

Measuring the impact of Intensive Interaction on joint attention and intentional communication using the FOCAL wheels

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Editorial comment

In this paper, Amandine Mourière, an Intensive Interaction practitioner, shares her work in assessing how Intensive Interaction affects joint attention and intentional communication. She outlines her use of an action research design to allow her to reflect on her own practice, a useful method for practitioners working independently. She also describes the design and use of an assessment tool referred to as FOCAL wheels (Fundamentals of Communication Assessment and Learning) to overcome some of the issues faced with the currently available tools. This paper is based on a single case study, so more research is needed to validate the use of FOCAL wheels. This paper, however, provides a good example of a thoughtful study design, its implementation and careful data analysis.

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Introduction

"...to be effective communicators we have to want to communicate, to have a concept of what communication is all about, and to simultaneously apply many complex and inter-related skills.

The best and possibly only model we have is in caregiver-infant interaction." (Nind, 1998, page 98)

Some children with autism stand out because they display difficulties with joint attention skills (Schertz and Odom, 2007) such as making eye contact or turn taking (Mundy, 1995; Kasari et al, 2006), and using eye contact and pointing (Charman et al, 1997; Mundy, 2007; Kasari et al, 2010). Joint attention has been identified as a key component in human communication (Tomasello, 2008). It has also been suggested that difficulties with joint attention may make it more difficult for children with autism to develop in other areas, such as communication and

social interaction (Mundy and Sigman, 1989; Charman and Stone 2006). Therefore, some children require extra help to develop joint attention (McConachie, Diggle, 2007) as some research has suggested that this leads to improvements in children's social interaction (Oosterling et al, 2010; Whalen et al, 2006).

Intensive Interaction is a developmental approach influenced by the caregiver-infant interaction model (Hewett and Nind, 1998; Nind 1993) and does not attempt to re-parent, but rather to adopt a nurturing framework for interaction (Nind, 1998). It is a naturalistic approach as it resembles the typical interactions between caregivers and infants. Kellett (2000, 2004, 2005) undertook three case studies in which she demonstrated how Intensive Interaction could develop sociability and communication through the ability to attend to a joint focus.

Intensive Interaction is child-led and therefore has the potential to develop a sense of agency on the child's part (Nind and Powell, 2000). Intentionality cannot be forced upon an individual, but Intensive Interaction can lay the ground for it through its nurturing style (Nind, 1998). By learning that they can have an impact on others and that they can share meaning, children are more likely to become intentional communicators (Nind, 1998; Schaffer, 1977). Intentional communication refers to the child's ability to convey meanings to their interactive partners through common communicative functions, such as requesting and commenting (Wetherby et al, 1989). According to Leavens and Hopkins (2004):

"Intentional communication is the display of communicative signals that are sensitive to the state of the receiver."

Intensive Interaction requires the practitioner to be in the moment, fully present, spontaneous, flexible, and in-tune with his/her partner. Because of this, there is very little room for reflection during the sessions. Since this intervention is on a one-to-one basis, having the opportunity to discuss, practice, and share ideas is crucial to allow reflection. To create the opportunity to study aspects of her own practice, an action-research design was used for this research which allowed the author to take on both the role of researcher and that of practitioner (Koshy, 2005).

Case study

A 10 year old child named Jack (name changed) diagnosed with autism took part in this action-research. The 12 week home intervention comprised four assessments which combined the use of videos as well as fieldnotes. One of the main challenges faced was the lack of an appropriate tool with which to assess and record joint attention skills. Existing standardised tools are based on quantitative observational measures, such as frequency of initiating eye-gazing, turn-taking, initiating joint attention and responding to joint attention (Toth et al, 2006; Schertz et al, 2012). However, the author felt that using such assessments would be unsuitable for this study. For example, recording the number of times the child gave eye contact in a session did not seem useful since the act of looking at someone can have

a variety of meanings. Therefore, the Fundamentals of Communication Assessment and Learning (FOCAL) was designed based on the Sounds of Intent (SOI) framework (Ockelford, 2003) and this made it possible to map and record the communicative progress of the child. The text of the FOCAL wheels was inspired from the author's readings on parent-infant interactions, and how intentional communication develops. The distinctions between the six levels in each domain were inspired by the Sounds of Intent and the Engagement Profile work of Firth and Barber (2011).

Aims of the study

The aim of this research was:

- to explore the efficacy of Intensive Interaction on the joint attention skills and intentional communication of Jack
- to review the usefulness and reliability of the FOCAL assessment tool

Participant

A 10 year old child with autism took part (named Jack for the purpose of this paper). The researcher had already established a bond with Jack and his family by volunteering in a play scheme which he attended once a week. He attends a special school and the author worked with Jack at home, after school, in her own time.

Ethics

Ethical issues were considered and strictly adhered to, with ethical approval being sought and gained from the University of South Wales. The parents were asked to fill in a consent form, which complied with the United Nations Convention on the Rights of the Child where: "the best interests of the child must be a top priority in all things that affect children" (Article 3, 2011).

Design of the Fundamentals of Communication Assessment and Learning (FOCAL)

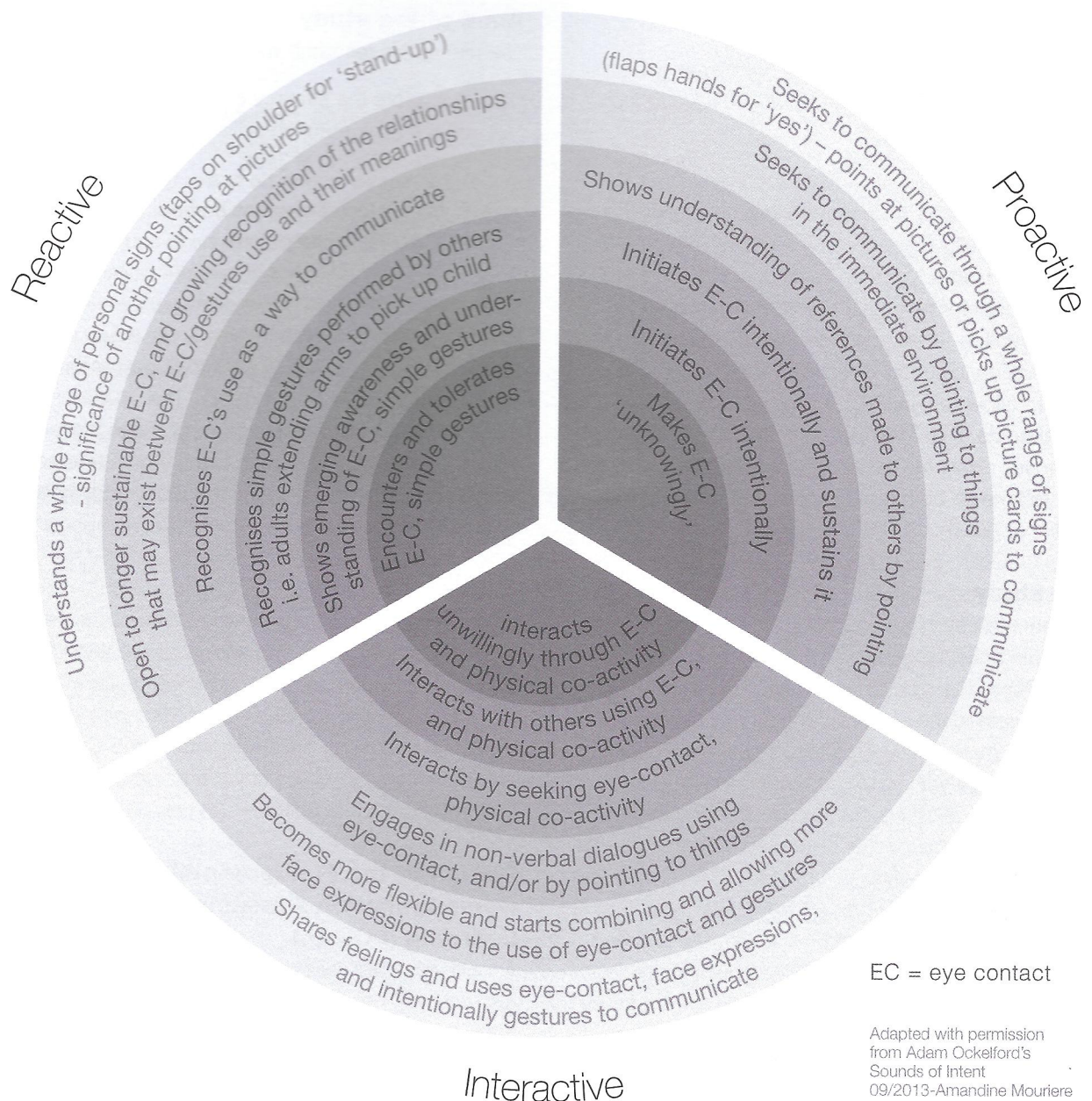
A tool that would assess Jack's communication through his different senses was designed based on the Sounds of Intent framework produced by Ockelford (2013). This tool developed was the Fundamentals of

Communication Assessment and Learning (FOCAL) and as the graphic layout is circular, it was referred to as the FOCAL wheels assessment. Figures 1, 2 and 3 show three separate wheels capturing three modalities that focus on visual and gestural communication, communication through touch and

vocal and auditory communication. The three modalities captured within the FOCAL wheels reflect aspects of the development of joint attention skills and intentional communication, and the different senses children use to communicate (based on Hertenstein et al, 2006; Neaum, 2010).

Figure 1: FOCAL wheel; visual/gestural

Visual/Gestural

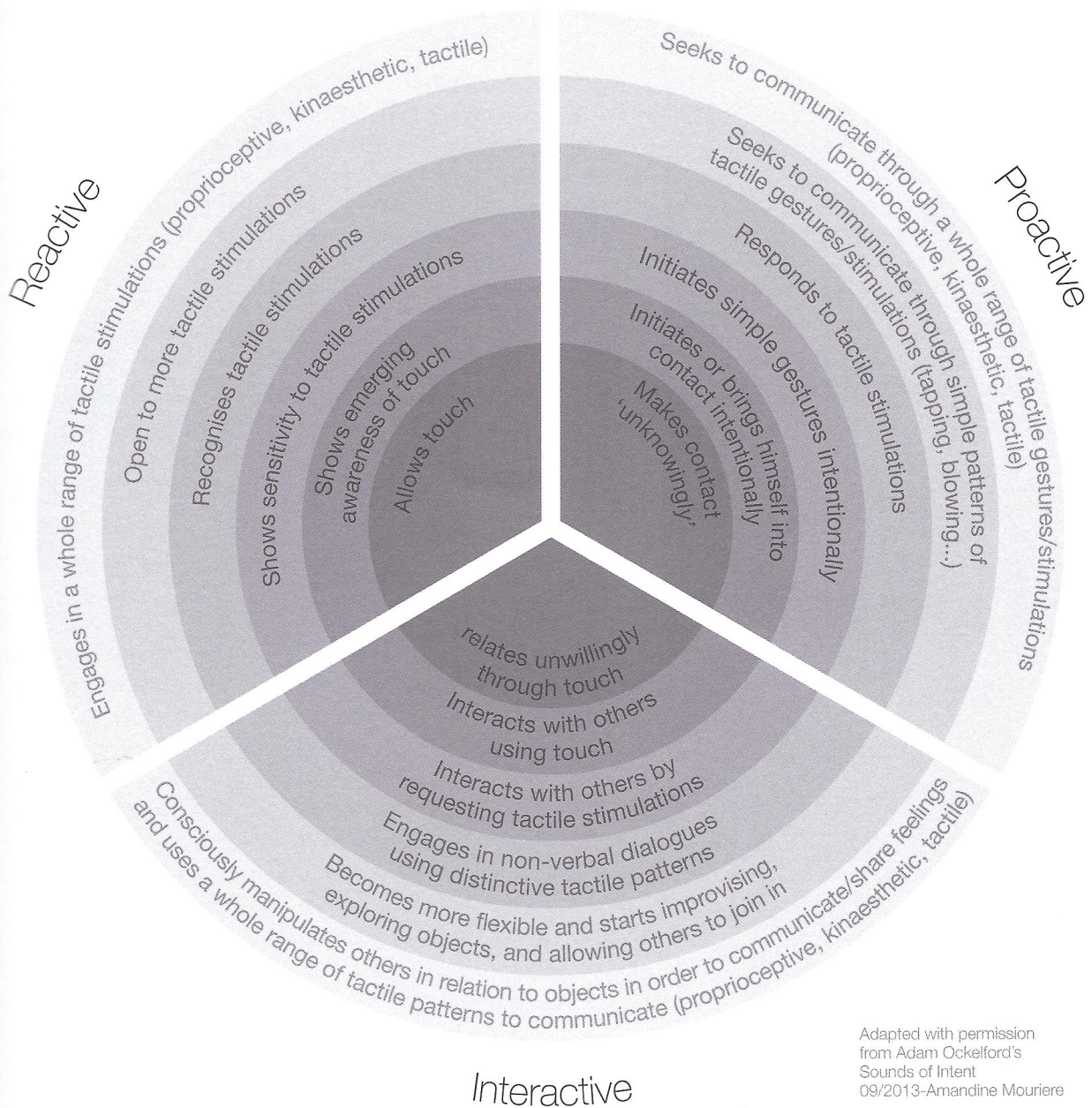


Each of the three modalities is divided into three domains: reactive, proactive, and interactive. These three domains correspond to the level of awareness in responding to communication (reactive), in causing, creating and controlling communication (proactive), and in participating actively in communication with others (interactive). The

three domains are, in turn, divided into six segments 'ranging from the centre, with its focus on the self, outwards, to increasingly wider communities of others' as discussed by Ockelford (2013, page 132). Thus, the segment nearest to the centre is coded as 1 (little or no awareness), and so on to number 6, representing the last segment on the outside of the circle.

Figure 2: FOCAL wheel; tactile/haptic

Tactile/Haptic



Adapted with permission from Adam Ockelford's Sounds of Intent 09/2013-Amandine Mouriere

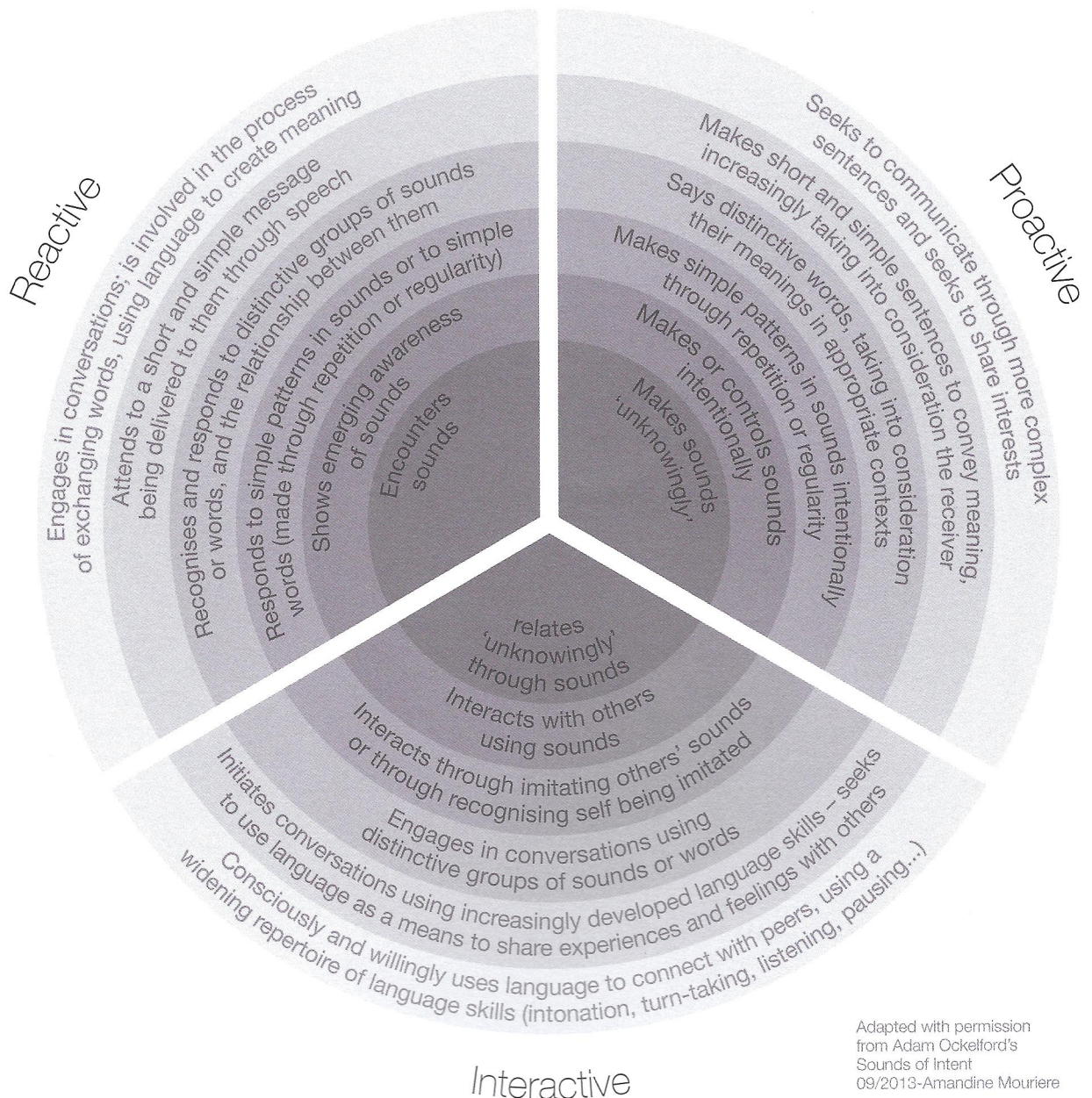
Study design

The research design chosen for this study was an action research design which allows a practitioner to be both researcher and participant; thus allowing the researcher to study aspects of his or her own practice. The cyclical structure of action research gives the

researcher a constant opportunity to reflect on and change practice accordingly (Koshy, 2005). To ensure the validity of the research, an independent reviewer, blind to the research, took part in the assessment of the four videoed sessions.

Figure 3: FOCAL wheel; vocal/auditory

Vocal/Auditory



The research was conducted over a period of 14 weeks, in Jack's own home. An intervention session was held for an hour every week, over a period of 12 weeks. A baseline assessment was carried out in week one in two different ways. First, both parents (Observers 3 and 4) were separately asked to assess their son's communicative abilities by using the FOCAL wheels; as Jack's primary care-givers, their testimonies were extremely valuable in building a picture of his personality and communication skills. The video recording of the first session was then assessed by the researcher (Observer 1) and the independent reviewer (Observer 2) using the FOCAL wheels.

A second assessment took place at mid-intervention, after five weeks. This assessment not only acted as a means of comparison, but also gave the researcher a first opportunity to reflect on her practice and adapt her practice for future sessions. A third assessment at the end of the intervention took place five weeks after the second one, and finally, a follow-up assessment was carried out a month after the intervention ended. Both parents were asked again to assess their son's communication at follow-up. The video-recordings of these four assessments were analysed by the researcher herself and by the independent reviewer. The observers were looking for intentionality in the participant's interactions, looking specifically at the three modalities (tactile/haptic, vocal/auditory, and visual/gestural) of the FOCAL wheels.

Findings

Inter-rater reliability of the findings and Jack's progress

Cohen's *d* was used to indicate the standardised difference between baseline and follow-up for the four observers (Cohen, 1988), and to test the significance of the results (see Table 1, 2 and 3). Cohen's *d* gives the practical significance of the difference (Dancey and Reidy, 2002) needed for small samples. Since the FOCAL wheels tool was being piloted for the first time in this study, the researcher did not have previous studies to know the size of the effect she was looking for. Therefore, she referred to the benchmarks suggested by Cohen (1988); effect sizes as small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$).

Vocal/auditory

This modality showed the most progression between the different timelines, and across the four observers. Here, it is interesting to note Observer's 1 data at baseline (see Figure 4). Observer 1 assessed Jack at level 1 in the three domains (reactive, proactive, and interactive), highlighting that he had limited awareness and few attempts to communicate using sounds. While the data of the other Observers is not too far removed from Observer 1 in the proactive and interactive domains, the reactive domain shows a noteworthy difference; both Observers 2 and 3 assessed Jack at level 3, and Observer 4 at level 2, thereby recognising Jack's emerging awareness of sounds.

For more clarity, the data are represented in two different graphs for each modality, since Observer 3 and Observer 4 assessed Jack at baseline and follow-up only. Each column represents the four different timelines (baseline, mid-intervention, end of intervention, and follow-up) for each observer.

Figure 4: Vocal/auditory modality

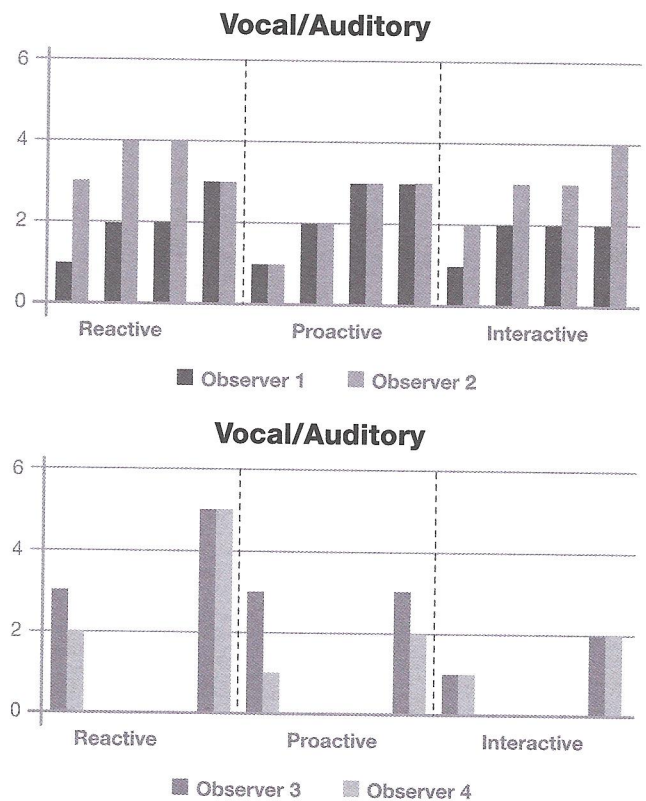


Table 1: Results at baseline and follow-up

		Reactive				Proactive				Interactive			
		Ob 1	Ob 2	Ob 3	Ob 4	Ob 1	Ob 2	Ob 3	Ob 4	Ob 1	Ob 2	Ob 3	Ob 4
Vocal/Auditory	Baseline	1	3	3	2	1	1	3	1	1	2	1	1
	Follow-up	3	3	5	5	3	3	3	2	2	4	2	2
COHEN D		1.6				1.6				1.6			

Cohen's d was calculated at 1.6 across in the three domains, going way beyond the 0.80 cut-off for a large effect size.

Tactile/Haptic

The tactile and haptic modality data do not show as much progression as the other two modalities (see Figure 5). Nevertheless, the results are still interesting; in that they are consistent with each other, with little difference between the four Observers in the three domains over time. Only two differences can be noted. At baseline, both Observer 3 and 4 assessed Jack with the highest level of awareness and abilities in the reactive domain. In the interactive domain, Observer 2 assessed Jack at level 3 whilst Observer 1 assessed him at level 4.

While the interactive domain still shows consistency between the Observers, a slight progression can be noted. From level 3 at baseline, everyone assessed Jack at level 4 by the end of the intervention, as well as at the follow-up, recognising his abilities to engage in non-verbal dialogues using distinctive tactile patterns. Cohen's d was calculated at 0 for both the reactive and proactive domains, suggesting no practical significance in progression. However, in the interactive domain, Cohen d was calculated at 1.6 exceeding by far the 0.80 cut-off for a large effect size.

Figure 5: Tactile/haptic modality

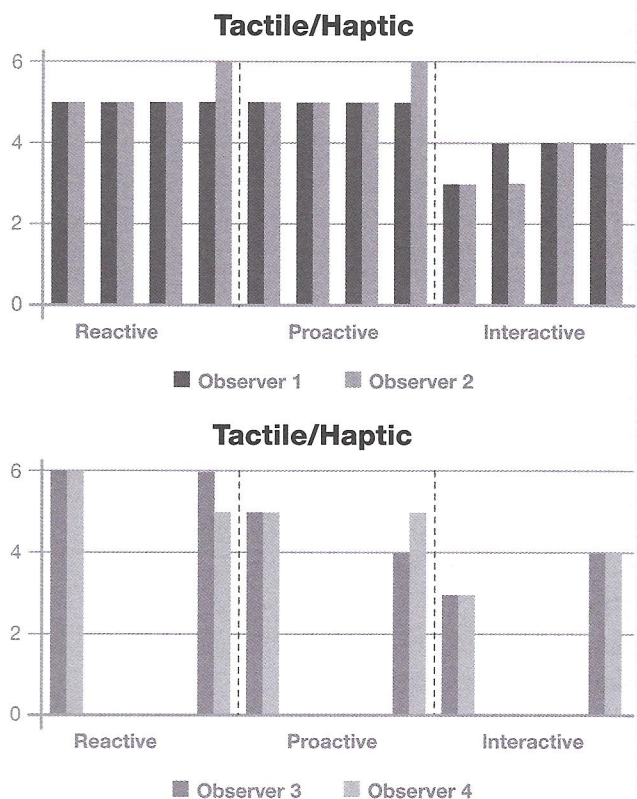


Table 2: Results at baseline and follow-up

		Reactive				Proactive				Interactive			
		Ob 1	Ob 2	Ob 3	Ob 4	Ob 1	Ob 2	Ob 3	Ob 4	Ob 1	Ob 2	Ob 3	Ob 4
Tactile/Haptic	Baseline	5	5	6	6	5	5	5	5	3	3	3	3
	Follow-up	5	6	6	5	5	6	4	5	4	4	4	4
COHEN D		0				0				1.6			

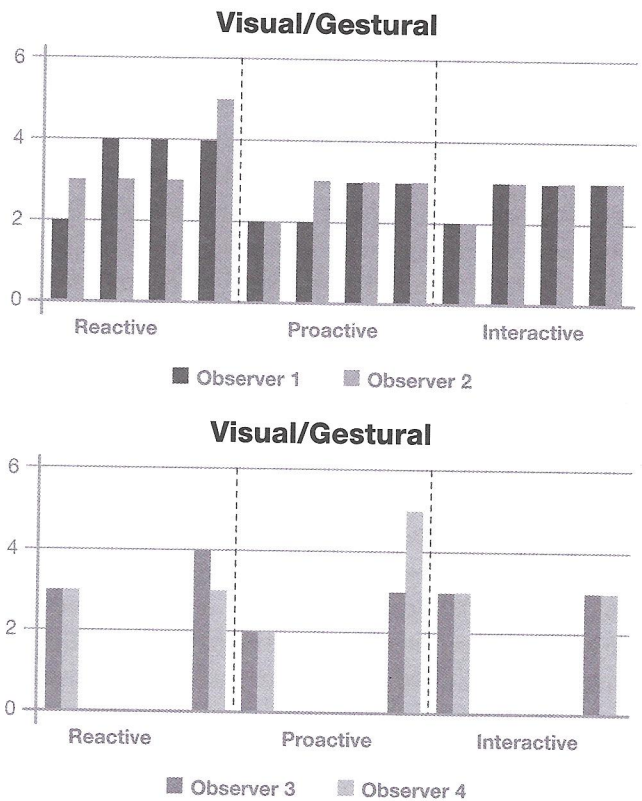
Visual/gestural

At baseline, one piece of data differs from the others in the reactive domain: Observer 1 assessed Jack at level 2 while the three other Observers assessed him at level 3 (see Figure 6). In the interactive level, both Observers 3 and 4 assessed their son at level 3 while Observers 1 and 2 assessed him at level 2. At follow-up, there are many differences among the Observers' assessments, with only the interactive domain in which they all match.

The results of this modality are all fairly consistent and represent a tangible progression of Jack's abilities to use eye contact as well as gestures more intentionally than at baseline. However, one piece of data is rather striking, as it differs considerably from the rest. While Observer 4's results at the follow-up rates Jack's proactive domain at level 5 - thereby highlighting his ability to communicate by pointing to things in the immediate environment - the three other Observers assessed Jack at level 3, only acknowledging his ability to initiate eye contact intentionally and to sustain it (discussed in participant's progress).

The results of this modality are all consistent and present a notable progression in Jack's abilities to use eye contact as well as gestures more intentionally than at baseline, apart from the interactive domain where Observer 3 and Observer 4's results are the same at baseline and at follow-up.

Figure 6: Visual/gestural modality



Findings at follow-up one month after the intervention ended

In follow-up assessments, the four Observers noted a progression in all domains (apart from one piece of data which remained at baseline), placing emphasis on Jack's growing awareness of sounds not only as a functional tool, but most of all as an interactive tool, or as a way to relate.

Further, Cohen's d was calculated at 1.8 for the reactive modality, 2.1 for the proactive modality, and 1.2 for the interactive modality, exceeding by far the 0.80 cut-off for a large effect size.

Table 3: Results at baseline and follow-up

		Reactive				Proactive				Interactive			
		Ob 1	Ob 2	Ob 3	Ob 4	Ob 1	Ob 2	Ob 3	Ob 4	Ob 1	Ob 2	Ob 3	Ob 4
Visual/Gestural	Baseline	2	3	3	3	2	2	2	2	2	2	3	3
	Follow-up	4	5	4	3	3	3	3	5	3	3	3	3
COHEN D		1.8				2.1				1.2			

Discussion

Jack's progress

Jack was already confident in communicating through touch at baseline, which (as noted) could explain the little progress recorded here. This observation would therefore suggest that while auditory and visual communication tend to be regarded as the main pathways for communication in the literature (Hertenstein, 2002), tactile communication might be developmentally present at an earlier stage. In the two other modalities – vocal/auditory and visual/gestural, a clear progression can be seen. His progress in these two modalities supports what Tharp and Gallimore (1988) call 'natural teaching', the transmission of skills that cannot be taught, but experienced and practised with another person.

Some of the results also draw attention to certain skills seen as joint attention skills and thus are necessary and crucial from a developmental aspect (Mundy et al, 1994; Charman et al, 2003; Whalen et al, 2006). Joint attention skills refer to the ability to share attention with others through pointing, coordinating looks between objects and people and developing a mutually sustained joint engagement with others (Kasari et al, 2010). For instance, Jack's awareness of the use of eye contact to communicate progressed over time, in addition to his abilities to initiate and sustain eye contact. One parent reported how Jack sought to communicate by pointing to things in the immediate environment. While this data should certainly not be overlooked, it must be interpreted cautiously since only one Observer reported it, and it would therefore require further monitoring. Furthermore, when it comes to joint attention, pointing is defined in two distinctive ways: proto-declarative pointing and proto-imperative pointing (Kaplan and Hafner, 2006; Tomasello et al, 2007). In a way, this piece of data is extremely important as it highlights the limitations of the FOCAL wheels, which will be further discussed below.

Children with autism have difficulty relating to their peers (Knott et al, 2006; Lasgaard et al, 2010), and communicating their 'needs' and 'wants' (Liss et al, 2008; Maljaars et al, 2011), in other words, in communicating intentionally. From the results, it would appear that Intensive Interaction gave Jack weekly opportunities to practise

and understand further the fundamentals of communication (Nind and Hewett, 1994), and he was therefore able to become a communicator with more skills than he had at baseline by enhancing his intentional communication. There was also a positive reaction from his school, and Jack started to receive daily sessions of Intensive Interaction as part of his curriculum.

Action research design

From a practitioner's point of view, reflecting on my own practice was extremely valuable. As there is very little room for reflection during the sessions, taking videos, analysing them, and receiving feedback from other professionals is a crucial aspect of Intensive Interaction, since it allows reflection. I became more aware of the importance of repetitive games and playful routines. Jack's range of interests and games did not expand over time, but by practising them repeatedly he became more interactive, more 'in-tune' with me, and this bond allowed for more flexibility and a complicity which was most definitely not there at baseline. Intensive Interaction is a developmental approach, based on neurotypical children (Nind and Hewett, 2005). Therefore, it is not surprising to realise that repetition through play is key when learning any new skills (Vygotsky, 1966). 'Success is consolidated through repetition - both partners are usually willing to repeat successful and effective episodes' (Nind and Hewett, 2005, page 133).

Usefulness/reliability of the FOCAL wheels' assessment tool

Vocal/auditory

Overall, Observer 1's data across this modality appears to either match the three other Observers or to have been assessed in a more severe manner. A plausible explanation for this could well lie in the dual role of the researcher. Working as the practitioner as well as the researcher may have had an impact on her analysis. Here, in trying to avoid being biased, she may have assessed Jack slightly more harshly than her independent reviewer. This again is partially true at mid-intervention and at the end of the intervention. Partially, because her results can only be compared to the independent reviewer (Observer 2), since no data for the parents was collected for these two periods.

The analysis of the field notes corroborates the progression observed in all domains using the FOCAL wheel. For example, in Week 1, Observer 1 made a note that Jack made sounds similar to blow, intentionally' thus speculating that he was using sounds in order to communicate, or questioning whether this was an idiosyncratic incident. In Week 5, Observer 1's note for Jack stated, 'said blow in context', and in Weeks 5 and 10, she noted 'imitated blowing sound with his mouth to request; twice'. In Weeks 7 and 10, she commented that the participant was extremely happy throughout both sessions, was very much in-tune, and was having 'laughing conversations'. Finally, in the follow-up (Week 16), Jack was 'extremely vocal, using a whole range of sounds, and was making new sounds with his mouth'. These field notes clearly show the progression highlighted by the FOCAL wheels analyses.

Tactile/haptic

Jack was already comfortable in the tactile and haptic modality, and progress here did not seem to present so significantly. However, the intervention substantiates his competence in communicating through touch in the reactive and the proactive domains, which ultimately allowed him to progress in the interactive domain as well; he therefore interacted not only through requesting tactile stimulation, but actually by engaging with others 'using distinctive tactile patterns'.

In the interactive domain, there was consistency between the Observers, and a slight progression can be noted. From level three at baseline, everyone assessed Jack at level four by the end of the intervention, as well as at follow-up. This data suggests that the three domains are interrelated, and that the interactive domain relies on both the reactive and proactive domains being developed first.

The field notes seem to be in line with these assumptions. In Week 12, Jack was 'holding my hand to jump on the trampoline, twice, looking at me and laughing'. At follow-up (Week 16) he was 'holding my hands to twirl on the desk chair', and 'happily got off the furniture into my arms'. While Jack was already comfortable and would happily allow interaction through touch at baseline, these two instances highlight his abilities to

be an active communicator through touch, using eye contact and taking part in the interaction, being fully aware of the activity.

Visual/gestural

In the visual/gestural modality, one piece of data is striking, as it differs considerably from the rest of the data. At follow-up, Observer 4 rates Jack's proactive domain at level 5 - thereby highlighting his ability to communicate by pointing at things in the immediate environment. However, the other three Observers assessed Jack at level 3, only acknowledging his ability to initiate eye contact intentionally and to sustain it.

Differences in the parents' results (Observers 3 and 4) in comparison to those of Observers 1 and 2 were to be expected, since the former were not assessing the video footage, but rather assessing their child's communication in general, and in daily life. However, one would then expect the parents' results to be fairly similar to each other. It is possible that Jack uses pointing in very limited situations, which only one parent would have had the opportunity to notice.

The field notes indicate that as Jack's eye contact increased; he became more engaged with the practitioner, and thus would start imitating some movements, and, at times, follow the practitioner's lead. Therefore, in Week 3, Jack would 'either take my hand or tap it to get me to start bouncing; left the interaction a couple of times, but would initiate it again every time'. In Week 4, there is a similar comment on Jack initiating interaction by tapping on the practitioner's hand as well as 'imitated clapping twice'. In Week 7, one note states 'excellent eye contact on the trampoline', and in Week 10 it is indicated that he 'copied actions; sat on trampoline when I did, and stopped jumping when I did'.

The Fundamentals of Communication Assessment and Learning (FOCAL): the recording tool

The FOCAL wheels generated a set of data which was fairly coherent across the time periods and between the four Observers. This tool was being piloted for the first time in this project, and several limitations were noted. To begin with, the use of jargon sometimes made it difficult for the Observers to assess Jack without further

explanations (eg they did not understand the words 'kinaesthetic' and 'proprioception'). In addition to this, they felt that there was not always a clear distinction between the levels, and they would therefore sometimes 'pick' a level by default. Here, both parents as well as the independent reviewer commented on the tactile and haptic modality, and did not grasp the difference between level 5 – denoting a condition that was open to more tactile stimulation, and level 6 – denoting an engagement in a whole range of tactile stimulations in the reactive domain. Having monitored these potential difficulties as the study progressed, it became evident how important the field notes were; these were made throughout the assessment, intervention and evaluation and proved extremely important in clarifying particular aspects arising from the FOCAL wheels as well as acting as a means of increasing the validity of the findings.

Concluding comments

A clear progression could be noticed in Jack's communicative skills: for instance, his ability to initiate and sustain contact, or to acquire a wider range of vocalisations. The research findings highlight the crucial aspect of Intensive Interaction where the member of staff is the main teaching resource, using personal qualities of face, voice and body language to involve the learner in progressive sequences of interactive activities. The repertoire of activities that the researcher and Jack built over time provided him with the opportunity to learn the pre-speech fundamentals of communication such as enjoying being with another person, giving sustained attention, turn-taking, use and understanding of eye contacts, facial expressions, body language and non-verbal signalling.

The results of this research support the effectiveness of intensive interaction with individuals at a pre-verbal level of communication by bringing about the development of their communicative skills. The FOCAL wheels were designed to measure small but essential developmental steps, and to provide the researcher with an improved understanding of the participant's abilities and competence as a communicator. They have the potential to provide a user-friendly tool with which to assess and record an individual's communicative progress, and will continue to be monitored as it is used in

practice. It will need to be adapted, depending on the population, and will continue to be further developed. Consequently, further research could look at ways to further develop the FOCAL wheels in practice, such as in a school setting by working together with other professionals to evaluate its utility.

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