dad initiates correction of Ben’s manual work, both verbally and manually, saying “nuh no nono that goes next to it (.) on there” whilst manipulating Ben’s hands. Starting the turn with “nuh no nono” indicates that what Ben has done so far is incorrect. Then by saying “that goes next to it (.) on there”, the turn then proceeds to indicate what should be done, rather than what is wrong with what has been done. In this turn then, Dad moves from identifying a problem to suggesting a remedy. By contrast, Dad subsequently indicates a problem (or continuing problem) by saying “erm (.) hang on hang on” which indicates that Ben should stop what he is doing (137). Rather than proceeding to offer advice or clarification about how to proceed, Dad states that the way that Ben has been working is incorrect, “not that way”. Whilst the first correction-initiation turn was followed by an opportunity for Ben to follow the suggestion that it included (136), the second correction-initiation turn is followed by Dad carrying out the correction himself. In both these cases, the problem is in (or is evident in) the way in which Ben is manipulating the pieces; as such these are problems with manual courses of action. Nevertheless, Dad’s utterance “that goes next to it (.) on there” can be analysed as a clarification that addresses a problem with understanding his previous instruction, “put that on there” (133). As such, the remediation (in 135) targets a talk-related interactional problem and so, on this



[*Ben sits up*

251 Ben: [nhgh!

252 Dad: [( ) there

[*touches Ben's knee*

253 Ben: Ghn huh huhg

254 Ben: Agh hrr hrr [hrrgh.

255 Dad: [Can you put that gun. (.) in there:]

[ *holding components* ]

[*handles components* →

256 [(-----1-----2-----)

[*holding components* →

257 Dad: >Push<

258 Dad: >Oh hang on< push

259 (-----2-----)

260 Dad: [Oh like that maybe ]

[*takes and fits components* ]

261 Dad: O:kay

On occasion then, in the parental session in which Ben and Dad assemble a construction kit, Ben encounters problems completing the manual actions that Dad directs him to carry out. Whilst such problems are not problems in speaking or hearing, Ben's difficulties can be construed as problems with understanding the prior instruction; consequently, Dad's initiation of remedial action is targeting an interactional trouble and so these are instances of SJS-repair. A feature of Dad's other-initiations of repair and other-initiations of correction is that these actions are multimodal: they involve the

coordination of objects, talk, and bodies. In the two cases just considered, Extract 3 and Extract 4, having provided an opportunity for Ben to assemble some pieces, and having carried out other-initiated repair to address Ben's problems in doing this, Dad finally completes the assembly task. After all, playing with the construction kit is not a test situation but is a joint project.

### Repair and Correction in the ABA session

Whilst Dad's directives in the parental session are almost entirely geared to the production of manual actions involving the retrieval or manipulation of construction-kit pieces, most of the directives in the ABA session require verbal responses, though some require handling objects. We have already seen one example of this in Extract 2 where Ben was required to identify an onion. Extract 5 shows an example where a problem in speaking occurs in Ben's response.

Extract 5 [MR2012 Ben ABA 00:46-01:02] I like eggs too

0116 Ste: Yu- (.) Is that a nice egg?

0117 (-----)

0118 (Ben:) ° ( ) °

0119 Ste: [I don't like eggs.]

[ *head shake* ]

0120 Ben: I like eggs [°(too)°

0121 Ste: [Good work,] you like eggs (.) jus'

[ *looks up* ]

0122 say I like eggs.

0123 (-----1-----)

0124 Ben: I like eggs too=

0125 Ste: =[Na not without] <forget the too >(say)< I like eggs

[ *wags finger* ]

0201 Ben: †I like eggs.

0202 Ste: [Very good]

[*thumbs up*]

In Extract 5, Ben is eating a small chocolate egg which he acquired as a reward for correctly answering some previous questions about his siblings' names and through tendering the correct pretend price for the egg. Steve asks "Is that a nice egg?" (0116). Ben's response is unclear (0118), but having topicalised the assessment of chocolate eggs, Steve announces "I don't like eggs" (0119). This is the first occurrence in the recorded session of what is apparently an ABA conversation-building practice whereby the tutor presents a negative assessment of an item that the child likes; the relevant response is for the child to produce their contradictory positive assessment. Ben promptly complies with "I like eggs" however, to this correct response, he erroneously adds "too" (0120). Ben's error is a problem in speaking, and repair in the sense of SJS is relevant.

Steve responds by first positively evaluating the correct element and acknowledging the assessment that Ben has made "Good work you like eggs" (0121). Having done this, he then addresses the incorrectly post-positioned "too" with the instruction to produce the correct response "jus' say I like eggs." (0121-0122). By going back to address a prior trouble in speaking, and by supplying the correct version, this is other-initiated other-correction as a subtype of other-initiated other-repair. After a pause, Ben complies with the instruction to produce a corrected version but again makes the error of including the post-positioned "too" (0124). Again, this is a problem in speaking and repair is relevant. Steve promptly responds with a turn that is wholly geared to correcting Ben's response. First, he pinpoints the trouble "Na not without forget the 'too'" and then adds the correct version "I like eggs". Again then, this is an instance of is other-initiated other-correction as a subtype of other-initiated other-repair. Ben responds with a correct answer "I like eggs" (0201) and receives a positive evaluation "very good" accompanied by a thumbs-up gesture (0202). (A further detail of Steve's corrective-reparative response in (0125) is that in the course of carrying out other-initiated other-repair on Ben's

talk, it also involves self-initiated self-repair of Steve's own talk. Steve self-repairs from a "not without" to "forget the too").

In extract 5, Steve's use of other-initiated other-correction, rather than allowing Ben to self-correct, is likely to reflect an ABA principle of *errorless learning* in which the aim is to maximise the likelihood of a correct response, rather than allowing the production of a response that then needs to be corrected. Whilst here Steve produces a full correct response for Ben to repeat, a number of other practices are used to promote the production of correct responses, as illustrated in Extract 6 in which Steve is looking through photographs of items seen on a shopping trip earlier that day. He picks out a photo of a jacket and asks "where do we buy a jacket" (2401). When it becomes clear that Ben isn't going to respond straight away, Steve produces a modified initiating action, this time presenting the question as a sentence stem "We buy a jacket i:n: thee:." plus the interrogative pronoun "where" (2403). When it is evident that Ben is not able to respond, Steve changes tack. Rather than posing another version of the original initiating action, he produces an ancillary initiating action that is geared to establishing the class of items that a jacket belongs to (and thereby prompting the class of shop where it can be bought) (2405). (This ancillary sequence is a form of side-sequence, Jefferson, 1972). Rather than posing a question, Steve produces a sentence stem "A jacket is" and produces the initial sound of the target word, "cl" for, "clothes" (2405). Ben readily provides the correct response to this item (2406). Steve then re-does the original initiating action, framing it as following on from talk about clothes with a turn-initial "so", "So where do we buy a jacket" (2407-2408) and adds the sentence stem "we buy a jacket in the" 2408). As he says this, he brings the hand in which he is holding the picture of a jacket into contact with a card depicting a clothes shop which is on the table. After a pause, Ben correctly names the place, "clothes shop" (2410) and receives a positive evaluation (2411).

Extract 6 [MR2012 Ben ABA 11:59-12-18] Jacket

2401 Ste: Ah! (.) A jacket. <where do we buy a jacket

2402 (-----)

2403 Ste: We buy a jacket i:n: thee:: ↓where

2404 (-----)

2405 Ste: A jacket is cl-

2406 Ben: <Clothes>

2407 Ste: So [where ] do we buy a  
           [ *touches picture* ]  
           [ *of clothes shop* ]

2408 [jacket? we buy a jacket] in the.  
           [ *touches picture* ]  
           [ *of clothes shop* ]

2409 (-----)

2410 Ben: Cl:otnes shop

2411 Ste: Fantastic answer >that's brilliant.<

In extract 6, then, Steve produces three instances of initiating actions that are built out of grammatically incomplete expressions: “We buy a jacket in thee” plus the interrogative pronoun “where” (2403); “A jacket is cl-“ (2405); and “So where do we buy a jacket? we buy a jacket in the” (2407-2408). The use of sentence stems to be completed by students is used in a number of educational settings. The production, by academic tutors, of syntactically incomplete expressions, for completion by students, is examined by Koshik (2002) who refers to them as Designedly Incomplete Utterances (DIUs). Whilst the tutors in Koshik’s data produce DIUs composed of words that students have used in written work in order to prompt the student to correct errors, here Steve is using a form of DIU to re-present a directive that he has previously produced, but to which Ben hasn’t responded. Steve’s DIU shares prosodic features with DIUs examined by Koshik, namely sound stretches. In an

examination of DIUs in a classroom context, Margutti (2010) shows how DIUs may be used to allow students to demonstrate their understanding of an issue that the teacher has just mentioned. In extract 6, Steve's third DIU corresponds to the forms of DIU described by Koshik (2002) and Margutti (2010). The second case, the initial sound of the target word, "cl" for, "clothes" (2405), results in the production of an incomplete word. Within ABA therapy such partial productions are very common, they are referred to as *prompts* and are construed as indications of the correct response. Sometimes, as in this case, the prompt is clearly sounded, on other occasions, it is uttered softly, and on some occasions, it is mouthed but apparently not sounded. Whilst other-initiations of repair characteristically halt the progression on a turn at talk, or a sequence of turns at talk, prompting is apparently geared to progressing talk.

In Extract 6, Steve carries out various kinds of remedial action to address problems that Ben encounters. In so far as Ben's problem with "where do we buy a jacket" (2401) is one of understanding what is being asked, then Steve's remediation would constitute SJS-repair. More specifically, Steve is carrying self-initiated self-repair on his previous talk. However, the determination of the problem is not always so clear cut. In Extract 7, Steve summons Ben's attention and asks a polar question "Do you have any sisters/brothers" (0001). Steve acknowledges Ben's correct response (0003) and proceeds to a new question "What (w)are you sisters/brothers called" (0004). We will be concerned with the other-initiations of correction that Steve produces following Ben's responses.

Extract 7 [MR2012 Ben ABA 00:02-00:31] Do you have any sisters/brothers

(Ben has two siblings that are the same sex as each other. The gendered term is used in the participants' talk. However, in order to protect Ben's anonymity, when the single, gendered term is used, the transcript shows both gendered terms.)

0001 Ste: Listen. (.) Do you have any sisters/brothers.

0002 Ben: Yes I (.) do::.

0003 Ste: [ You do: ]=  
 [slight nod]

0004 Ste: =What (w)are you sisters/brothers called  
 0005 (.)

0006 Ben: °my sisters/brothers are called° (.)Sue!

0007 Ste: [Ah- ] (you) sisters/brothers are ca:lled  
 [rotates head ]  
 [gazing at Ben ]

0008 (-----)

0009 Ben: William

[Dad →

0010 Ste: [Nah that's [your da[d.] (----)  
 [ [ points ]  
 [ . . . Dad . . .

0011 Ste: [Your [sisters/brothers are called  
 [. . [Ben →

0012 (---)

0013 Ste: Ca  
 [ . . Steve →

0014 Ben: [Cameron

0015 Ste: A:nd

0016 Ben: Vivian

0017 Ste: Very Good. So what are you sisters/brothers called?

0018 Ben: Ma si/bruh called

0019 (Ben:) ( )

0020 Ste: Your sisters/brothers are called

0021 Ben: <Cameron>

0022 Ste: A:nd

0023 Ben: <Vivian>

0024 Ste: That's [ fantastic ].

[gets chocolate egg]

0025 (0.5)

0026 Ste: [D'you wan' an egg]

[ offering egg ]

Ben responds to Steve's directive to name his siblings with an appropriate sentence stem "My sisters/brothers are called" then after a slight pause gives a single name, "Sue", which is actually his mother's name (0006). So, Ben has succeeded in producing a name from the correct domain, a member of his family, but it is not a correct response. Although this is an error *in speaking*, it is not an error *of speaking*, as such, this is an incorrect response rather than a case of misspeaking. On this analysis, this would not be an SJS-repair situation. Alternatively, it is possible that Steve construes Ben as having a problem with understanding. For example, perhaps he has misunderstood the meaning of "sisters"/"brother", taking it to mean something like "someone who lives here with you". On this analysis, Steve's correction would be a case of SJS-repair. However, we can examine how Steve actually represents the nature of the trouble. He initiates correction, by producing a turn that starts with "Ah", which shows that a problem has just occurred; then he produces a sentence stem "(you) sisters/brothers called" to create another opportunity to respond (0007). By indicating a problem with the previous response, and by repeating the sentence stem, Steve does not present any particular analysis of the nature of the trouble, rather he creates a new opportunity to respond. The re-initiating of

directive-response sequences is very common in the ABA session. (The re-initiating of initiation-response-evaluation sequences as an instructional method has been examined by Zemel & Koschmann, 2011).

After a short pause, Ben presents a name to complete the sentence stem: “William”, which is his father’s name (0009). Again, this is an error and again, Steve initiates correction. As with the production of his mother’s name, this can be analysed as an incorrect response rather than an error in speaking. Steve again initiates correction, by producing a turn that indicates that there is a problem “nah” (0010) and subsequently re-producing a sentence stem for completion “Your sisters/brothers are called” (0011). However, in this instance, Steve points out what it is that is wrong with the response “William”, pointing at Ben’s dad, he says “that’s your dad” (0010). This suggests that Steve is not construing Ben’s problem as a problem of hearing or speaking of understanding what he was asked to do but as a substantive error.

As Steve reproduces the sentence stem (0011), Ben is still gazing at his father and is apparently not engaging with Steve. Here then, there is a communication-related problem, one relating to attention rather than one involving the production of a problem item. Steve utters the first sound of one of Ben’s sisters/brothers “Ca” to prompt Ben (0013). Ben produces a correct name “Cameron” (0014), and in response to Steve’s “and” (0015) produces the other sister’s/brother’s name “Vivian” (0016). In so far as Steve’s prompt “Ca” can be understood to target a problem with Ben’s hearing, or understanding, it can be analysed in terms of being other-initiated repair. Such utterances, involving the initial phoneme, or phonemes of the target response, occur several times in the session.

This practice of initiating correction and then *explicating the error* that has been made that occurred in “Nah that’s your dad” (0010) occurs in ten corrections in the ABA sessions. Two examples occur in Extract 8, where Ben’s task is to identify a 50p coin (this is a pentagon). Ben’s first two attempts, “ten p” (0216) and “twenty p” (0219, 0223) each receive correction-initiations in which he is exhorted to look at the coin carefully (0217, 0223). The second of these is accompanied by an



0305 (----)

0306 Ben: five p

0307 Ste: [Nah it's not five p that's the five p]  
[ *points with coin still in hand* ]

0308 Ste: [This is ay ]  
[*adjusts position*]

0309 (-----1)

0310 Ben: <°fifty p°>

0311 Ste: fifty [p very good  
[*puts coin down*

The multimodal correction-initiations “It’s not ten p It’s got straight sides” (0220), “Nah it’s not five p that’s the five p” (0307) include demonstrations of why Ben’s answer is incorrect. It is possible that these explications are produced in order to justify Steve’s rejections of Ben’s responses, or to provide Ben with resources that he could use to in the future. Nevertheless, as with the case of “that’s your Dad” (in Extract 8), these explications show that Steve is construing Ben as having made substantive errors, getting it wrong rather than having a problem with hearing, speaking or understanding. Again then, the correction-initiations in Extract 8 are corrections of errors rather than cases of repair-initiation.

A further example of the explication of an error occurs in extract 9, where Steve gestures to the food items on the table and asks Ben to provide the collective name for them (1020). He proceeds directly to a sentence-stem format “this is all” (1021). Ben responds to this by naming one item from the collection “egg” (1022)

Extract 9 [MR2012 Ben ABA 05:27-05:35] nah it’s not all egg

1020 Ste: Can you tell me [ <this is all what all what]  
[*sweeps hand over food items*]



0902                   (-----[---1)  
                           [*mouths /ju/*  
                           [*sweeps RH sleeve of jumper*

0903    Ben:    °ss° stripy

0904    Ste:    Nah [yours is stripy this is a ju:mper.  
                           [*points to Ben's jumper*

0905                   (---)

0906    Ben:    Jumper

0907    Ste:    These [are:  
                           [*points at own trousers*

Steve responds by carrying out exposed correction (Jefferson, 1987) (0904). The turn in which this occurs is constructed to indicate that correction is underway “nah” and includes a comment that Ben’s jumper is stripy. As the problem is not one of speaking, hearing or understanding, this correction lies outside the scope of SJS-repair. By offering a comment about the nature of the error that has occurred, Steve displays how he is construing the problem. This can provide us with evidence about how he is diagnosing Ben’s difficulty and, in particular, that Steve is seeing the error as a substantive matter or as a result of a problem with hearing, speaking or understanding.

In summary, in the ABA session, a range of practices are used to address incorrect responses. A major resource is re-presenting the directive; when doing so, it can be presented in a modified form, for example transforming it into a sentence-stem for completion. This may be preceded by a vocalisation that assesses Ben’s response; for example, Steve can indicate that a problem has occurred and the sequence cannot proceed by saying “Ah”, or he can reject the response “Nah”. In some cases, where Ben’s response is partly correct, as in “I like eggs too” (Extract 5), Steve acknowledges the correct part and identifies the incorrect part. Finally, on occasion, Steve explicates the nature of the error. In some

cases, Steve's other-initiations of correction apparently target problems with speaking, hearing or understanding and are thereby other-initiations of SJS-repair however on some occasions, when the nature of the error is demonstrated to be a substantive error, these are not other-initiations of repair in the SJS sense. Across the examples considered, Ben demonstrates that he is able to make use of Steve's other-initiations of correction in order to carry out self-correction.

### Concluding Discussion

Although the parental session and the ABA session are different kinds of interactions, they show a number of similarities. In both, an adult largely directs activities and they do so by producing directives. In both settings, it becomes relevant to correct the way in which Ben responds to these directives. Nevertheless, as might be expected, the rate of production of directives is much higher in the ABA session and the proportion of talk that Ben engages in is higher in the informal parental session.

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Insert Table 2 about here

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Table 2 summarises the key differences between the two sessions. First, there are differences in the spatial configurations and in the use of rewards. Second, correction is relatively rare in the parental session and when it occurs it does so with respect to actions in progress; in the ABA session correction is common and is overwhelmingly applied to completed actions. This difference may reflect differences in the kind of responsive actions that Ben is being directed to perform in these two settings. In the setting with his Dad, the manual responsive actions (e.g. fitting two plastic components together) have a relatively expanded time course and a problem may become apparent as Ben works on the responding. Dad thereby has the opportunity to identify that there is a problem before an incorrect end state is reached. On the other hand, in the ABA setting the responsive actions have a short time course (many are single word responses). Consequently, the tutor is only able to respond to completed actions

rather than actions-in-progress. As such, there is less opportunity for the provision of assistance.

Furthermore, although in both settings, the adult commonly provides verbal praise for completing actions successfully, Dad's praise generally follows fairly extended activities whereas the tutor's praise occurs as an action within a three-part sequence (Kevoe-Feldman, & Robinson, 2012) which is geared to eliciting an action for evaluation and providing an evaluation of it.

In these sequences, the ABA tutor uses a number of resources to pursue correct responses. In addition to re-doing directives, the practice of explicating the nature of the error in the course of other-initiated corrections was identified. This practice involves showing why the response that has been offered is incorrect (e.g. when Ben names a coin incorrectly, pointing to the coin that he has named). This practice keeps the directive sequence open, providing another opportunity for Ben to respond. Furthermore, it potentially provides some assistance to Ben in deciding how to respond. This practice can be contrasted with Schegloff et al.'s (1977) analysis of other-initiated repair. Schegloff et al. (1977) demonstrate that the other-initiation of repair may be carried out using a range of turn-constructional devices (pp 367-369). For example, expressions like "Huh" "What"; wh- words, (who, where, when); a partial repeat of the trouble-source turn, plus question word; a partial repeat of the trouble-source turn; or "Y' mean" plus a possible understanding. They remark that these techniques are techniques for locating the trouble source. (p. 377). The practice of explicating an error is distinctive in that it does not locate the spoken trouble source but rather it speaks to the substantive problem with the response. For example, in "It's not ten p It's got s:traight sides" (Extract 8, 0302), the first clause locates the trouble but the second clause explicates the substantive problem with the response. As discussed in the introduction, Schegloff et al. (1977) represent correction as a specific case of repair (and the initiation of correction as a specific case of the initiation of repair) however this is within the context of repair with respect to problems with understanding, hearing or speaking; this does not mean that all types of corrections are cases of repair. The issue is less what is going on in the mind of the party being corrected and not even the analysis of that by the party carrying out the correction (though

that is relevant) but rather how the party carrying out the correction is construing, or representing, the nature of the trouble. In producing a comment showing how a response is wrong, the party initiating correction represents the problem as something other than a problem with hearing, speaking and understanding.

Less analytically, it can also be noted that one merit of studying Ben's interactions in these two settings has the benefit of revealing different, indeed complementary, capacities and challenges. In the parental session, Ben shows creativity, initiative and playfulness for example in initiating bouts of physical play, yet he also engages in biting behaviour, which Dad skilfully addresses. In the ABA session, Ben has less opportunity for creativity but shows a capacity to remain focused and to respond to feedback. Needless to say, the analysis offered here has only considered a narrow selection of Dad's and Steve's skilfulness in engaging Ben in positive and interesting activities.

This study has considered a very small data set and is limited to one child-parent pair and one child-therapist pair. Future research could consider larger samples in order to establish the generalisability of these findings and extend the analysis into other social-organisational practices in these settings. A limitation of the present analysis is that it has refrained from relating the practices described to technical ABA practices. For example, within ABA theory, the use of sentence stems is construed as an intraverbal prompt (e.g. Sundberg, Endicott, & Eigenheer, 2000). As suggested by Place (1991), future work could consider the relationship between CA and ABA frames of reference.

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#### Statement of interest

The authors declare no conflict of interest.

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## APPENDIX

### Transcription Key

The transcription system used in Conversation Analysis was developing by Gail Jefferson. It aims to capture, graphically, the structure of talk as it emerges.

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Insert Table 3 here

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Insert Table 4 here

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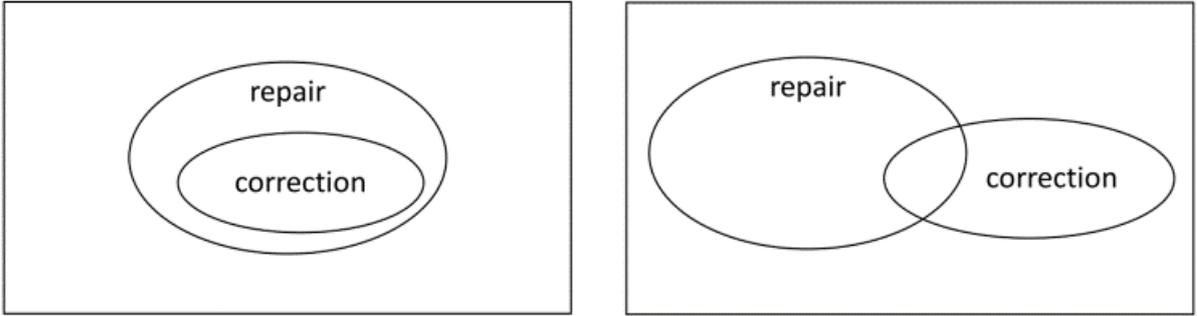


Figure 1. Two different understandings of the relationship between correction and repair

Table 1. Rates of talk and production of directives in the two sessions

Parent Session	ABA Session
Locally new directives	
17	139
Duration (minutes)	
8.32	23.57
directives/minute	
2.04	5.9
words used by child	
260	576
Words used by the adult	
718	2664
Words used by child/words used by adult	
0.36	0.22
words used by child/minute	
31.25	24.44
words used by adult/minute	
86.3	113.03
directives/adult words	
0.024	0.052

Table 2 Key differences between the Parent-Child session and the ABA tutor session

Parent-Child	ABA Tutor
C-formation	F-formation
-	Occasional additional rewards (chocolate, high-fives)
Correction - rare	Correction - common
Correction applied to course of action-in- progress	Correction applied to completed actions

Table 3 Transcription Key - Talk

Temporal properties of talk	
[text]	adjacent lines overlap
[text]	
(1.5)	pause: timed to nearest tenth of a second
(-----1-----)	An alternative graphic representation of a pause; each dash represents 0.1 second, every tenth dash is replaced by a number.
(.)	Short pause (less than 0.2 seconds)
01 A: Text=	“latching” talk, between turns or within turns, follows immediately without the slight moment of silence that would usually be present
02 B: =Text	
Speech Delivery and Intonation	
. (full stop or period)	preceding talk is falling, stopping
, (comma)	preceding talk as falling-rising (continuing intonation)
? (question mark)	preceding talk is rising
! (exclamation mark)	preceding talk is animated
↑ (up arrow)	following talk goes up suddenly
↓ (down arrow)	following talk goes down suddenly
: (colon)	preceding sound is lengthened
<u>word</u> (underlining)	spoken with emphasis
WORD (capitals)	spoken with increased volume
°word°	Spoken with decreased volume
Word-	Cut off
<text>	talk spoken at slower pace than surrounding talk
>text<	talk spoken at faster pace than surrounding talk
<text	word starts suddenly
°hh or .hh (preceding degree sign or fullstop)	in breath
hh	out breath
tha <sup>˚</sup> (superscript)	not explicitly sounded but colours neighbouring sounds.
£text£ (UK pound sign)	Smiley voice
(word) (parenthesis)	uncertain transcription
#text# (hash sign)	Creaky voice
( ) (empty brackets/parenthesis)	transcription can't be made
~text~	Tremulous voice

Table 4 Transcription Key – Visible Action, non-speech sounds, and transcriber’s comments

Visible conduct	
Visible action is transcribed sparingly shown as annotations to numbered lines of talk (or silence)	
0003 Ste: [ You do: ]= 0004 [ <i>slight nod</i> ]	Visible actions are given a brief description, shown in italics, shown as overlapping the talk (or silence) with which it co-occurs. In the case of instantaneous actions, the time of occurrence is shown with a single “[“. Annotations above the line of talk are Ben’s actions, annotations below the line of talk are the adult participants.
196 [ <i>Ben sits up and works on pieces →</i> [ (-----) ]	Continuation arrow – the action continues until otherwise indicated.
0011 Ste: [Nah that’s [your dad.] (----) [ [ <i>points</i> ] [ . . . Dad _____ . . .	Eye-gaze is shown as a continuous line that is co-extensive with the talk (or silence) with which it co-occurs. This line is labelled to show the target of the gaze. Moving gaze is shown by full stops.
0012 Ste: [Your [sisters/brothers are called [. . [ <u>Ben</u> →	Continuation arrow - gaze continues at the labelled target until otherwise indicated
Transcriber’s comments	
((word)) (text in double bracket)	transcription comment
Non-speech sounds	
xxxxxxxxx1xxxxx ((sound effects box))	A graphic representation of a non-speech sound; each character represents 0.1 second, every tenth character is replaced by a number