Learning the point of pointing and learning to make it

The EFCIC-Programme for people with severe communicative impairments

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The needs and wishes of people are often misunderstood, if they are unable to express themselves reliably either orally or with the help of other symbol systems. Their thoughts, ideas and feelings remain largely a mystery to their environment. Learning to communicate independently and in a more differentiated manner, opens up various ways of social participation and greater learning opportunities for these people as well as a reliable way of communicating with their environment. To achieve this is always the goal of Augmentative and Alternative Communication (AAC).

The concept of EFCIC (*Effective Communication through Interactional Coordination*) offers a method to acquire deictic gesturing (especially the pointing gesture) and language skills. EFCIC is a comprehensive programme for the acquisition of communicative and linguistic skills and is based on current research in the fields of the development of action, communication and language.

The programme was developed by the Swiss institute for effective communication (efc). On the one hand it builds on varied experiences with 'Facilitated Communication' (FC), but its focus is decidedly set on (re)habilitative aspects in the development of the ability to point autonomously and the teaching of literacy skills for people with very limited oral language and impairments in their executive abilities. On the other hand the EFCIC programme uses current models in language acquisition, semiotics (research of meaning and symbols) as well as in multimodal conversation analysis, which take an interactionist perspective. In the development of EFCIC these models have been applied to the teaching and improvement of communicative and linguistic executive skills for people with respective disabilities. Therefore the programme offers a lot more than 'just' teaching the autonomous use of the pointing gesture and literacy skills or a further development of FC. Because of the models of language acquisition and the constitution of meaning on which the EFCIC programme is based, the approach is grounded in a specific interactionist understanding of communication that will become obvious in this article.

The parts of the EFCIC programme described in this article show how people with severe communication impairments, who as yet demonstrate no or very few communicative behaviours can learn to point to graphic signs with their hands – or if necessary with other means – and by doing so communicate something to other people. The focus lies on people with cognitive impairments that sometimes combined with impairments in perception and/or motor abilities. In the field of AAC their behaviour is usually referred to by the terms 'pre-symbolic' and/or 'pre-intentional" according to Piaget's developmental phases.

A major goal of the EFCIC programme is the teaching of 'pointing', as an action skill as well as a communicative competence. As the phrases indicate, 'pointing' in EFCIC refers to two entirely different abilities. Acquiring these involves tackling difficulties in different areas. Learning to point at something with a communicative intention and discovering through this at the same time the basic function of signs represents a milestone in the development of language and communication in any human being. It is the decisive expansion from an instrumental perspective to a symbolic and social-communicative perspective in the interaction with objects and other people.

In teaching 'pointing' skills using the EFCIC approach understanding one thing is absolutely crucial: the difference between:

- 'pointing' as *an action* in the sense of pressing a button, grasping an object, typing out a symbol and

- 'pointing' as *a gesture,* a communicative act and in combination with the sign to which the gesture refers.

This topic will be treated in more detail later on. The EFCIC programme brings together various strategies and methods from the field of AAC and the rehabilitative aspects concerning the acquisition of action skills from facilitated communication (FC) and further develops them with regard to the teaching of communicative and and linguistic skills.

7 important key features of EFCIC

To give an overview over the EFCIC programme and facilitate the placement of particular aspects that will be discussed later within it, some important key features will be presented first.

Key feature 1: Basic interactional skills are developed

Communication takes place within interactions. We communicate in specific interactional situations. These may differ greatly from each other but are in each case specific with regard to location, time, duration, local features, persons involved, occurring activities, contents and structure. If we want to communicate with someone we can only do so in relation to and dealing with this interactional context. We have to be able to move within it in order to move our interactional partners. To develop communicative and linguistic skills we therefore need basic interactional abilities, e.g. shared attention, directing attention (of self and others), shared intentionality, turn-taking and other sequencing abilities, initiating skills, abilities for object manipulation or abilities to understand the meaning and structure of specific situations and actions. For people with severe communication impairments, acquiring such basic interactional skills can be likewise impeded.

EFCIC starts with building up these basic skills and developing a positive interactional relationship between interaction partners. Constant strengthening and expanding of these competencies remains important throughout the process of communication and language development.

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Key feature 2: perception and action skills are trained simultaneously

Perception and action are closely related processes. They share in parts the same neuronal basis. Two sides of the same coin, so to speak, as current cognitive research suggests (e.g. Gibbs, 2006; Hommel et al., 2001; Noe, 2004). This is true in several regards:

- For one, perception is an active process. It entails movements and attention. We need to look in order to see something.

- For the other, our perception is always goal-directed and influenced by the surrounding context: with regard to previous, ongoing and currently planned actions, with regard to the situation's goal and depending on our previous experiences with actions.

This is valid for the interaction with objects as well as with other people in social contexts, for concrete, object-related actions as well as for symbolic ones.

It is central to EFCIC that the perception of situations and possibilities for action they afford and the execution of those actions are trained and supported simultaneously, and that this goes for the acquisition of object based action sequences (like baking a cake, setting the table and the like) as well as for the acquisition of communicative and linguistic skills.

Key feature 3: attention and coordinative abilities are supported and taught

The ability to direct one's attention and coordinative skills form the basis for perceiving possibilities for action and for performing actions (on communicative and other levels) within an interaction. Therefore, interventions and supports that will train and improve attentional and coordinative abilities are at the core of the EFCIC programme. This involves amongst other things the training of:

- orienting behaviours (e.g. eye gaze, body orientation and alignment, proximal behaviours)

- movement control and direction,

- adequate sequencing of movements sequences.

In the beginning and whilst acquiring new actions/action sequences or functions, the supporting activities of the interaction partners with regard to motor coordination are often intensive and always multimodal and adaptive. The EFCIC programme subsumes these supports under the term 'cooperative coordination'.

'Cooperative coordination' will be explained in more detail in a later section together with some examples.

Key feature 4: 'pointing' is taught as *communicative gesture*

'Pointing' with communicative intention consists of several components with different requirements for their execution:

- a movement

- an act and

- an observable communicative intention

Only when all three aspects come together can we talk of a 'communicative act' in our case, a pointing gesture. In the beginning, people with severe communicative impairments will often only show individual aspects spontaneously or even none at all.

In addition, a pointing gesture always needs something in the surrounding to point to in order to be communicatively effective: An object or a point in space that will serve as a sign and in combination with the pointing gesture will constitute an utterance. In this way a composite sign is constituted consisting of the pointing gesture and the object pointed to (e.g. object, pictogram, letter).

The EFCIC programme teaches all these aspects of 'pointing' simultaneously thereby forming a truly 'communicative gesture'.

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Key feature 5: Right from the beginning, communicative and linguistic skills are taught within regular everyday interactional situations

We acquire language and communicative skills mainly in order to shape everyday interactions with other people. Current research in language acquisition makes clear that these skills are also acquired whilst interacting with others, whilst doing something together with others and through shared experiences (e.g. Tomasello, 2003; Barlow and Kemmer, 2000).

The so-called usage-based models of language acquisition demonstrate that it is absolutely decisive to not only experience language use in everyday situations but to actively use language within them as well. Only through using it can we learn to use language competently in a communicative way and acquire its meanings and

syntactic structure. Our brain is generally laid out to acquire language and communicative skills. However, there is no inborn 'language module'. On the contrary, language skills have to be learnt as do other skills. Skill requires doing – a lot of doing.

Entering into communication and language this way is massively more difficult for people with severe communicative impairments. This is why the EFCIC programme supports active communicative and linguistic activities within naturally occurring everyday interactional situation intensively from the beginning. The central point of orientation in this is the interactional behaviour of parents and people with a similar role to children without communicative impairments during language acquisition.

For training executed by EFCIC-trainers to have a lasting effect on the communicative and linguistic development of people with communicative impairments and the supporting abilities of their interaction partners, several requirements need to be met. First, the EFCIC-trainer needs to know the AAC-users concerned and their practical everyday life and be able to interact directly with them in parts. Second, they have to teach the everyday interaction partners (parents, siblings, carers, teachers, therapists …) the necessary know-how and coach and instruct them in the practical application of it. This aim is not achieved through 'round-table' meetings with the carers alone, but mainly in a 'hands on' approach.

Whenever possible, specific exercise-sequences are also integrated into the everyday life of the AAC users and their environment. The natural environment of everyday interactions should mostly be the practice ground for the acquisition of communicative skills, as is the case for people without communicative impairments. Additional 'AAC-sessions' are of course possible and helpful but they must remain exactly that: an addition.

Key feature 6: Different communicative functions are developed simultaneously

Building communication skills within the EFCIC programme means teaching several different communicative functions simultaneously:

- imperative functions (e.g. 'I would like to have…', 'I want to…'),

- declarative functions (e.g. 'look, there is…', 'I think this is…', 'it is…', I feel…) and

- informative functions (e.g. 'I am…', 'tomorrow there will be …', 'How are you?')

Such an approach is very important to avoid strengthening a purely instrumental understanding of symbol use and interaction partners, which would be difficult to change after a while. An instrumental understanding can be compared to dealing with a sweet vending machine: I give you some money (an object, a pictogram), so you give me what I want at the moment (chocolates, coffee, my I-pod, etc.). Interaction partner and linguistic symbols are treated as 'instruments' or tools (like the machine and the money). They are necessary to satisfy my needs. However, on this level there is no communication with the machines/interaction partners, no communicative intention towards them. I don't share anything with them, I pay them with money/symbols. Language is only an object of trade in this and a 'means to an end'.

It would be a misunderstanding on the side of the interaction partner to generally already ascribe communicative intention to such an instrumental symbol use (e.g. because linguistic symbols are used in it), which also can only fulfil imperative functions. It would also be a misunderstanding to assume that observable 'means to an end'-behaviour in interaction will automatically lead to the development of communicative intention and the discovery of linguistic symbols as a means to communicate and share thoughts and feelings. In the process of acquiring communicative skills, the imperative (e.g. I want X) is by no means the precursor of the other functions, that has to be learnt first or that comes first. Current research with young children proves quite to the opposite without any doubt that imperative, declarative and informative functions all emerge at the same time, between the age of 9 to 12 months, very early on in development (see Lieszkowski, 2007).

The EFCIC-programme practices declaratives and informatives from the very beginning and even more extensively than imperatives in order to avoid a communicational dead end and because this principle agrees with the normal process of language acquisition. In declaratives and informatives – as opposed to imperatives - the aspect of communicative intention is far more apparent and therefore accessible, since the intention towards the other, the communication partner, is partly inherent in these functions.

In the presence of another person we only point at something without wanting to have it at the same time, if we want to *share* information regarding the object pointed at *with* our interaction partner. We do it 'for' the other person.

The approach also applies to people with cognitive impairments, where behaviours relating to communicative intention and declaratives are not yet observable in their interactions with others. And it shows goods results if frequency is high enough. The frequency of exposure to the practice and experience of such communicative language use that is necessary to enable the AAC users concerned to discover declarative and informative functions of language for their own use can only be achieved, if enough core vocabulary with options for commenting, describing and navigating a conversation is available for their use in everyday life. For this reason communication aids with a well organised, easily accessible and copious enough core vocabulary are very important when working with the EFCIC programme.

Key feature 7: making use of parallels between language and action development

The EFCIC programme makes use of existing parallels between the growing of syntactic and semantic differentiation in the process of language acquisition and the development of action skills. The programme follows the process of language acquisition of children without communicative impairments, and it lets itself mostly be informed by communicative behaviour in oral language use.

- It all starts with one-word utterances: Individual words, phrases and sentences, represented by graphic symbols, are pointed at with a single gesture. This coincides with the phase of one-word utterances (holophrases) in the normal development of oral and sign languages.

- On the second level there are multi-part-utterances, normally starting with 2-3-word sentences getting longer afterwards and starting to show more and more differentiation in syntactic structure. On the action level the parallel is (pointing) action sequences that are taught in the EFCIC programme at this stage. Several words/phrases are pointed at (e.g. in the form of pictograms) one after the other. As an alternative, pointing gestures can be combined with representational gestures of sign language or spoken words, depending on the AAC-users abilities and preferences and the sign systems used by their surroundings. Also on this level, literacy skills using spelling are additionally taught. Written words were of course already present on the one-word one-gesture level as written words presented together with pictograms. Now individual letters are introduced and familiar words are first spelt.

- Literacy skills are also introduced early, because the discrepancy between language comprehension and the abilities and possibilities to execute verbal actions for people who do not spontaneously use any or only very few conventional signs must often be assumed even greater than for children with normal language development. Cognitive abilities or limits cannot be discerned directly. They can only be inferred on the basis of observed behaviour in specific situations or as reactions to set tasks. What someone understands is concluded from what they do (or don't do), especially in diagnostic tests. Such deduction is not really possible for people whose abilities for executing actions reliably are impaired. We cannot legitimately conclude that someone, who cannot act or whose actions do not make sense to their surroundings, is also incapable of comprehending linguistic signs and communicative acts. From this perspective, the label of 'severe cognitive impairment', that a lot of people who are enrolled in the EFCIC programme walk around with, can mainly be seen as a description of their specific interactional

behaviour only. Therefore we should generally start by assuming competence until – after their abilities to execute actions have been enhanced - their actions will allow to draw conclusions concerning their current cognitive abilities. So far, the positive experiences with this group of people in the EFCIC programme speak for such an approach to things.

- As a third stage, there follows the development and automation of longer action sequences and multi-part utterances. It is on purpose that EFCIC only promotes automation of actions and action sequences at this stage, as the programme aims at a general competence to execute specific actions – independent of the material context and a particular communication aid. To achieve this it is necessary to be able to adapt the execution of the individual parts of an action or action sequence to the surrounding circumstances. An early and quick automation of simple movement patterns fitted to the handling of a specific communication aid and a specific layout of the vocabulary or the way it has to be selected would prevent adaptability and greatly limit the possibilities for action in varying circumstances.

The parallel teaching of language and action skills remains fundamentally the same, whether the difficulties lie more in the area of action, of language and communication or equally in both areas. For the development of communicative action skills it is crucial that both areas come together. Naturally, the strategies and supports used are adapted to the individual needs of the AAC-users.

Learning the point of pointing

At the centre of the following discussion is how people can learn 'communicative pointing' with the help of 'cooperative coordination' and the teaching of observable communicative intention. The following text has first been published in the context of the discussion surrounding 'facilitated communication' (FC), with the intention to enrich the discussion by a further perspective. It therefore makes sense to concentrate on overlapping topics of the EFCIC programme and FC.

To allow a better understanding of how 'cooperative coordination' works and which supports and strategies are offered to AAC-users to enable them to select symbols autonomously by pointing at them, the following aspects will be introduced:

- aspects of the pointing action (selection of graphic symbols by pointing at them)

- causes for failure or lack of pointing actions

- supporting activities in the execution of pointing actions

- 'cooperative coordination' and FC

After that, a separate chapter is dedicated to the execution of the communicative intention through which a pointing action is transformed into a pointing gesture, a communicative act, and how it is taught within EFCIC. In the everyday practice of people with severe communicative impairments, both components are of course inseparably related.

Aspects of the pointing action

Orientation – movement direction – stop

In order to press a lift-button, a toilet flush-button, the on- button of an I-pad or to select a graphic symbol by pointing with a finger, various attentional and coordinative activities are necessary.

- First, the person has to orientate towards the button/symbol (usually visual orientation). They have to position and direct their body in such a way as to make orientation and pointing movement possible.

- Then, they need to coordinate that orientation with the muscle tone needed for the movement in the executing body parts and the adequate movement direction: Start – maximum expansion – retraction – stop.

- All this has to happen in a sequence which allows the button/symbol to be successfully selected (e.g. not make the pointing movement before orienting).

Most humans master this coordinative task at the age of a few months already, and this description seems a very complicated way of explaining an essentially simple act often done without thinking. Unfortunately, we tend to rather quickly assume that there is a lack of symbolic or situational comprehension, if a person with severe communicative impairments does not or not contextually adequate point to/select or grasp the offered pictograms or buttons.

For the people who profit from the training of the pointing action within the EFCIC programme this 'simple' action is often just as complicated in the beginning as it is described above. They fail at the attentional and coordinative tasks a pointing action entails.

causes for failure or lack of a pointing action

Physical causes

In some cases the causes for failure or lack of goal-directed pointing actions are obvious, e.g. a person cannot perform a movement like 'extending or flexing the arm'. This is the case for paralysis, some form of spasticity and similar phenomena. Or there is a sensory impairment that prevents or impedes visual orientation or orientation towards things in the vicinity generally. If this is the case, the people caring for the AAC-users try to find alternatives that will still enable them to select and execute communicative symbols. They do not automatically assume that the person is unable to understand linguistic signs. Alternatives for the selection of signs are e.g. selection by eye-gaze or scanning with the help of switches and buttons that may be used with the head or other parts of the body. It is also possible to introduce strategies that support the process of learning the pointing movement – as far as the given physical condition of the person will allow that this movement be learnt. In these situations tactile supports are a possibility - executed by mechanical contraptions or by human assistance. A human assistant must of course respect the directive that they always have to be blind with regard to the selectable symbols, as the assistance must only be related to the movement that is necessary for the execution and acquisiton of a pointing action in general, but it must never be related to the specific direction of this movement.

causes in the area of attention, orientation and movement direction

If someone is capable of carrying out the movement necessary for pointing at least approximately and if someone can orient at least towards objects of their interest, difficulties in the execution of pointing actions may still exist, but are difficult to spot at a first glance. Those difficulties can still be as strongly disabling as a severe movement disorder. Those who work with people with communicative and cognitive impairments who are labelled 'pre-symbolic', will likely recognise all or some of the following behaviours:

- The persons have difficulties directing their own attention and to orient towards a symbol within a given context and remain focused.

- Building up the necessary muscle tone is difficult as well as keeping it up during the whole pointing action.

- As a result, the movements overreach their aim, stop short or collapse. Deficient control of movement impulses is also quite frequent. This leads to repetitive, hasty or unsteady movements as well as inadequate movement patterns. For example, in some cases the persons always move to both the 'yes'- and the 'no'-icon sequentially or touch all icons on the left margin, etc. In other cases we can observe a

kind of 'finger echolalia', i.e. all or only the last icons used by the communication partner by means of structuring and modelling support are automatically repeated by the AAC-user.

Lack of coordination

The difficulties regarding attention, orientation, muscle tone and movement direction appear in individuals to various degrees. If they concentrate on one aspect, the difficulties can be reduced with specific exercises or specific aids. But the real problem for these people with severe communicative impairments is not the individual aspects. It is rather the inability to coordinate all aspects in such a manner that they can point to an intended sign. At the start of the acquisition process they are not yet capable of coordinating the individual necessary activities to form of a pointing action even if they have already mastered the individual components in isolation.

Language acquisition research has come to the same results when observing healthy young children in their acquisition of language (e.g. Klann-Delius, 1999, S. 31-33). One possible explanation for these difficulties observed in persons with impaired communicative development is impaired executive functioning in the prefrontal cortex. In the following, we will describe how these coordinative problems can be reduced.

Supporting the pointing action – 'cooperative coordination'

At this particular point the concept of 'cooperative coordination' takes effect – a central feature in the training of the pointing action in EFCIC.

'Cooperative coordination' is a unifying term for various action rehabilitating supports and strategies with which people with communicative and motor impairments and impaired action skills can be supported to acquire new action skills.

Basic principles

- 'Cooperative coordination' means that the coordination of the various activities necessary for the execution of a pointing action (attention, orientation, movement direction and sequencing) is carried out by the AAC-user and their interaction partner in cooperation in the beginning.

- In this it is important to make sure that the AAC-user learning to point be active from the very beginning. Their activities are then supported by the interaction partner with regard to coordinative tasks, so that the intended pointing action can be executed.

- In the EFCIC programme AAC-users are neither physically lead through the action nor is the work of controlling their muscle tone and movement impulses that they can do themselves, done for them by the supporting interaction partner by giving them a tactile support of the movement in general (If they cannot manage the bare movement (yet), see explanations further up).

- The intensity of the support depends on the individual extent and form of difficulties in executing actions. It is steadily reduced, until the AAC-users can carry out pointing actions independently in varying contexts and under different conditions.

Model: The interaction with somebody acquiring new action skills

When we observe young children, we see how they are supported by their carers in acquiring new action skills. They also have difficulties with physical coordination and directing their attention. Other fields of research are for example sports or music teaching which require coordination and attention. There, too, children and adults receive tactile, visual and acoustic supports when learning new action sequences.

Zukow-Goldring (2006) did research on how young children learn to handle unfamiliar toys and so acquire new action skills. She observed that the carers, who are involved in the interaction, support the playing children in the areas of attention direction and coordination. This support was mostly given unconsciously but nevertheless in very systematic ways. The children received support until they were able to perform the action on their own. Zukow-Goldring calls this process of acquisition 'assisted imitation'. She shows clearly in her article that even 'normal' children do not learn to act independently by simply observing and imitating. Quite to the opposite, they receive intensive interactional support to direct their attention to the points relevant for the action and to the correct sequencing of individual aspects of the action as well as to coordinate their visual orientation with a suitable direction of movement. This happens amongst other things through:

- modelling

- structuring

- directing the visual attention and

- various tactile supports

This makes clear that a very active imitation is necessary to acquire new action skills. With the support of their carers, the children are able to recognise possibilities for action and to perform actions before they can carry them out on their own. This process is important because our experiences with perception and action through sensory-motor simulations build *image-schemata* and *concepts* in our brain. These constitute the actual organising structures necessary for language, communication and other so called 'higher-level cognitive tasks' (e.g. Gibbs, 2006).

These findings come from scientific research concerned with the effects of the fact that humans come with a certain body structure and can only experience the world through the medium of the body in movement. Research on this topic can be found in the literature under the term of 'embodiment'. Embodiment concepts consider active bodily execution to be important for the development of action and communicative language skills, because our perception is so closely linked to action. Varela/Thompson/Rosch (1991, p. 163 ff.) conclude that what we are able to perceive is dependent on what we are able to do. And what we are able to do and actually do do, in time alters our perception. But action or at least movement comes first.

Consequences for the interaction with people with communicative impairments

People with severe communicative impairments can experience greatly increased coordinative and attentional difficulties in the acquisition of pointing and other actions in comparison to very young unimpaired children. In addition, their difficulties take longer to overcome or to reduce than with children with an inconspicuous development: Without specific additional support they can often not be overcome at all. This makes the phase of 'cooperative coordination' the more important to allow them to experience increasing action skills and a growing understanding of actions and activities shared with their environment, by this creating the basis for communication and language.

The specific supporting activities to develop an autonomous execution of a pointing action used in the EFCIC programme come partly from many years of practical training-experience with FC-users who wanted to learn to select the symbols on their communication aids independently. This has always been the aim of facilitated communication: to be a rehabilitation programme for arm/hand motor skills (Crossley, 1997). Successful attempts at 'fading' physical support and video analysis of various very different 'facilitating'-activities of interaction partners clearly showed coordinative and attentional aspects to be the main problems. Alfaré (2010) already pointed out how the treatment of these aspects by the facilitating interaction partner and the level of autonomy in the execution of the pointing action by the FC-user are closely related.

Examples for supporting activities in 'cooperative coordination'

The supporting activities in 'cooperative coordination' are designed to help AAC-users to organise their actions independently as soon as possible.

Orientation:

In order to execute a pointing action, first we must orient towards the selectable symbols. This is usually done by eye-gaze. Through orientation, adequate positioning of the body is possible. The interaction partner gives visual and/or acoustic signals that catch the AAC-user's eye and help with orientation. E.g. the interaction partner makes a 'knock-knock' noise or clicks his/her fingers where the orientation is supposed go in space. The area of focus can also be circled with a finger or the right visual projection line can be indicated by pointing it out with a finger. Of course there are other acoustic (e.g. whistling) or visual (e.g. light) supports that can be used.

Movement direction:

Once the intended aim of the pointing action has been focused on, the next step is the pointing movement. In the beginning, this movement is often executed without an extended index finger or by a grasping movement. The important thing is that the AAC-users look at the aim *before* starting the movement. Gaze must not follow the movement, but precede it. Persons with very active hands who are always already moving before looking may need tactile support in that the interaction partner holds the AAC-users hands back while they are still orienting.

The time between orientation and pointing movement should not be too long. Otherwise AAC-users have difficulties to memorise and execute orientation, positioning and movement as parts of one single action. Quite often the AAC-users' span of attention is very short at first. The pointing movement must therefore be performed in this short window of attention.

Some persons experience difficulties to start the movement. Here we offer 'tactile prompts', e.g. a short tap on the shoulder, the back or the back of the hand, applied in a flexible manner. Some persons with low muscle tone need help in building up their tone before starting the movement. If it is very difficult for the AAC-user to carry out the movement up to aim (e.g. they stop in the middle, change direction, retract the arm or the arm droops) a few movements executed with tactile support help to model the appropriate movement, before it then is carried out autonomously by AAC-user immediately afterwards.

Stop:

As important as carrying out a movement is the ability to stop it. Only then a pointing action can ensue. Like the beginning, the ending of the movement can also be supported if needed (e.g. the AAC-user keeps repeating the same movement). This can be done with visual (offering a visible resting place for the hand, the carer accompanies the retracting movement with their own hand parallel the AAC-users hand), acoustic (stop signal, verbal reminder, etc.) or tactile (taking the AAC-users hand and putting it in the resting position, etc.) activities.

Flexibility as a principle of 'cooperative coordination'

It is impossible to list and describe all possible coordinative supporting activities used in EFCIC for every single coordinative or attentional problem of AAC-users that has been observed. However, there is no definite catalogue supporting activities that has to be followed anyway. Not every AAC-user with coordinative difficulties needs the same supports. And in the same way, there is no prescribed form of the pointing action to be aimed at.

It is the aim of the EFCIC-programme that AAC-users acquire the general skill to 'select symbols' with the hand no matter how these may be presented in any given situation: on a wall, on a communication aid with a touch-screen, in a folder, on the menu of a restaurant, on a smart-phone, on the arm of the carer, on a working tool, etc.

Therefore it is important not to use the same supporting activities in the same way all the time. The idea is not to build up an automated movement pattern that will lead to exactly the same handling of objects and tasks each time. AAC-users must be able to react flexibly to contextual variations which are a constant reality of communicative interactions. If supporting activities are used flexibly in different, various ways, the individual aspects of the pointing action come up into focus again and again: orientation – movement direction– stop. And there is no danger that the AAC-users will develop prompt dependencies.

multi-part pointing actions

It has been explained why in the EFCIC programme single pointing actions are developed and trained first. As soon as the AAC-users can execute these more or less autonomously several pointing actions are trained to be carried out one after the other. However, at first they are performed with a stop phase and a new orientation in between the individual points, the stop growing shorter with time and practice. In the end, pointing sequences will result where individual points are no longer distinct from each other but rather the action sequence is perceived as one act.

'Cooperative coordination' and FC

Supporting activities without tactile support during the movement

The previous section shows how pointing actions are learnt within the frame of 'cooperative coordination'. People with communicative impairments who did not point spontaneously, communicatively or at all are learning from the start of the training to execute goal-directed movements to signs in a physically autonomous manner through the intensive support of their attention and coordination. Persons who have been physically supported at the hand or the forearm for many years with certain FC practices can still also learn to point autonomously using 'cooperative coordination'. That this can be done successfully with the approach of the EFCIC programme has been shown many times in actual practice. If the fc-users concerned can perform the arm movement required for the pointing action even approximately (if the movement is physically possible for them), the tactile support on the hand or any part of the arm doing the movement is unnecessary to acquire the skill for autonomous, goal-directed pointing movements. If in the beginning they are supported intensively before the pointing movement in the coordination of the activities necessary for the pointing action, tactile support during the movement will not be necessary. However, if the arm movement cannot be performed yet even though it is physically possible, it can be learnt in many cases. Tactile support while practicing the movement can be helpful at that point. But in this situation it is purely about the movement not the action.

The sometimes heated 'manipulation-debate' about fc that has been going on for many years and is concerned with the influence facilitators take at the physical level of selecting a symbol, does not apply to EFCIC. The behaviours of fc-users and supporting interaction partner that have to be made responsible for the influence of the facilitator on the selection of the symbols, do simply not occur in the EFCIC-approach.

FC had to face the accusation that the facilitators are responsible for the choice of the linguistic signs, especially because with its help the fc-users produced utterances, the complexity of which required much greater cognitive abilities than the people with cognitive and communicative impairments in question were believed to have. The tactile support alone was hardly the cause for the harsh criticism, though. Because physical, tactile support of the same level of intensity is also given in other programmes (e.g. Verbal Behaviour in ABA or PECS) when teaching and practicing new skills. But these have never been criticised in the same way. FC was criticised on the one hand because the physical support of the movement was often long term not only in the initial learning phase. On the other hand fc resulted in utterances of a much higher complexity than took place with other AAC interventions for the same group of people an than was the be expected for these people

But FC has always vehemently stated that the cognitive (learning) abilities of the people in question were much larger than assumed, but that they were underestimated because of their lack of action skills. Unfortunately, this possibility has never seriously been taken up by the research community because of the often missing physical autonomy of fc-users and the fact that there is undoubtedly unconscious influence taken by the facilitator on the selection of symbols in certain practices of FC still in use today.

There are many 'FC-candidates' enrolled in the EFCIC-programme: children and adults with cognitive impairments who cannot yet use conventional symbols. The programme helps these persons to successfully learn to point communicatively to symbols. This is achieved through the use of 'cooperative coordination' teaching the meaning of communicative intention and how to show it. It is to be hoped that through this the hypothesis of impaired action skills in these people will be more seriously considered in the future.

Persons who do not start to point and select signs spontaneously may not do this because their abilities to execute (pointing) actions are impaired and not because understanding linguistic signs is too complex for them. For these persons, learning to act is even more of an interactional phenomenon, than it is for others. The reason that they do not point at symbols is not their inability to learn to understand the meaning of signs, but the lack of or the wrong kind of support they get from their interaction partners. It should also be remarked that in FC there never existed a unified way of practice regarding facilitating activities (see Alfaré's 2010 overview). And it did not necessarily include 'hand support' and similar practices, not even at the start of training. In the German-speaking world, FC has developed a range of differing supporting activities. Crossley (German translation in 1997) herself described in her training book a wide range of facilitating activities for various observable difficulties of the fc-users in pointing at symbols with their hands. Only within a narrow area of problems does she talk about touching the fc-user's arm during the movement.

Unfortunately, when dealing with FC, there can repeatedly be observed, that this fact is not generally known. In the German-speaking area, FC is still widely associated with tactile support at the hand/forearm. One reason could be that such practice of FC was nearly exclusively used at one time. We have repeatedly seen how even people who were perfectly able to execute a pointing action autonomously, but did not use language in a communicative way, received physical support at the hand. But for these persons, the problem is not one of movement, not even of action. The problem for them is to develop an already existing pointing *action* into a pointing *gesture* i.e. a *communicative act*. Such behaviour illustrates very well the big difference there is between a pointing action and a gesture. Acquiring one skill does not automatically lead to the acquisition of the other. The following chapter deals with the teaching of the pointing gesture in the EFCIC programme.

Showing communicative intention – the decisive component of 'communicative pointing'

In the previous chapters we have extensively explained how a pointing action is structured and how people who so far have not pointed spontaneously, communicatively or at all, can learn to execute goal-directed pointing movements to linguistic signs autonomously. It will now be looked at in depth how decisive the aspect of communicative intention is for the constitution of 'communicative pointing', of the *pointing gesture*.

We can talk of an *action,* whenever a behaviour or a movement can be perceived as goal-directed (or intentional from a mentalistic perspective). This is achieved when the activities observed are seen as being coordinated with each other. Selecting a specific linguistic sign by pointing at it with the hand is an action but not in itself a *communicative action*. Not even when conventional linguistic signs like pictograms, written words or oral phrases in a talker are selected.

This distinction in 'pointing' between the execution of signs (pointing action) and the communicative act (*pointing gesture*) as well as the following definition of gestures by means of formal criteria of the execution of communicative intention are neither found in FC nor anywhere else in AAC so far, but they bear great relevance for teaching and understanding communicative pointing. This distinction entails the necessity for behaviours executing communicative intention to be observable in order for any behaviour to be interpreted as communication. This may be slightly unusual in AAC, as communication is often defined very loosely in this

field. In this article we hope to show how much sense such a definition of what constitutes communication makes and that it will in no way lead to the exclusion of people whose behaviours would not yet be classified as communication by the standards of this definition, from participating in communication. For the observable behaviours necessary for an action to be defined as communication are achievable for everybody.

When linguistic signs are selected with a pointing movement, this can easily be mistaken for a communicative act. On the one hand because linguistic signs are being used, on the other because a movement is being performed that resembles that of a pointing gesture. In addition, both elements very often appear in communicative contexts. For an observer the elements then function as triggers (Enfield, 2009). Therefore we assume a communicative intention almost automatically when these elements are present. The following chapter explains how the *pointing gesture* differs from the *pointing action* and what an important role the execution of communicative intention plays with regard to 'communicative pointing'.

Executing communicative intention

Bridging the pointing action to the *pointing gesture*, action to communication, instrumental use to communicative use of symbols is the 'communicative intention' (Tomasello, 2003). It must not be understood as some sort of inner state but as an *executed, observable communicative intention*. It is therefore an additional action, carried out in combination with the execution of the sign, yet independent.

Lexical and pragmatic meaning of a sign

By communicating a sign, i.e. an information, its meaning changes.

- First, the sign refers to a *lexical* meaning. 'Car', e.g., stands for a driveable object in the real world with at least 4 wheels that serves for the transport of passengers.

- If this information is communicated it refers to a *pragmatic* meaning that can differ according to the context of the interaction. If someone points to a real car on the pavement with the appropriate behaviours showing communicative intention, this can mean 'whose car is it?', 'I like cars', 'I would like to drive this car' and so on.

The example makes quite clear that it is not enough to just execute a linguistic sign (orally, as hand sign, by pointing at it, etc.) in order for communicative intention to be executed and be understood. It needs a 'surplus' to the mere physical manipulation of executing a sign in order for the communicative meaning 'I like cars' to be constituted from the information 'points at CAR'.

Missing communicative intention in pointing at a sign

If the communicative intention is missing, the interaction remains on the level of *instrumental* functions. On this level, somebody might point to the pictogram for 'car' which stands for their toy car. They give the appropriate pictogram or the signal object to their interaction partner or press a button that says 'car'. They keep doing this every time they want to have their toy car and are unable to fetch it themselves. They do exactly as much as is necessary to receive his car. If they could get the car themselves, they would not press the switch or select the pictogram. The interaction partner in the presence of who the sign is expressed, is only part of the object manipulation that is necessary to reach their aim. Even if an AAC-user approaches their interaction partner in this context out of their own initiative and uses their button, this orienting activity must not be confused with the execution of communicative intention. It is like walking up to the afore mentioned sweet vending machine, finding the slot for the coins and the appropriate buttons. Even if an AAC-user has learnt to use several linguistic signs in sequence to get their toy car instead of just the one 'car'-symbol, we are still on the same instrumental level. Paying with several coins is still only paying. It does not automatically change into an act showing communicative intention, never mind what it says on the coins.

However, if the actions necessary to reach one's aim are joined with activities showing communicative intention (they will be explained further down) the instrumental function becomes a communicative one, in this case an imperative. 'I would like to have my toy car' or 'Please, give me my toy car' etc. Imperatives are somewhat problematic in communication training. Their function in interacting with other people is to receive something or to satisfy a need. Usually this aim can be achieved by both, a communicative or an instrumental way of acting. In both cases the interaction partner can grasp the need and can help satisfy it. If they want, the interaction partner can understand an 'utterance' even in case of mere instrumental action without behaviours showing communicative intent. If an AAC-user leads their interaction partner to the shelf with the toy car, the interaction partner can understand this as an 'utterance'.

The problem arises on the side of the person with communicative impairments. If they do not learn to understand and execute this intention towards the other person, this intention to act for the benefit of the other person, to share, that is inherent in communication, if they do not learn that because their needs are understood by their surrounding even on an instrumental level and if they do not grasp the meaning and added value of executing communicative intention on their own one day, they will stick and be stuck with the imperatives. The person who loves their toy car so much that they are happy if they can see it, hold it and play with it, will never make a declarative utterance about it, even if they can point to linguistic signs: Because the use of declarative and informative functions requires an understanding of communicative intention. This person will never say anything else apart from 'I want' about this toy car. This is not because they are not capable of learning and understanding the appropriate linguistic concepts. It is because they only act but do not communicate. Declarative utterances such as 'nice car' or 'I love this car' make sense only in the context of showing communicative intention.

Teaching showing communicative intention

Using 'cooperative coordination'

It needs specific training of behaviours showing communicative intention to teach people with severe communicative impairments to use pointing actions not just in instrumental functions but to execute them as pointing gestures within communicative acts. They can learn to understand and use linguistic signs as what they primarily are: *Contents of communicative acts*. It is mainly in this function that language is first acquired by human beings according to current usage-based models of language acquisition (e.g. Tomasello, 2003; 2008; Barlow/Kemmer, 2000).

The EFCIC-programme teaches these communicative aspects again with the help of 'cooperative coordination' in the sense of 'assisted imitation', as was described in detail in the section on supporting activities for the acquisition of the pointing action. When teaching executing communicative intention, it is most important:

- - to support orientation and attention direction towards communicatively relevant possibilities for action and

- - To support the physical realisation of showing communicative intention on the coordinative level through visual, acoustic or tactile supports.

In this way the communicative aspects can be executed and acquired early on – parallel to the acquisition of the pointing action.

Training takes place from the start in naturally occurring everyday situations. The supporting interaction partner directs the AAC-user's attention and gaze to current focus-activities in the interaction. The supporting interaction partner gives them meaning by using the appropriate terms from the current vocabulary up for acquisition and by pointing at the appropriate symbols. They support the physical coordination of orienting between changing focuses of attention. They take up even the smallest physical activities of the AAC-user that could express communicative intention such as initiating an utterance, addressing someone, or attempts at sequentially

appropriate pointing actions, and help achieve an execution that is clearly observable, or they model for the benefit of the AAC-user the use of appropriate utterances at certain sequential places of the interaction with the user's communication aid.

Using the results of gesture research

The EFCIC programme uses elements of Conversation Analysis (e.g. Schmitt 2007) and findings from gesture research (see Mueller 2007) in the teaching of aspects of communicative intention.

For the question what the difference is between a pointing gesture and the simple selection of a linguistic sign by pointing at it, Mueller (2007) offers a helpful definition of gesture. It is based on "formal characteristics of the movement rather than on inner states" (Mueller 2007, p. 243). This means *observable behaviours* and not mental states like an existing communicative intention. It is therefore a definition along the lines of the *activities showing communicative intention*. The EFCIC programme supports exactly these activities through 'cooperative coordination'.

Mueller (2007, p. 243) defines a gesture by three formal characteristics. She mentions as relevant components:

- "the voluntary execution of the movement"

- "its address" and

- "its sequential position within the flow of surrounding activities".

'The voluntary execution of the movement':

'The voluntary execution of the movement' means that the movement of a gesture could have been performed in a different way or not at all, that it is executed voluntarily and purposefully in the way it is executed at a specific moment. However, for the AAC-user to direct their movement and execute it in a controlled manner is not enough. This goal is already achieved in the act of sign selection by pointing, the pointing action. Automatic and stereotypical movements, conditioned action sequences always repeated in the same way are in this sense not 'voluntary' and do not express communicative intention. A person who automatically grasps every object laid before them or who always points to the same icon at the lower right, or to every selectable pictogram one after the other does not execute a gesture. Neither does a person who always taps 'hello, how are you?' on their talker and never 'Good morning' or 'Long time no see'.

An integral aspect of a gesture in Mueller's sense is the *flexibility in its execution*. This includes the choice of the signs and the communication aids presenting the vocabulary as well as the movement direction.

The EFCIC-programme achieves this flexibility by practicing from the start in differing situations and varying field conditions and therefore with differing presentations of the linguistic signs to be pointed at. We do not teach one fixed form of the pointing movement. The movement must be adapted and adaptable to the material conditions of each situation and is then supported on the coordinative level. If the movement can be carried out flexibly for sign selection, it can also be executed in different ways for reasons of showing communicative intention by making it more obvious for the sake of the interaction partner. We use different linguistic signs for the same communicative meaning from the beginning. Familiarisation with their usage happens mainly through modelling and supporting execution as described above.

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AAC-users *initiating their actions* constitutes a further aspect of the 'voluntary execution'.

The EFCIC programme encourages AAC-users from the beginning to initiate their own turns and their pointing

actions themselves. This includes the orienting towards the sign, the movement, or both. It is therefore important to end the pointing action as well as start it. A pointing activity the AAC-user does not end observably autonomously is impossible to observe as a movement purposefully directed exactly in this manner. Hence, where there is no ending there can be no beginning of a new action.

This initiative is *not* promoted by using positive reinforcement (e.g. through an object, the AAC-user would like to have). A 'reinforcer' can trigger a reaction fairly reliably. But such conditioning effects have little to do with the idea of 'voluntary execution'. One possibility to introduce initiating turns and pointing actions is through indirect encouragement behaviour of the interaction partner by using gestures, clearly observable changes in body posture or muscle tension, facial expressions, noises such as clearing one's throat, loud intake of breath, or tactile prompts. All these activities serve to highlight the sequential position in the ongoing interaction that should be filled by the user with his turn. The encouragements are indirect, because they do not directly tell the AAC-user to start a pointing action now. Nor is there prompting of the AAC-users' initiative by a specific unchanging activity. Again, there would be danger of creating prompt dependency.

'Address':

On a content level 'address' can be understood as 'appeal'. Declarative and informative utterances are more easily perceived as entailing communicative intention than imperative ones. Declaratives and informatives 'call' the attention of the interaction partner. They are intended towards them, uttered 'for the other person' in order to share something with them. When persons start commenting things to their interaction partner of their own accord, the interaction partner can assume that there is a communicative intention behind that.

The EFCIC-programme offers the vocabulary for declarative utterances from the beginning in a prominent way and easily accessible. The AAC-users' attention for respective affordances for declarative actions is supported and trained by intensive modelling and coordinative support in the execution of such utterances.

'Address' also means addressing an interacting partner, e.g. saying someone's name or using a personal pronoun. For the pointing gesture this means that the action itself contains an address. The person for whom the gesture is intended should be made aware of this fact. This can happen trough looking at the interacting partner, through touching them, through giving them the 'adressing-stick' or some such object or through an unusual way of delivering the pointing movement. It is an activity that goes beyond what is required for the mere selection of the linguistic sign, but is none the less a controlled movement.

These features can be promoted by supporting their attentional and coordinative aspects. In the EFCIC programme this is done in combination with directing the attention of the AAC-users to the respective addressing activities of the other interaction partners.

'Sequential position':

'Sequential position' means among other things the 'appropriate' moment for the execution of an action within the interaction process. By being executed with this sort of sequential timing these respective actions show communicative intention. That is another reason why a self-controlled start and ending of a pointing action is so important. It depends strongly on the general context of and the sequential position in the interaction in which some behaviour occurs, how it will be understood. If a AAC-user constantly or at random times presses icons on their talker, it may be difficult to understand what they want to say or if they want to say anything at all, or whether they press buttons accidentally, randomly or just for fun.

We cannot detect a communicative intention if someone asks questions but does not wait for the answers of their interaction partner or if someone often starts to point while the interaction partner is talking or if they point to signs that make no sense in the context or if they remain passive and only carry out an action after much encouragement and help.

> The EFCIC-programme encourages frequent communicative practice in everyday interactions at work, school, leisure time, playing, meals, caring, etc. During this practice perception and execution of suitable action is supported and trained through 'cooperative coordination'.

The discussion and the examples above are not exhaustive, but they show how important it is to develop pointing gestures as well as pointing actions for the selection of linguistic signs. Only if aspects of action and communication are promoted likewise communicative action skills can be achieved through pointing to symbols. Communication training with EFCIC leads to a congruent development of the different linguistic and communicative skills. There are no discrepancies between language- and content-based and social-communicative abilities. Such discrepancies occurring was criticised in facilitated communication in the past, often rightly so. 'Facilitated' pointing quite often became 'facilitated' typing and 'facilitated' language production but never the execution of communicative intention, never a pointing gesture.

With the approach shown here, people with severe communicative impairments learn to use language in flexible, autonomous and varied ways. They can use it in various communicative functions. The EFCIC programme ensures that no purely instrumental use of linguistic signs will be developed. Unfortunately this still happens all too often in AAC to people with cognitive impairments. But if a person with disabilities remains stuck in an instrumental use of symbols, we may want to stop seeking the reason for this in their cognitive impairments, in a disability to learn to understand and use language in a truly communicative way. We may want to look to the interactional behaviours of their surrounding for the reason.

Favourable conditions for training with the EFCIC programme

Finally, some important conditions will be discussed that favour a successful training with the EFCIC programme. Much can already be deduced from the above explanations of its key features and the strategies used.

- Communication enhancement has to be the focus of the whole team, and even better, of the entire institution. This is especially important when AAC-users with very limited communicative behaviours and cognitive or multiple impairments are involved in the training. Communication practice takes place as an integral part of their entire everyday life. As long as communication with AAC means is perceived as just another thing on the to-do-list it will not work.

- We need open-mindedness for the discussed usage-based approach, because it will change the ways of behaviour in interaction and communication that staff are used to, sometimes rather considerably.

- The interaction partners need to be ready to apply a consistently multi-modal approach. If some members of a team only want to work with hand signs or pictograms or specific strategies, then they will not be able to help things along.

- Those carers who spend the most time with the AAC-users involved in the programme should ideally also be the ones trained, not only the team leaders, language therapists and AAC-responsible. Communication and its training happen in normal everyday life and cannot be delegated to speech therapy lessons.

- There needs to be a long-term perspective for the training, especially if the prospective AAC-users are not very young children any more. The carers need access to competent practical support and counselling during a longer period of time. Learning to communicate and learning the point of pointing and then making it is not achieved in a day.

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