OCS-R

Manual

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Contents

Structure, content, guidelines

General matters

The OCS-R is an observation-based tool to assess communicative or communication-relevant skills in children, adolescents, and adults with complex communication needs. Its basic idea is a multi-perspective approach. Thereby, there are two possible applications: First, the OCS-R can be filled out by different caregivers in multiple settings – e.g. school (teacher), home environment (mother), therapy (therapist) and leisure time (sports trainer). Second, the OCS-R can be utilized for a detailed multi-perspective assessment in a single setting – e.g. four different professionals in the school environment could determine a child's communicative competencies in school.
It is *not* the aim of the instrument to produce a single result based on the assessment of many different caregivers; but to reveal similarities and differences in the assessment of each individual caregiver as basis for individual support. This traces back to the results of an AAC project at the Ludwig-Maximilians-University Munich and the Bavarian State School for the Physically Disabled in Munich, from which the original version of the OCS emerged (Wagner & Kannewischer et al., 2005). It showed that people use multiple forms of communicative expressions in different areas of their lives, their communication competencies vary depending on their social environment, and further that individual observers can assess a person's abilities very differently. The OCS-R is not designed to be an ad-hoc instrument and it is not suitable for recording observations in single situations; the concept of the OCS-R is to make an assessment based on experiences in many different situations

Design and structure

The instrument is modularized. Each sub-module can be filled out and evaluated on its own. There is an Excel file for this purpose, which can be downloaded free of charge on the website www.ocs-r.com. Please ensure you always use the latest version of the instrument (questionnaire, manual, Excel analysis file). A detailed description for analyzing the filled-out questionnaire can be found in the chapter on Analysis. The instrument achieves its full potential when all modules have been worked through by several caregivers (maximum 4). In addition to the collection of general data (module 0), the OCS-R consists of five modules: *situations-specific communication (1)*, *basic communication skills (2)*, and, as optional additional modules, *perception (3)*, *orientation (4),* and *motor skills (5)*.
The core component of the OCS-R is capturing situation-specific communication (module 1) and assessing communicative skills (module 2). These modules are divided into sub-modules, which we will discuss in more detail. In summary, the basic structure of the instrument is as follows:

1. Situation-specific communication
1.1 Behavior regulation
1.2 Social interaction and communication
1.3 Joint attention
1.4 Emotions
1.5 Needs
1.6 Decisions

2. Basic communication skills
2.1 Signal production

2.2 Signal perception
2.3 Interaction

3. Perception
4. Orientation
5. Motor skills

Due to the scope of the OCS-R, it is not recommended to work through all modules at once. It makes sense to split the questionnaire over a longer period.

Scale

The questionnaire uses a four point scale. Please note the following when filling out the form:

"Always" (sometimes also "Yes") should be selected if the item describes a skill or a behavior that the person can always perform successfully and thus can almost always be observed in the described situation.

"Frequently" should be checked if the behavior has been mastered and can therefore be observed in principle. However, the person might not always succeed in performing it in certain situations.

"Rarely" should be chosen if the behavior is shown in single situations but cannot be observed in most cases. Accordingly, the skills can only be seen in individual situations.

"Never" (in sub-questions also "No") should be checked if a behavior or skill cannot be observed at all.

These notes apply to the entire questionnaire except for module 1 *Situation-specific communication*. In this module, the instrument only offers the options "always", "frequently", and "rarely". All modules and sub-modules will be explained in more detail below, as well as hints for filling them out.

Basic data

In the basic data section, the personal data of the child, adolescent, or adult for whom the OCS-R will be used is initially collected. It is very important for the subsequent analysis to specify who filled out the form (name of person) and his or her role in the setting (e.g. teacher, parent).

Module 1: Situation-specific communication

Module 1 *Situation-specific communication* is divided into six sub-modules, in which the caregivers should assess the nature and frequency of certain forms of expression in specific situations. The structure is based on communicative functions (behavior regulation, social interaction, and joint attention, following Wetherby and Prizant (1989, 2011)). Additional areas focus on emotions, needs, and decisions. The underlying questions are which intentions are expressed with what forms of communicative expression (e.g., posture, facial expressions, spoken language) and how this can be observed by the caregiver (e.g. lifting the arm). The aim of this module is to document communicative competencies in given situations. The results can for example be utilized to produce an *About me Book* for the person

concerned, which describes their individual forms of expression in important communication situations.

General instructions for filling out the questionnaire

The sub-module requires three steps: First, enter how the observed person expresses the issue in question (e.g. lifts their arm). Then assign a corresponding form of communication (e.g. gesture/manual sign) and finally estimate how reliably the person can use this form of expression (e.g. "frequently"). In order to assign the correct form of expression, it is necessary to elucidate the individual concepts: A total of nine forms of expression are available – they aim at *the user's* perspective. E.g., with a digital speech-generating device the recipient hears natural or synthetic speech. But from the user's viewpoint there are various ways in which the information can be organized. The user can, for example, use a certain symbol collection (e.g. Picture Communication Symbols (PCS), Makaton, Metacom) on the device to express something - then the form of expression would be 'photos/images'. Or he or she can use written language – then the form of expression would be 'written language'. It is therefore not important what you perceive in your position as an observer (e.g. text-to-speech-output of a speech-generating device), but what form of expression the person uses.

Behavior
The person shows a behavior that is associated with a change in spatial position in the specific situation (e.g., gets up and goes to the door to signal that they have to go to the toilet).

Posture
The person changes their posture to express themselves (e.g., stretches as a sign of agreement).

Vocalizations
The person uses vocalizations in the situation that do not have either a specific personal (idiosyncratic) or conventional meaning in the respective spoken language.

Gaze
In the given situation, the person deliberately looks in a specific direction (e.g. looks at the door to express that they want to go to the toilet).

Facial expression
The person uses their facial expression to communicate in the given situation (e.g. grimaces for "no").

Gestures/manual signs
In the specific situation, the person uses personal (idiosyncratic) non-conventional gestures, a conventional gestures or manual signs to express themselves (e.g. raises their right arm as a sign for "Yes", signs "toilet").

Photos/images
The person uses photos, images, or pictograms to express themselves in the given situation (e.g. points to the photo of the school toilets or a pictogram from a collection of symbols that represents the school toilets, to signal that they want to go to the toilet).

Spoken language
The person uses spoken language in the situation, i.e. words with a conventional or even idiosyncratic meaning (e.g. "daddy" conventionally for father or "da" idiosyncratically for father).

Written language

The person uses written language to express themselves in the situation (e.g. by writing something on a notepad or spelling a word on a speech-generating device).

1.1 Behavior regulation

This sub-module deals with the person's ability to influence other people's behavior. It is a very basic communicative competency, either to get something you want or to end or refuse something that you do not want (cf. e.g. Rowland, 2011; Wetherby & Prizant, 1989, 2011).

1.1.1 What forms of expression are used to request items/objects within the field of vision?

Observe the communicative forms of expression that the person uses to request objects or items that they cannot reach themselves but can see directly.

Practical suggestion

Place an item the person likes (e.g. toy, sweets) in their field of vision. The item should be placed so that the person cannot reach it on their own. Observe the person's reaction.

1.1.2 What forms of expression are used to request items/objects outside the field of vision?

Observe the communicative forms of expression that the person uses to request objects or items that they cannot directly see because they are in another room or in a closed cupboard.

Practical suggestion

Place an item the person likes (e.g. toy, sweet) in a cupboard or a room with the person present. Close the cupboard or leave the room with the person. Observe the person's response in a subsequent communication situation.

1.1.3 What forms of expression are used to request actions in the specific situation?

Observe the communicative expression that the person uses to request the initiation or continuation of an action that fits the respective context (e.g. continuing a game in a play situation, help with changing in the bathing cabin).

Practical suggestion

In a familiar situation, do not begin with the expected action (e.g. dishing out food at the lunch table) or pause a joint action (e.g. a joint game). Observe the person's reaction. Does the person prompt you to start or continue the action?

1.1.4 What forms of expression are used to request actions outside the specific situation?

Observe the communicative expression that the person uses to request the initiation of an action that does not directly aim at the present situation (e.g. beginning a game in the changing room of a swimming pool).

1.1.5 What forms of expression are used to refuse objects/items?
Observe the communicative expression that the person uses to show you that they do not want something (e.g. food or a toy they dislike).

Practical suggestion
Offer the person an object you are sure they do not like. Observe the person. How do they express that they want you to take the item away?

1.1.6 What forms of expression are used to refuse actions?
Observe the communicative expressions that the person uses to show you that they do not want to do something or want to stop something that is currently happening (e.g. stop serving food because the person is full, end a game).

Practical suggestion
Start with an action that you are sure the person does not like (e.g. a game they dislike). Observe the person's reaction. How do they express that they really do not feel like doing what you want to do?

1.2 Social interaction and communication

Communication has an important social function. *Social interaction* refers to the person's actions with the primary aim of drawing attention to themselves. Further, this attention itself serves a specific social purpose or has a social function (e.g. a child draws attention to themselves – because they want to be comforted).

1.2.1 What forms of expression are used to request a joint action (e.g. starting a joint game)?
Observe the forms of expression that the person uses to request a joint action where the focus is on doing something together. How does the person express that they want to do something with you (e.g. reading a picture book together, playing a game together).

1.2.2 What forms of expression are used to request social or emotional support (e.g. comfort)?
Observe which forms of expression the person uses to request social or emotional support from you. How does the person express that they need to be emotionally supported or comforted?

1.2.3 What forms of expression are used to greet people?
Observe the forms of expression used by the person to greet familiar or unfamiliar people. This is not necessarily about starting a conversation with people, but also about basic courtesies (e.g. greeting those present when entering a room).

1.2.4 What forms of expression are used to say goodbye to people?
Observe the forms of expression used by the person to say goodbye to familiar or unfamiliar people. This does not necessarily mean that the situation was preceded by a conversation, but it is also about basic courtesies (e.g. saying "bye" when leaving a room with different people).

1.2.5 What forms of expression are used to thank people?
Observe the form of expression the person uses to thank someone for an act or an object (e.g. signing "thank you" after being given a scoop of ice cream).

1.2.6 What forms of expression are used to ask for permission?
Observe which form of expression the person uses to obtain permission to do something. How does the person express when they want to do something, they is not sure to be allowed to or that they know they have to ask you about first?

1.2.7 What forms of expression are used to begin/initiate communication?
Observe how the person gets your attention to start a conversation or discussion. How do you know that the person wants to talk to you?

Practical suggestion
There are several ways to observe how a person starts a conversation. You should create situations that make it necessary for the person to first gain your attention. Hide an item that the person likes (e.g. toy) and usually uses in the situation or that they will need within the upcoming situation. Or replace useful items with things that are unsuitable for the purpose ahead (e.g. the person's drinking cup with a toy figure). Then follow the familiar routines. Observe how the person tries to gain your attention.

1.2.8 What forms of expression are used to resolve misunderstandings, e.g. to express "being misunderstood" or "not being understood"?
When communicating with people who are dependent on aided or alternative forms of expression, misunderstandings can easily arise. In some circumstances, the conversation can then lead to an impasse. What forms of expression does the person use to express that you have misunderstood or not understood them?

1.2.9 What forms of expression are used to terminate/end communication?
Observe the forms of expression the person uses to signal that a conversation has ended. How does the person indicate that they want to conclude the communication process?

1.3 Joint attention

In order to establish joint attention, the person must have learned to focus their attention on at least two things (e.g. a person and a particular object) at the same time. The aim of establishing joint attention is to direct other people's attention to a particular event or object, to comment on something, to obtain information about an object, or simply to draw attention to something.

1.3.1 What forms of expression are used to draw other people's attention to events/objects?
Observe the communicative expression the person uses to draw your attention to something (an event or person). How does the person manage to focus your attention on a specific thing (e.g. a passing car, the neighbor’s cat)?

Practical suggestion
To see how a person draws your attention to something, you can work with sudden changes or objects that are unexpected in the context. There are various possible ways of doing this: If an intervention takes place in a certain room, one possibility would be to place something very unusual and easily noticeable in the room (e.g. a life-sized cardboard figure or a flying balloon) and deliberately pay no attention to the object. The object could also be placed in front of the window, so that it can be seen, but not immediately on entering the room. A second possibility would be to change an object that's part of a game. You could, for example, work with a transparent sphere. Play with the person by rolling the sphere back and forth. After a while, hide a small object (e.g. a toy figure or flashing light) in the sphere underneath the table without the person noticing and then continue the game without letting anything on. Observe whether and how the person responds.

1.3.2 What forms of expression are used to comment on events/objects in the current situation?
Commenting refers to remarks about an event or an object from the observed person's point of view. What forms of expression does the person use to comment on events or objects (e.g. "oh, how cute" referring to the neighbor's cat, "cool color" referring to a garment)?

1.3.3 What forms of expression are used to ask for information about situations, people, or objects?
An important motivation for communication is the need to find out more about certain people, things, or events. Observe what forms of expression the person uses to tell you that they want to know more about an object or thing e.g. pointing to an object to find out more about it (e.g. caregiver`s answer_ "This is an elephant") or its characteristics (e.g. caregiver's answer: "The car is green").

1.3.4 What forms of expression are used to tell you about something outside the current situation?
Exchanging information is hugely important in social situations. Observe the forms of expression the person uses when talking about something that has nothing to do with the current situation or that is not related to the immediate environment (e.g. what their last holiday was like or what they did yesterday).

1.4 Emotions

This sub-module examines how the person expresses their inner moods and states. The structure of the section is based on Ulich and Mayring's (2003) classification of emotions, which divided 18 basic emotions into four groups (feelings of affection, feelings of aversion, feelings of well-being, and feelings of discomfort; cf. Bundschuh, 2003). This is supplemented by the question regarding ways of expressing pain.

1.4.1 What forms of expression are used to express well-being?
Emotions in the area of well-being include joy, satisfaction, relief, relaxation, happiness, etc.

1.4.2 What forms of expression are used to express discomfort?
Emotions in the area of discomfort include depression, grief, sorrow, guilt, boredom, tiredness, tension, stress, loneliness, etc.

1.4.3 How is pain expressed?
Pain has a major influence on a person's receptiveness and well-being. Therefore, it is important to know when another person is in pain and how they express it.

1.4.4 What forms of expression are used to express affection?
How does the person express affection towards themselves and others? Emotions in this area include love, sympathy, compassion, pride, surprise.

1.4.5 What forms of expression are used to express aversion?
Emotions in this area include disgust, revulsion, annoyance, anger, rage, fear, envy, etc.

1.5 Needs

Expressing needs is hugely important to actively influence interaction situations and in the context of one's own requirements. A person's physical well-being and the possibility of developing their personality are dependent on satisfying basic physiological needs (Maslow, 1978). This sub-module therefore takes the ways of expressing basic physical needs into account: I want something to eat; I want something to drink; I want to rest. The supplementary aspects of going to the toilet (this question also explicitly includes incontinence care, e.g. a full diaper) and changes in position are also central to a person's well-being. When observing and assessing a person's corresponding forms of expression, you should refer to situations in which the corresponding need is clearly at the foreground.

1.5.1 What forms of expression are used to express hunger?

1.5.2 What forms of expression are used to express thirst?

1.5.3 What forms of expression are used to express tiredness?

1.5.4 What forms of expression are used to indicate that the person has to go to the toilet or requires incontinence care?

1.5.5 What forms of expression are used to express the need for a change in position?

1.6 Decisions

This section covers the areas already enquired about in sub-module 1.1 but in more specific terms. For this purpose, the aspects we consider most relevant to everyday life were chosen (choosing, refusing, and agreeing).

1.6.1 What forms of expression are used to decide between given alternatives?
Observe which forms of expression the person uses to decide between two or more options (e.g. different beverages or different activities). How does the person indicate to you that they have chosen a specific alternative?

Practical suggestion
It is important to be clear on the extent to which the person actually makes a deliberate decision or whether another factor influences the choice (e.g. the position of the object, the availability of a particular means of expression). When you arrange decision-making situations, you should work with objects that you are sure the person either really likes or definitely does not like. Change the order of the items to be sure that the person actually makes a choice in the sense of a deliberate

1.6.2 What forms of expression are used to express agreement ("yes")?
Observe which forms of expression the person uses to confirm something, i.e. to say "Yes".

Practical suggestion
You can observe agreement by offering the person items they like (such as food or drinks, a particular game). You should be sure that the person really does want the items. Show the object to the person and ask "Do you want this?" or "Do you want to play with this?". Pay attention to the child's reaction. Make sure that the signal for agreement can be differentiated from signals for reaching out for the object (e.g. pointing in this direction or grasping at the object).

1.6.3 What forms of expression are used to express refusal ("no")?
Observe which forms of expression the person uses to refuse something, i.e. to say "No".

Practical suggestion
To create situations for refusals, you need items that the person does not like. Present something they do not like (e.g. food, drinks) or play a game that the child does not like. Pay attention to the child's reaction when you offer them the item ("Do you want this?") or initiate the action.

Module 2: Basic communication skills

The *Basic communication skills* module deals with the areas of signal production, signal perception, and interaction, following Bullowa's (1980) classification. The aim is to capture the competencies available to a person in expressing something, taking in information from others, or to shape interactions.

General instructions for filling out the questionnaire

Most questions in this module require an assessment based on the four point scale previously described. In addition, there are open questions about the scope and nature of the person's vocabulary.

2.1 Signal production

This section asks for *signal production* possibilities available to the person. A distinction is made between vocalizations/spoken language, gestures/manual signs, photos/images, and written language as possible means of conveying information. Similar to module 1 this module also focusses on the user's perspective. So, for example, even if the speech-generating device says "toilet" after the person

presses a symbol of a toilet, the form of expression used here is photos/images, not vocalizations/spoken language.
The range of expression in the OCS-R offers only a very rough assessment of the child's actual competencies. For a more differentiated diagnosis in the area, it is necessary to use methods for determining the person's active vocabulary.

Vocalizations/spoken language
Vocalizations/spoken language includes all sounds that are produced by the person's vocal apparatus and/or speech organs. The questions range from the articulation of specific individual vocalizations to the elucidation of complex interrelationships by means of spoken language.

2.1.1 Can articulate individual vocalizations
The person can express individual vocalizations in a way that is perceptible for others.

2.1.2 Uses conventional terms
Conventional in this context means that the terms are part of a specific language, i.e. they are not words that are only used by that person. The terms used are therefore intelligible to third parties.

2.1.3 Can speak single words intelligibly
The pronunciation of the words is such that they can be understood by third parties.

2.1.4 Can name objects or people
The person can name different objects (e.g. a specific drink) or people (e.g. the teacher in the class) in their immediate environment using spoken language.

2.1.5 Can name properties of an object
The person can use spoken language to name the properties of objects in their environment (e.g. the color or size of objects).

2.1.6 Can name activities
The person can use spoken language to describe their own actions or the actions of others (e.g. "paint", "drink", etc.).

2.1.7 Can speak simple sentences intelligibly
The person can articulate not only individual terms, but also combinations of concepts consisting of at least two to three words in a way that is intelligible for others.

2.1.8 Can recount events
The person can use spoken language to report events they have observed or experienced (e.g. "Peter went to toilet" or "Yesterday I watched football"). The grammatical correctness of the sentences does not matter (e.g. "Yesterday I watch football").

2.1.9 Uses pronouns (I, he, she, mine, yours, his)
The person uses pronouns in spoken language (e.g. "That ball is *mine*", "The pen belongs to *him*").

2.1.10 Can express relationships (e.g. cause & effect)
The person manages to express different relationships using spoken language (e.g. "Lisa is not here because she is sick" or "The tree has fallen down because the wind was so strong").

2.L1 How many words does the person actively use?
Estimate the extent of the person's active vocabulary. Enter a numeric value.

2.L2 In your estimation, what are the words the person uses most frequently?
Estimate which words the person uses most frequently and which therefore probably also have a special meaning to them. List these words.

Gestures/manual signs
Gestures and manual signs are summarized in this category because the transitions and differences between conventional gestures that are intelligible to everyone (e.g. pointing) and manual signs are relatively fluid. All signs that are expressed by fine or gross motions of the hands fall into this category. The questions range from pointing, to using manual signs.

2.1.11 Can point to objects purposefully
The person can point clearly to a particular object using their hands or feet.

2.1.12 Uses conventional gestures/manual signs
In this context, conventional means that the signs are used following certain rules. Thus, the gestures or manual signs have a shared meaning: the signs can also be understood by others. The person might use gestures that have a defined meaning in the respective cultural milieu (e.g. pointing, waving, etc.) or individual signs from a particular signing system. Either used as a distinct language (e.g. BANZSL (British, Australian and New Zealand Sign Language), ASL (American Sign Language) or encoding an existing language (e.g. “Signing Exact English”).

2.1.13 Can express the names of objects or people with gestures/manual signs
The person can name different objects (e.g. a specific drink) or people (e.g. the teacher in the class) in their immediate environment using manual signs.

2.1.14 Can express activities with gestures/manual signs
The person can use gestures/manual signs to describe their own actions or the actions of others (e.g. "paint", "drink", etc.).

2.1.15 Can express the properties of an object with gestures/manual signs
The person can use gestures/manual signs to name the properties of objects in their environment (e.g. color or size of objects).

2.1.16 Can recount events using gestures/manual signs
The person can use gestures/manual signs to report events they have observed or experienced (e.g. signs for "Peter" – "go" – "toilet" or "yesterday" – "me" – "watch" – "football"). The grammatical correctness according to a rule system (e.g. American or British, Australian and New Zealand Sign Language) does not matter.

2.1.17 Can express pronouns (I, he, she, mine, yours, his) with gestures/manual signs
The person uses pronouns in communication with manual signs (e.g. "*your*" – "name" – "what"?).

2.1.18 Can express relationships (e.g. cause & effect) with gestures/manual signs
The person manages to express relationships using gestures/manual signs.

2.G1 How many gestures/manual signs does the person actively use?
Estimate the extent of gestures/manual signs actively used by the person. Enter a numeric value.

2.G2 In your estimation, what are the gestures/manual signs the person uses most frequently?
Estimate which gestures/manual signs the person uses most frequently, and which therefore probably also have a special meaning to them. List these gestures/manual signs.

Photos/images
Similar to the gestures/manual signs section, there is no distinction between different forms of images. The section covers the person's competencies in using two-dimensional representations, i.e. photographs, illustrations, drawings, or pictograms from symbol collections. This also includes the use of digital speech-generating devices, if they utilize an interface featuring symbol systems (PCS, Makaton, Metacom, etc.). The content ranges from naming objects (e.g. with one-to-one mapping) to expressing cause-effect relationships.

2.1.19 Can express the names of objects or people with photos/images
The person can name real objects (e.g. a specific drink) or people (e.g. the teacher in the class) in their immediate environment using photos/images. They thus achieve a 1-to-1 mapping between the photos/images s and the object or person in the environment.

2.1.20 Can express activities with photos/images
The person can use photos/images to describe their own actions or the actions of others (e.g. "paint", "drink", etc.).

2.1.21 Can describe the properties of an object with photos/images
The person can use photos/images to describe the properties of objects in their environment (e.g. color or size of objects).

2.1.22 Can recount events using photos/images
The person can use photos/images to report events they have observed or experienced (e.g. pointing to the symbols for "Peter" – "go" – "toilet" or "yesterday" – "me" – "watch" – "football"). If the utterance is grammatically correct according to a rule system (e.g. the BLISS system) does not matter.

2.1.23 Uses photos/images for pronouns (I, he, she, mine, yours, his)
The person uses pronouns communicating with photos/images (e.g. pointing to the symbols for "*mine*" – "pen" or "*yours*" – "car").

2.1.24 Can express relationships (e.g. cause & effect) with photos/images
The person manages to express relationships using photos/images.

2.B1 How many photos/images does the person actively use?
Estimate the extent of the images/photos actively used by the person. Enter a numeric value.

2.B2 In your estimation, what are the photos/images the person uses most frequently?
Estimate which photos/images the person uses most frequently, and which therefore probably also have a special meaning to them. List these photos/images.

Written language
The written language section covers the rule-bound use of written language to express themselves. It includes the use of both paper and pen, as well as of lettered interfaces on speech-generating devices. The section ranges from the written designations of people and objects to the expression of relationships.

2.1.25 Can write the names of objects or people
The person can write the names of different objects (e.g. a specific drink) or people (e.g. the teacher in the class) in their immediate environment.

2.1.26 Can report about activities in writing
The person can use written language to describe their own actions or the actions of others (e.g. "paint", "drink", etc.).

2.1.27 Can describe the properties of an object in writing
The person can write down the properties of objects in their environment (e.g. color or size of objects).

2.1.28 Can report events in writing
The person can report events they have observed or experienced in writing (e.g. "Peter went to the toilet" or "Yesterday I watched football"). The grammatical correctness of the sentences does not matter (e.g. "Yesterday I watch football").

2.1.29 Uses pronouns in written descriptions (I, he, she, mine, yours, his)
The person uses pronouns in written communication (e.g. "That ball is *mine*", "The pen belongs to *him*").

2.1.30 Can express relationships in writing
The person can express different relationships in writing (e.g. "Lisa is not here because she is sick" or "The tree has fallen down because the wind was so strong").

2.S1 How many written words does the person actively use?
Estimate the extent of the words that the person can actively write. Enter a numeric value.

2.S2 In your estimation, what are the written words the person uses most frequently?
Estimate which words the person writes most frequently and which therefore probably also have a special meaning to them. List these words.

2.2 Signal perception

The *signal perception* section has two parts. First, it covers the ways in which the person is able to perceive information. The areas covered range from gathering information from 'reading' a situation to the reading of written text. Second, you will be asked about the person's language comprehension. The complexity ranges from understanding one's own name to deducing relationships. As in section *2.1 signal production,* the OCS-R provides only a very rough assessment of the person's individual competencies. For a more differentiated diagnosis in this area, it is necessary to use methods for examining a person's passive vocabulary.

Ways of perceiving information

2.2.1 Can gather information from situations
Observe whether the person can gather information from situations they are in.

Practical suggestion *Arrange situations that contain clear information. For example, lay the table. Does the person make the appropriate responses by getting ready to eat or waiting for help to reach the dining table if necessary?*

2.2.2 Can gather information from gestures/manual signs
Estimate the extent to which the person is able to understand conventional gestures or manual signs.

2.2.3 Can gather information from photographs
Estimate the extent to which the person can gather information from photographs. To what extent does the person recognize objects?

Practical suggestion *Show the person a photo of a particular object (e.g. a toy they like) or a familiar situation (e.g. a family having lunch). Does the person react appropriately, for example by fetching the toy or getting ready to eat?*

2.2.4 Can gather information from pictorial symbols
Estimate whether the person can gather information pictorial symbols. Does the person recognize objects depicted using pictorial symbols from symbol collections (e.g. PCS, Makaton, Metacom, etc.)?

Practical suggestion *Show the person a graphic symbol for a particular item (e.g. a toy they like) or a familiar situation (e.g. a symbol for food). Does the person react appropriately, for example by fetching the toy or getting ready to eat?*

2.2.5 Can gather information from spoken language
Estimate the extent to which the person is basically able to understand verbal utterances.

2.2.6 Can gather information from written language
Estimate whether the person can extract meaning by reading.

Speech comprehension

As all the other competencies, speech comprehension is assessed through observations. Especially in very basal areas it might be difficult to distinguish whether a person is responding to speech or to other things in their environment.

2.2.7 Understands their own name
Estimate whether the person understands their own name, that is, if the person reacts to it in some way.

Practical suggestion
If you are not sure, vary the way you speak to the person (e.g. from the front, from the side). Observe whether the person reacts in any way. This can be something very small (e.g. changing facial expressions).

2.2.8 Understands words that designate people
Estimate the extent to which the person understands names that designate other people.

Practical suggestion
In order to see the extent to which the person understands names as designations for other people, natural situations should be used. It is important that the people involved are well-known. In a group with more than one person, you could try to trigger a reaction by saying a person's name, "Lisa", or with a prompt, "Look what Lisa's doing". If the person looks in the direction of the named person, this means that they understand the spoken name as a designation for the person. Pay attention to even the smallest responses, e.g. moving the pupils towards the person named if looking in that direction is not possible due to motor impairments.

2.2.9 Understands words that designate objects
Estimate the extent to which the person understands words that designate objects.

Practical suggestion
Work with simple terms. You could, for example, confront the person with two objects that play an important role in the person's everyday life, such as a ball and a plate. Place the objects at a clear distance in front of the person. Name an object or ask the person to look in the direction of the object. If the person looks in the direction of the object mentioned, it is to be assumed that they understand the term as a name for the object. Pay attention to even the smallest responses, e.g. moving the pupils towards the object named, if looking in that direction might not be possible due to motor impairments.

2.2.10 Understands words that designate actions
Estimate the extent to which the person understands words that designate simple actions (e.g. walk, sit, shop, etc.).

2.2.11 Understands words that designate properties of people or objects

Estimate the extent to which the person understands words that designate properties of people or objects (e.g. large, small, young, old, blue, yellow, red, etc.).

Practical suggestion

Work with simple terms for properties. You could, for example, confront the person with two objects that play an important role in the person's everyday life (e.g. two toy blocks) and that differ in a specific property (e.g. size or color). Place the objects at a clear distance in front of the person. Name the property and object, then ask the person to look in the appropriate direction or give you the object ("Give me the yellow block"). Pay attention to even the smallest response, e.g. moving the pupils towards the object named, if looking in that direction might not be possible due to motor impairments.

2.2.12 Understands simple prompts

A simple prompt consists of an action involving a person or an object. Estimate the extent to which the person understands a prompt and then also wants to implement it. It is not decisive whether the person can actually do it themselves, but merely that they have understood the prompt.

Practical suggestion

Simple prompts (e.g. "Give me the pen" or "Give Adriana the pen") are needed to test this competency. Observe whether the person understands such utterances. There are various things to consider. What matters is understanding, not carrying out the action. It may be that the person understands what you want but does not want to do it. Therefore, you should use different prompts in different situations. The second possibility is that the person is unable to carry out the prompt due to motor skills. In this case, you should pay close attention whether the person at least tries to comply with the prompt, for example, by pointing to the pen, and then to Adriana.

2.2.13 Understands pronouns (I, he, she, mine, yours...)

Estimate the extent to which the person understands the meaning of pronouns as substitutes for people or objects and, for example, understands the difference between "yours" and "mine".

2.2.14 Understands causal connections (if-then)

Assess the extent to which the person can understand causal connections; for example, showing that they are aware of the explained consequences, for example by doing something that is the basis for a reward.

Practical suggestion

Possible sentences for checking understanding of causal relationships could link a positive event to a requirement (e.g. "If you help me clear up, we'll go to the cinema tonight" or "If it doesn't rain, we'll go to the outdoor pool today"). Ideally, you should be able to tell from the person's reaction if they have understood the relationship.

2.3 Interaction

The questions about *interaction* are divided into two areas. Under the heading *Conversation*, there are questions about the person's competencies in the context of situations that involve interacting with other people. The second part covers situations. The aim is to assess in what kind of situations communication works. This enables a differentiated picture of the person's communicative abilities depending on their social setting.

Conversation

2.3.1 Can focus their attention on a person or object
Is the person able to focus their attention on a specific person, event, or object?

Practical suggestion *Observe the person when the door is opened and someone enters the room or when something happens in the immediate environment. Does the person look in the appropriate direction?*

2.3.2 Can divide attention between people/objects
Can the person focus their attention on several things, for example, by pointing to an object and looking towards the caregiver at the same time?

2.3.3 Can start a conversation with someone of their own initiative
Is the person able draw attention to themselves in order to start a conversation with you or others?

2.3.4 Can maintain a conversation (switching between speaking and listening roles)
Can the person hold a longer conversation by actively bringing up further questions to discuss or encourage the other person to continue a story, for example by using polite set phrases (e.g. "that's interesting").

2.3.5 Can point out misunderstandings and breakdowns in the conversation
If misunderstandings arise in a conversation, it is important to make this clear to the communicative partner. Is the person able to deal with such misunderstandings? Can the person express that you or any other communicative partner has not properly understood anything?

2.3.6 Can end a conversation
Is the person able to make clear that a conversation has ended by saying goodbye to the other person with appropriate gestures, manual signs, or set phrases?

Situation

This section assesses characteristics a situation must have for the person in order to succeed in communicating. In this context, successful communication means that the person manages to fulfil their personal intentions in given situations and thus achieves their goals.

2.3.7 Can make themselves understood to well-known people

Is the person able to make their intentions or communicative goals understood in situations with people who are familiar to them?

2.3.8 Can make themselves understood to unfamiliar people

Is the person able to make their intentions or communicative goals understood in situations with people who are unfamiliar to them?

2.3.9 Can communicate in a one-to-one situation

Does the person have the ability to convey their communicative intentions or goals in one-to-one situations?

2.3.10 Can communicate in a group situation

Is the person able to implement their intentions or goals in communication situations involving several people in a group?

2.3.11 Can communicate in familiar situations

Can the person intelligibly communicate their intentions and goals to another person in familiar situations (e.g. lunch)?

2.3.12 Can communicate in unfamiliar situations

Is the person able to intelligibly communicate their intentions and goals to another person in unfamiliar situations, meaning situations that the person has never or rarely experienced before?

2.3.13 Can communicate within structured situations

Is the person able to fulfil their intentions or communicative goals in situations that are clearly structured and follow a script defined by social conventions (e.g. buying a bun in a bakery)?

2.3.14 Can communicate in unstructured situations

Is the person able to fulfil their intentions or communicative goals in situations that are relatively unstructured, and therefore do not follow a specific script based on conventions? In such situations, the person might be required to deviates from familiar structures to achieve their communicative goal (for example, asking for directions in a shop rather than buying something). Accordingly, the goal of the communication will be less clear to the other person.

Module 3: Perception

The Perception module focuses on the areas of perception that are important for communication and interaction: hearing and sight. Identifying possible impairments in these areas is important for interpreting a person's communicative competencies, as well as for developing concepts enhancing the person’s communication.

General perception

Handicaps or impairments in the areas of hearing and sight are first identified using yes/no questions. If one or both questions get answered with *Yes*, the respective impairments should be specified more precisely.

3.1 Can hear with no impairments

3.2 Can see with no impairments

Specific perceptual competencies

This section examines specific perceptual competencies that are important for communication situations. The assessment is based on the four point scale previously described.

3.3 Can fix their gaze on objects or persons
Is the person able to fix their gaze on immovable objects?

3.4 Can track people or moving objects with their eyes
Is the person able to track moving objects (e.g. a moving car or a cat walking by)?

3.5 Can recognize real people and objects
Does the person recognize people or objects in their vicinity?

3.6 Can make out real objects from a larger set
Is the person able to make out a specific object (e.g. pen) from a larger set of objects?

3.7 Can recognize people and objects in photos
Does the person recognize photographs of people or objects?

3.8 Can make out an object from several on a photo
Is the person able to distinguish objects on a photograph?

3.9 Can recognize shapes
Does the person recognize basic shapes (e.g. circle, triangle, square) with a one-to-one mapping?

3.10 Can make out a shape from several/distinguish shapes
Can the person make out a specific shape (e.g. circle) from a set of different shapes?

3.11 Can recognize pictorial symbols
Does the person recognize pictorial representations of objects from a specific symbol collection?

3.12 Can make out one pictorial symbol from several
Is the person able to make out a specific given pictorial symbol from a set of other symbols?

Module 4: Orientation

In addition to perception (module 3), spatial and temporal orientation is important for participating in communicative situations. This module is intended to assess both based on the four point scale previously described.

Spatial orientation

Spatial orientation is important to draw a communication partner's attention to an object or to request an object that is not in one's field of vision (cf. module 1.1 or 1.3). For prompting it is also important to know the extent to which a person can create corresponding spatial relationships and understand them conceptually (cf. module 2.2).

4.1 Can distinguish between right and left

4.2 Can distinguish between front and back

4.3 Can distinguish between up and down

4.4 Can understand spatial relationships (on, under, in front of, behind, between)
When it comes to spatial relationships, what matters is not just the differentiation of directions, but also whether the person understands the concept that something can be on, under, or in between something.

Temporal orientation

Temporal orientation is important when talking about the past or future (see e.g. module 1.3). It is also necessary for structuring and planning activities and communicating schedules

4.5 Can understand very short temporal relationships (later, soon, etc.)

4.6 Can understand longer temporal relationships (yesterday, tomorrow, etc.)

4.7 Can understand long temporal relationships (at the time, next year, etc.)

Module 5: Motor skills

The motor skills section assesses all motor skills that might be important in the context of aided communication systems. There is a particular focus on skills necessary for controlling and operating low and high-tech communication aids.

5.1 Can move around independently
For using aided forms of communication, it is important to know whether the person can reach certain places independently, e.g. to get objects or other communication aids. Therefore, the question is whether the individual can move around independently? This might also be carried out using mobility aids (e.g. electric wheelchairs). The decisive criterion is autonomy.

5.2 Can point accurately
For decision-making or other utterances using communication boards or speech-generating devices, it is important to be able to point to something accurately. Is the person able to point at one object or symbol out of a selection of at least two?

5.3 Can purposefully grasp an object
Can the person purposefully grasp an object (e.g. cup or ball)?

5.4 Can grasp with a pincer grip
Can the person grasp smaller objects with a pincer grip?

5.5 Can move at least one arm beyond the center of their body

5.6 Can move at least one leg beyond the center of their body
It is essential to determine the mobility of the person to make sure, that he or she can reach the entire surface of their communication aid.

Practical suggestion
Create a situation where the person has two choose between two items (one that the person likes (e.g. a certain toy or sweet) and one object that you are sure the person dislikes). Place the item the person likes so that they must move their arm or leg beyond the center of their body to get it.

5.7 Can hold an object
If the person is able to grasp an object, are they also able to hold it for a while?

5.8 Can use a pen
Can the person use a normal pen for writing or drawing?

5.9 Can press a switch
Is the person able to press a switch (e.g. BIGmack communicator)?

5.10 Can trigger switches using motor activity (blinking, muscle contraction, pressing, …)
Can the person deliberately trigger a switch? If so, what kind of switch is triggered and how?

5.11 Can activate several switches in a coordinated manner
In order to control complex communication aids, it may be necessary to activate several switches in a coordinated manner to select a specific symbol or letter. Coordinated means that the person can operate two switches if they fulfil different functions (e.g. one switch selects a different field/line, the second switch triggers an action).

5.12 Can move their head in a controlled manner
Can the person move their head in a controlled manner, so that, for example, a fixed switch can be triggered?

5.13 Can purposefully look in a direction
It is necessary to look purposefully in one direction to control digital speech-generating devices by eye tracking. Is the person able to do this?

5.14 Can fix their gaze
It is necessary to fix one's gaze on a point for a certain amount of time in order to control digital speech-generating devices by eye tracking. Is the person able to do this?

Analysis

Structure of the analysis

The assessments can be analyzed, and results can be compared using an Excel file. You can download it free of charge at www.ocs-r.com. At the bottom of the screen the user interface is subdivided into three areas:

(1) **Entering the basic data**

BASIC DATA

(2) **Transferring the data from the completed questionnaires (MODULE 1 – MODULE 5)**

MODULE 1.1 & 1.2 | MODULE 1.3 & 1.4 | MODULE 1.5 & 1.6

MODULE 2.1 | MODULE 2.2 | MODUL 2.3 | MODULE 3 | MODULE 4 | MODULE 5

(3) **Analyses**

OVERALL ANALYSIS | RADAR CHART (MODULE 1) | RADAR CHART (MODULE 2-5) | AGREEMENT

To facilitate orientation, the colors of the Excel worksheets match the colors of the modules from the questionnaire.

Entering the basic data

A maximum of four different perspectives can be compared using the Excel file. In principle, each module can be filled out and analyzed separately from all the others. First, enter the surname, first name, age, and attended institution of the person to be assessed into the ***Basic data*** worksheet. Secondly, enter the names and roles of the people who completed the questionnaire. Enter these in columns B12 to B15 (cf. Figure 1).

	A	B	C
1	Basic Data		
2		**Last name**	Maier
3		**First name**	Lisa
4			
5		**Age**	7;11
6			Years; Months
7			
8		**Institution currently visited**	Heartfield School
9			
10			
11		**Name / Role of observer**	
12		1 Ms Elmas (teacher)	
13		2 Ms Maier (parent)	
14		3 Mr Lau (school assistent)	
15		4 Ms Wagner (speech-language pathologist)	

Figure 1 Worksheet for entering the basic data (case example Lisa)

All information is automatically transferred to all worksheets and analyses (cf. Figure 2).

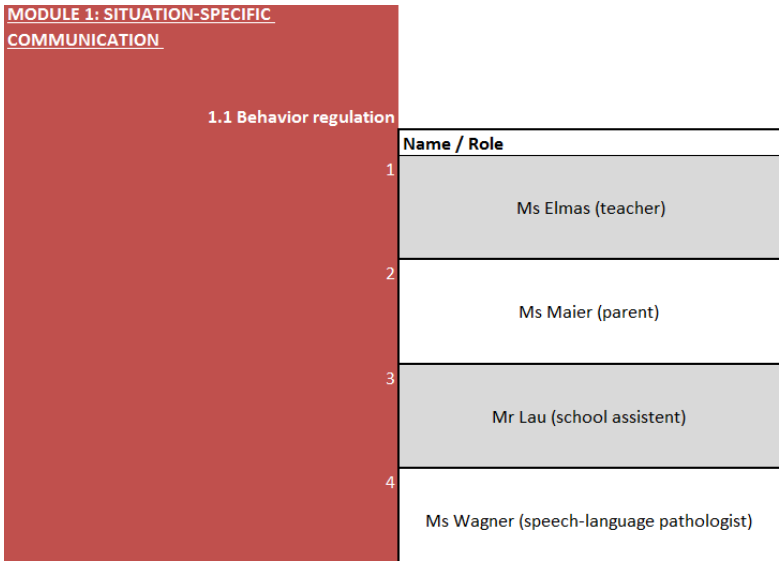


Figure 2 Worksheet for module 1 with automatically transferred names

With these steps, the entering of the basic data is completed. You can now begin to transfer the answers from the questionnaire.

Transferring the data from the questionnaire

In order to transfer the data from the completed questionnaires, it is necessary to convert the responses into numbers and enter these into the worksheets.
The following rules apply to the modules:

- *"Never" or "No" correspond to 1*
- *"Rarely" corresponds to 2*
- *"Frequently" corresponds to 3*
- *"Always" or "Yes" correspond to 4*

The numbers above the columns indicate the respective question number in the questionnaire. Click the blank column under the relevant question number (eg. 2.2.2) in the row of the person who filled out the questionnaire (e.g. Ms Elmas) and enter the appropriate number (1-4). Figure 3 shows a completed worksheet for module 2.2 filled out as an example.

A	B	C	D	E	F	G	H	I
MODULE 2.2 SIGNAL PERCEPTION		never=1	rarely=2	frequently=3	always=4			
Ways of perceiving information								
	Name / Role	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	
1	Ms Elmas (teacher)	3	2	3	3	4	1	
2	Ms Maier (parent)	3	2	4	3	4	1	
3	Mr Lau (school assistent)	3	2	3	3	3	1	
4	Ms Wagner (speech-language pathologist)	3	2	3	3	3	1	
Speech comprehension								
	Name / Role	2.2.7	2.2.8	2.2.9	2.2.10	2.2.11	2.2.12	2.2.13
1	Ms Elmas (teacher)	4	3	3	3	3	2	2
2	Ms Maier (parent)	4	4	4	3	3	2	2
3	Mr Lau (school assistent)	4	3	3	3	3	2	2
4	Ms Wagner (speech-language pathologist)	4	3	3	3	3	2	2

Figure 3 Example of a completed module

Module 1 of the questionnaire asks about communicative competencies in given situations. For this purpose, each observer fills in a form of expression in the questionnaire and rates how reliable the person can use this form of expression. These data must also be transferred to the Excel worksheet. First, the form of expression is selected from a drop-down list. To do this, click in an empty field (for example in C6) and an arrow will appear. When you click the arrow, there will be nine different options available to choose from. Transfer the form of expression indicated in the questionnaire by clicking the corresponding term (in our example, spoken language (cf. Figure 4)).

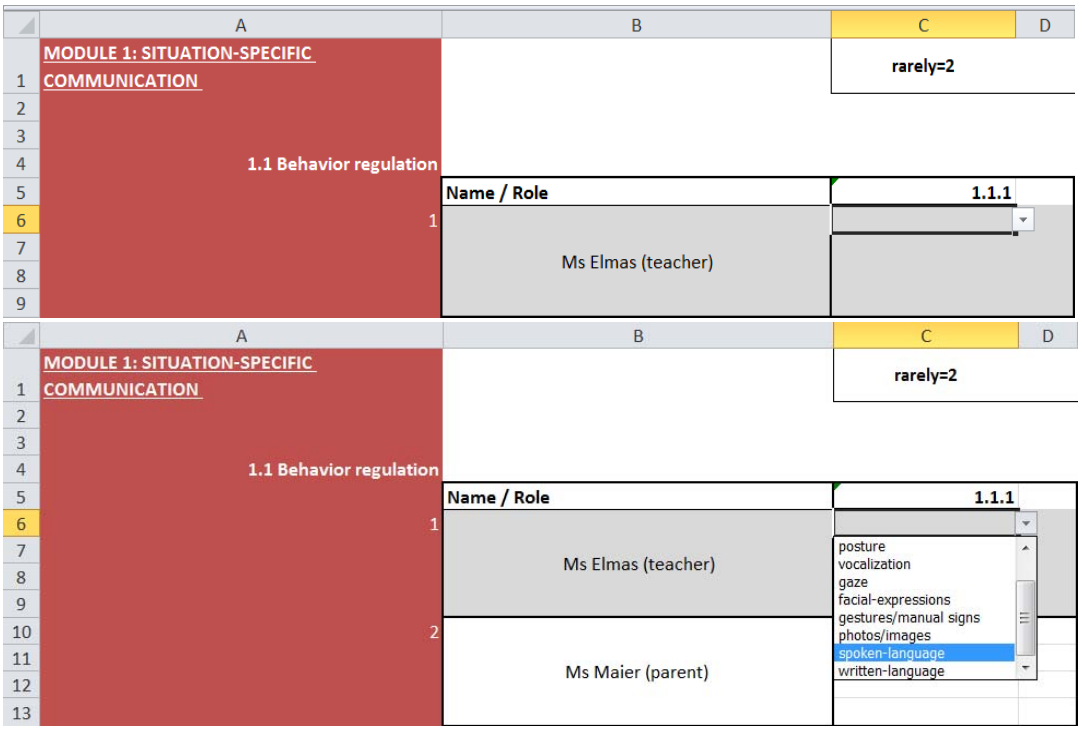


Figure 4 Transfer of data from the questionnaire to the Excel worksheet in module 1

After you have entered the form of expression, you need to specify how reliably it is used. The options to choose from are:

- "*Rarely*" corresponding to 2,
- "*Frequently*" (corresponding to 3), and
- "*Always*" (corresponding to 4).

To enter the value, simply click in the field to the right of the form of expression (in our example D6) and type the corresponding number (cf. Figure 5).

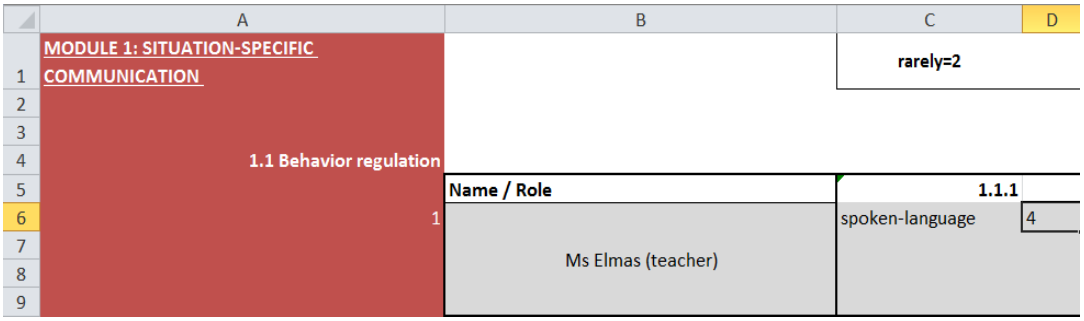
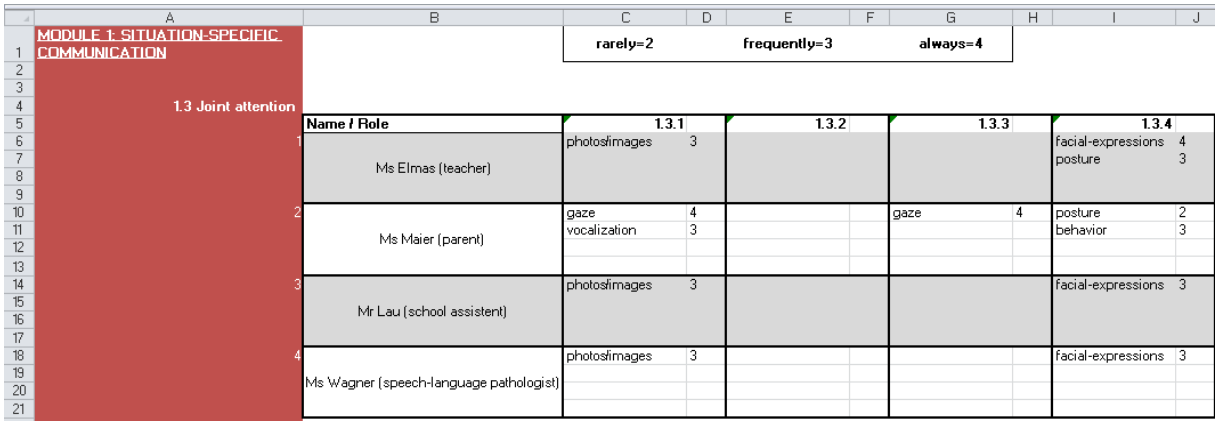


Figure 5 Transfer of data from the questionnaire to the Excel worksheet using the example of module 2

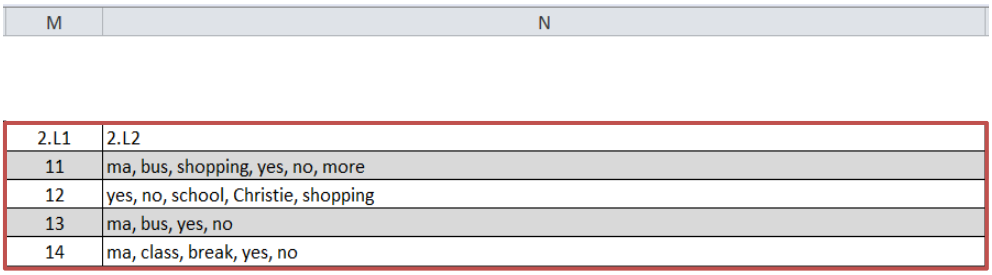
The following figure shows an example of the completed Excel worksheet for module 1 after transferring the data from the questionnaires (cf. Figure 6). It is possible that individual people will not have made any entries in certain sections.



	A	B	C	D	E	F	G	H	I	J
1	MODULE 1: SITUATION-SPECIFIC COMMUNICATION		rarely=2		frequently=3		always=4			
2										
3										
4	1.3 Joint attention									
5		Name / Role	1.3.1		1.3.2		1.3.3		1.3.4	
6	1	Ms Elmas (teacher)	photos/images	3					facial-expressions	4
7									posture	3
8										
9										
10	2	Ms Maier (parent)	gaze	4			gaze	4	posture	2
11			vocalization	3					behavior	3
12										
13										
14	3	Mr Lau (school assistent)	photos/images	3					facial-expressions	3
15										
16										
17										
18	4	Ms Wagner (speech-language pathologist)	photos/images	3					facial-expressions	3
19										
20										
21										

Figure 6 Completed module 1.3 as an example

You can now simply transfer all other values from modules 2 to 5 into the Excel worksheet. For some questions in module 2 (e.g. 2.L1 or 2.L2), numbers or words are listed. These can be transferred one-to-one into the analysis (columns M and N in module 2.1) (cf. Figure 7).



M	N
2.L1	2.L2
11	ma, bus, shopping, yes, no, more
12	yes, no, school, Christie, shopping
13	ma, bus, yes, no
14	ma, class, break, yes, no

Figure 7 Transfer of the number of words and the most frequently used words (module 2.1)

Results, analysis, interpretation

The questionnaires are analyzed automatically after entering the data. All data is summarized in the area “overall analysis“. In addition, the Excel file automatically generates a radar chart of the numerical values and calculates the agreement between the observers.[1]

[1] Arithmetic mean and percentage of agreement are used as specific values

Overall analysis

The overall analysis provides an overview of any of the assessments (cf. Figure 8). This table of results, like all other tables and graphics, can be exported or printed using the Excel print function.

	A	B	C
4	**Results from:**	**Ms Elmas (teacher)**	
5			
6	**1. Situation-specific communication**		
7		**Form of communication**	Mean (total)
8	1.1 Behavior regulation	photos/images	2,50
9	1.2 Social interaction and communication	vocalization	2,22
10	1.3 Joint attention	facial-expressions	2,25
11	1.4 Emotions	facial-expressions	2,40
12	1.5 Needs	photos/images	2,20
13	1.6 Decisions	photos/images	3,33
14			
15	**2.1 Signal production**	Photos/images	2,83
16	Vocabulary spoken language:	11	
17	Most frequently spoken words:	ma, bus, shopping, yes, no more	
18	Vocabulary gestures:	1	
19	Most frequently used gestures:		
20	Vocabulary photos/images:	21	
21	Most frequently used photos/images:	yes, no, school, break, shopping, bus, ma, pa, hungry, thirsty	
22	Vocabulary written language:	5	
23	Most frequently used written words:		
24	**2.2 Signal perception (Speech comprehension)**		2,75
25	Most frequently used forms:	situations, photographs, pictorial-symbols, spoken-language	
26	**2.3 Interaction**		2,64
27	Succeeds with familiar people:	yes	
28	Succeeds with unfamiliar people:	no	
29	Communication succeeds frequently in:	one-to-one, group, familiar, structured, unstructured situations	
30	Communication does not succeed (confidently) in:	unfamiliar situations	
31			
32	**3. Perception**		2,90
33	Hearing impairment:	no	
34	Visual impairment:	no	
35	**4. Orientation**		1,75
36	**5. Motor skills**		2,71

Figure 8 Table of results, based on the perspective of the class teacher Ms. Elmas

Subsequently all sections of the overall-analysis are described and the meaning of each value gets explained.

Module 1: Situation-specific communication

The top section of the overall analysis (1. Communication skills) refers to module 1 *Situation-specific communication*. For each sub-module (1.1 to 1.6) the table states two things: First, what is the most important form of expression the person uses, as estimated by the observer, and, second, how reliably the person can express themselves in the area as a whole (cf. Figure 9).

	A	B	C
4	**Results from:**	**Ms Elmas (teacher)**	
5			
6	**1. Situation-specific communication**		
7		**Form of communication**	Mean (total)
8	1.1 Behavior regulation	photos/images	2,50
9	1.2 Social interaction and communication	vocalization	2,22
10	1.3 Joint attention	facial-expressions	2,25
11	1.4 Emotions	facial-expressions	2,40
12	1.5 Needs	photos/images	2,20
13	1.6 Decisions	photos/images	3,33

Figure 9 Overview of the results for module 1 from the perspective of the class teacher Ms. Elmas

In our example, the class teacher Ms. Elmas assesses "photos/images" to be the most important form of expression for Lisa to carry out behavior regulation (see section *1.1 Behavior regulation* (B8 - red

outline)). The overall mean is 2.5 (C8 - orange outline), which is in the lower range. So, according to Ms. Elmas, Lisa has few reliable forms of expression for the *behavior regulation*.

Name / Role	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6
Ms Elmas (teacher)	spoken-language 4 vocalization 3 photos/images 4	photos/images 2	spoken-language 3 photos/images 2		facial-expressions 4 photos/images 2	

Figure 10 Data transferred to the Excel worksheet for module 1.1 by Ms. Elmas

The most important form of expression is determined by the highest total value. In this example, "photos/images" reach a total of 10 (4+2+2+2). Although there are some more reliable forms for individual aspects (spoken language for 1.1.3, facial expressions for 1.1.5), "photos/images" are most important overall. In some sections (1.1.2), they are even the only form of expression.

The overall mean in the analysis is obtained by adding up the highest values for the individual sections (in the example - 4 for 1.1.1 (spoken language and photos/images), 2 for 1.1.2 (photos/images), and 3 for 1.1.3 (spoken language), 1[2] for 1.1.4 (no observed form of expression), 4 for 1.1.5 (facial expressions), 1 for 1.1.6 (no observed form of expression); total 15)) and dividing this by the number of questions in the respective sub-module (here 6) (cf. Figure 10). A high mean indicates that there are reliable forms of expression available for the entire section, in this case *behavior regulation*. Accordingly, a low mean indicates that not all aspects of the section can be expressed reliably.

Module 2: Basic communication skills

Module 2 is divided into *2.1 Signal production*, *2.2 Signal perception*, and *2.3 Interaction*. The overall analysis is structured accordingly (cf. Figure 11).

2.1 Signal production	Photos/images	2,83
Vocabulary spoken language:	11	
Most frequently spoken words:	ma, bus, shopping, yes, no, more	
Vocabulary gestures:	1	
Most frequently used gestures:		
Vocabulary photos/images:	21	
Most frequently used photos/images:	yes, no, school, break, shopping, bus, ma, pa, hungry, thirsty	
Vocabulary written language:	5	
Most frequently used written words:		
2.2 Signal perception (Speech comprehension)		2,75
Most frequently used forms:	situations, photographs, pictorial-symbols, spoken-language	
2.3 Interaction		2,64
Succeeds with familiar people:	yes	
Succeeds with unfamiliar people:	no	
Communication succeeds frequently in:	one-to-one, group, familiar, structured, unstructured situations	
Communication does not succeed (confidently) in:	unfamiliar situations	

Figure 11 Overview of the results for module 2 from the perspective of the class teacher Ms. Elmas

Section 2.1 shows the most reliable form of expression, meaning the one that achieved the highest mean value (in this case, 2.83) for the corresponding questions in the OCS-R. A high value in this section indicates that the person can competently use this form of communication. In addition, this section of results also specifies how extensive the vocabulary for a certain form of expression is. In our example, the class teacher Ms. Elmas estimated that the active vocabulary includes about 11 words and that, according to her observation, the most important words for Lisa are "ma", "bus", "shopping", "yes", "no", and "more". Analogous information is given for other forms of expression (cf. Figure 12).

[2] No values have been entered in 1.1.4 and 1.1.6. If this is the case “1” (for “never” see section scale) is used for the calculation of the mean.

2.1 Signal production	Photos/images	2,83
Vocabulary spoken language:	11	
Most frequently spoken words:	ma, bus, shopping, yes, no, more	
Vocabulary gestures:	1	
Most frequently used gestures:		
Vocabulary photos/images:	21	
Most frequently used photos/images:	yes, no, school, break, shopping, bus, ma, pa, hungry, thirsty	
Vocabulary written language:	5	
Most frequently used written words:		

Figure 12 Overview of the results for module 2.1

The results from *module 2.2 Signal perception* are summarized in Section 2.2. The mean value here indicates competencies in speech comprehension (questions 2.2.7 to 2.2.13). The higher the value (in this case, 2.75), the higher the person's speech comprehension according to the assessment of the observer (cf. Figure 13).

2.2 Signal perception (Speech comprehension)		2,75
Most frequently used forms:	situations, photographs, pictorial-symbols, spoken-language	

Figure 13 Overview of the results for module 2.2

Next, the most frequently used ways of signal perception are shown, according to the observer[3]. Section 2.3 summarizes the data from *module 2.3 Interaction*. The mean indicates how competent the person is in interactions regarding conversational competencies and different situations. The higher the value, the better the person can deal with a wide range of different types of communicative settings and conversations. In our example, Mr. Elmas assesses the pupil Lisa with a mean of 2.64 (cf. Figure 14).

2.3 Interaction		2,64
Succeeds with familiar people:	yes	
Succeeds with unfamiliar people:	no	
Communication succeeds frequently in:	one-to-one, group, familiar, structured, unstructured situations	
Communication does not succeed (confidently) in:	unfamiliar situations	

Figure 14 Overview of the results for module 2.3

The section below refers to the character that interactions must have so that the person can handle them reliably. Figure 14 shows that, according to the assessment of the class teacher, Ms. Elmas, Lisa is able to interact under various conditions. She only finds it difficult to interact with unfamiliar people, and in unfamiliar situations.

Modules 3-5: Perception, Orientation, and Motor skills

The analysis of the additional modules 3 to 5 is similar to the previous sections. The values given are the mean of all answers to the questions in each of the respective section[4]. High mean values indicate a reliable competency.

3. Perception		2,90
Hearing impairment:	no	
Visual impairment:	no	
4. Orientation		1,75
5. Motor skills		2,71

Figure 15 Overview of the results for modules 3 to 5

[3] The Excel worksheet considers values equal or greater 3 concerning questions 2.2.1 to 2.2.6

[4] 3.1 and 3.2 are excluded because only „yes" and "no" are used as possible answers

In our example, according to the assessment of the class teacher, there is no hearing or seeing impairment. Moreover, according to her observations in the area of perception and motor skills, Lisa has some reliable competencies, but the value in module 4 Orientation is lower. Therefore, according to the assessment of the class teacher, Lisa has less reliable abilities here (cf. Figure 15).

Radar charts

The analysis includes two radar charts. Each summarizes the means of the overall analysis. The charts visualize the assessments of each individual observer at a glance. The used colors match the colors of the observers in the overall analysis (Ms. Elmas blue, Ms. Maier red, etc.).

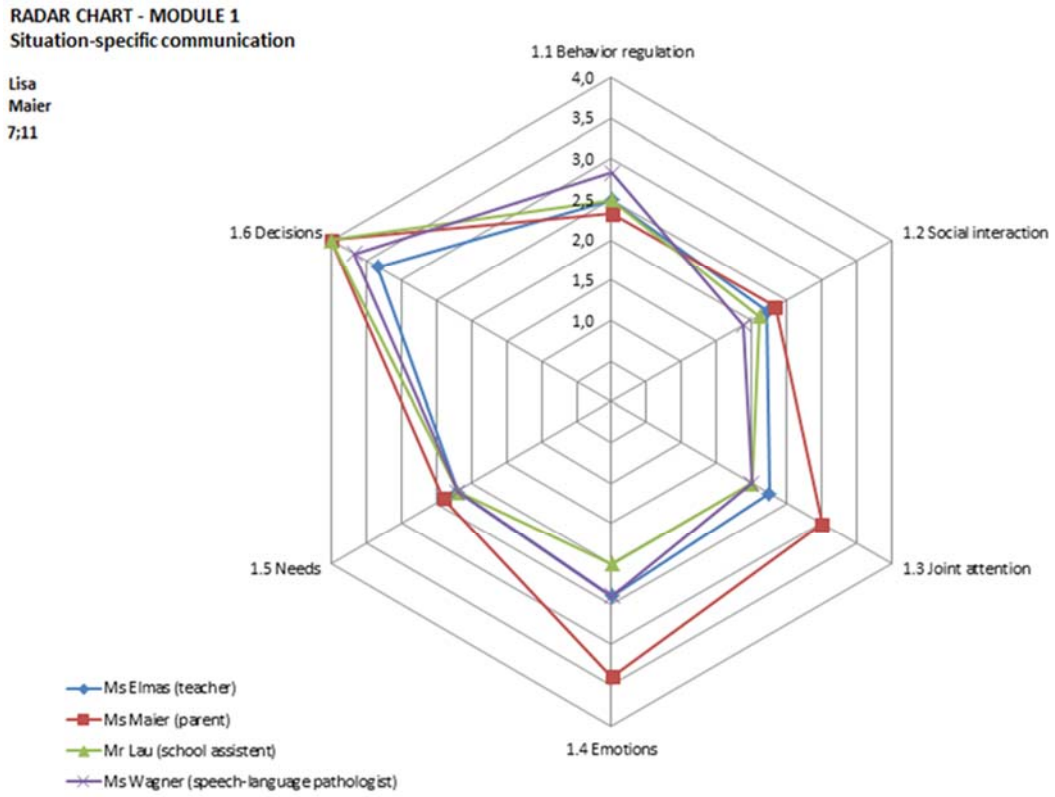


Figure 16 Radar chart for the example of Lisa Maier as a summary of the results for module 1. The basis for the radar charts are the overall means in the respective sub-sections (1.1 to 1.6). These are indicated in the overall analysis (cf. Figure 9).

The first radar chart displays how reliable the person can express different concerns to other people, assessed from the observers' perspective. Different assessments indicated by different mean values can thus be identified relatively easily. The chart in our example (cf. Figure 16) shows a broad agreement between the observers in the assessment of ***Situation-specific communication***. Greater differences in the assessments of Lisa Maier's competencies are only apparent in the areas of ***Joint attention*** and ***Emotions*** (cf. Figure 16). The mother assesses the available means of expression as being somewhat more reliable.

The second radar chart summarizes the means for modules 2 to 5 from the overall analysis. In section 2.1, the mean refers to the most competent form of expression. This is specified for each observer in the overall analysis (cf. also Figure 12).

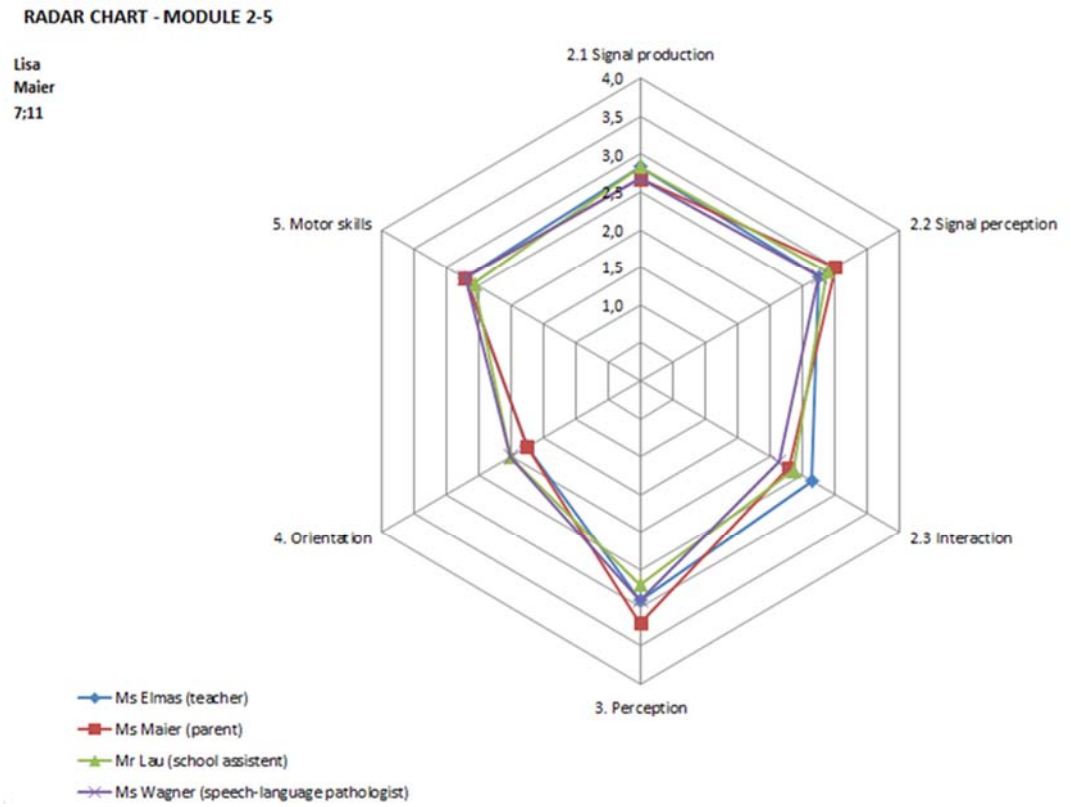


Figure 17 Radar chart for the example of Lisa Maier as a summary of the results for modules 2-5. The basis for the radar chart are the means in the respective sub-sections, which are also stated in the overall analysis for each observer (cf. Figure 8).

Our example shows relative consensus with regard to the average competencies in the respective areas (cf. Figure 17).

Visualization of interrater agreement

The last Excel worksheet analyzes the percentage of agreement between the observers for the modules 2 to 5. For this, the table shows the percentage of answers that do match exactly. Congruencies over 75% are colored green, congruencies between 75% and 50% yellow, and below 50% red. So, a percentage highlighted in red indicates that the two observers have disagreed in more than half of the questions in this section.

To measure the overall agreement, the percentages of agreement for all sub-modules are added up and then divided by the total number of modules (cf. Figure 18).

Lisa Maier - 7;11

Name / Role	
Ms Elmas (teacher)	1
Ms Maier (parent)	2
Mr Lau (school assistant)	3
Ms Wagner (speech-language pathologist)	4

Consent between the observers

		1 and 2	1 and 3	1 and 4	2 and 3	2 and 4	3 and 4
Module 2.1 Signal production	Number of equal responses	28	30	29	28	29	29
	Percentage of agreement	93%	100%	97%	93%	97%	97%
Module 2.2 Signal perception	Number of equal responses	11	12	13	9	10	13
	Percentage of agreement	79%	86%	93%	64%	71%	93%
Module 2.3 Interaction	Number of equal responses	11	8	10	11	12	9
	Percentage of agreement	79%	57%	71%	79%	86%	64%
	PERCENTAGE OF AGREEMENT (Module 2)	83%	81%	87%	79%	85%	85%
Module 3 Perception	Number of equal responses	7	8	10	5	7	8
	Percentage of agreement	70%	80%	100%	50%	70%	80%
Module 4 Orientation	Number of equal responses	7	6	6	6	6	5
	Percentage of agreement	100%	86%	86%	86%	86%	71%
Module 5 Motor skills	Number of equal responses	14	10	14	10	14	10
	Percentage of agreement	100%	71%	100%	71%	100%	71%
	TOTAL PERCENTAGE OF AGREEMENT	87%	80%	91%	74%	85%	79%
		1 and 2	1 and 3	1 and 4	2 and 3	2 and 4	3 and 4

Figure 18 Calculation of the percentage of interrater agreement for modules 2 to 5

In our example, you can see that the observers' results are consistent in many areas. The biggest differences can be found between observer 2 (Ms. Maier) and observer 3 (Mr. Lau). So, their assessments differ, especially in the modules 2.2, 3, and 5.

Application, interpretation, and support

The application of the OCS-R

In general, we recommend that the OCS-R gets applied by several people. One of them should coordinate the observers and the diagnostic process and later fill out and compile the analyses. Ideally, a joint meeting would take place before the observations are carried out, in which the coordinating person explains the structure and application of the OCS-R. At the same time, this first meeting offers the opportunity to determine, which individual modules should be carried out. Working through all modules at once is not recommended due to the broad scope of the OCS-R; it might also negatively affect the accuracy of the assessments made.

Interpretation and implications for support

Three scenarios are conceivable as an OCS-R-result for each of the sections.

1. All observers agree on the person's behaviors and competencies. The means in the section are high.
2. All observers agree on the person's behavior and competencies. The means in the section are low.
3. The observers do not agree on the person's behavior and competencies. The means in individual sections are high for some observers, low for other observers.

It is quite realistic that all three scenarios occur in different sections of the analysis regarding one person. Below we discuss consequences for each scenario on the basis of examples, taken from the main modules 1 and 2.

The concept of "agreement"

In the analysis, the percentage of agreement between different observers can be identified from the chart in the "Agreement" tab (cf. Chapter on the Visualization of interrater agreement). In each module percentages of agreement highlighted in green show that two observers gave the exact same responses to at least 75% of the questions. If the agreement ranges between 50% and 74%, the values are highlighted in yellow. Red means that the same response was given to less than 50% of the questions in this section.

The means visualized in the radar charts also indicate the extent to which observers agree on the person's competencies. If the means do not differ much, the observers made a quite similar assessment of all competencies and conditions in this section. In the following radar chart (cf. Figure 19), the observers are relatively unanimously in the areas of *Decisions*, *Behavior regulation*, *Social interaction*, and *Needs*. There are differences between Ms. Maier and the other observers regarding *Joint attention* and *Emotions*.

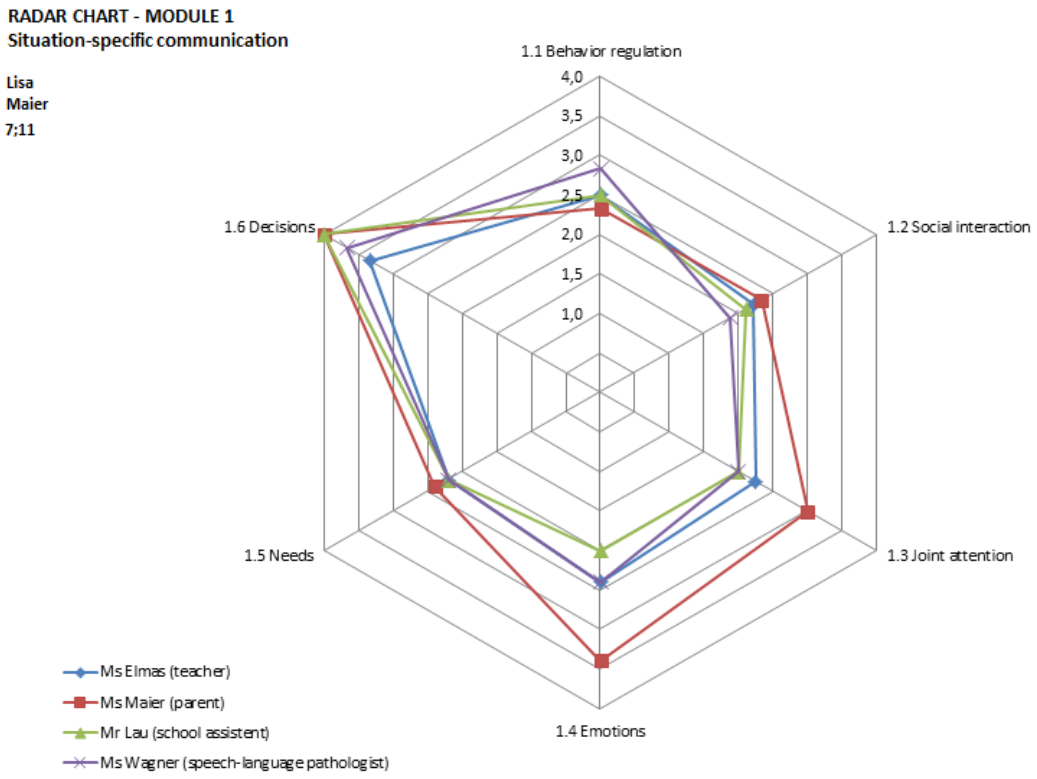


Figure 19 Example of radar chart – High interrater agreement and deviations

Scenario 1 – High interrater agreement with high values in all sections

In this scenario, the observers give similar assessments of the person's competencies to a large extent, with the values lying in the higher range, i.e. between 3 and 4. Thus, the think that the person has a broad range of communicative competencies. In this case, support could aim for expanding their forms of expression. For example, the assessed person might be very competent in the use of gestures and manual signs and thus able to communicate very reliably in all assessed situations.

In this case, it might be useful to expand the person's individual communicative capabilities with additional forms of communication so that they can also communicate reliably with unfamiliar people. A second objective could be to work on the individual items where the observers do think the person has no reliable forms of communication or competencies, as indicated by the responses "rarely" or "never". One consequence could be to support these aspects or to explicitly pay attention, whether the competency is actually unobservable in everyday life. In some circumstances, a low value in the area is not due to the person's abilities, but to the observer's perceptions, or to the absence of situations in which such behavior can be shown at all.

Scenario 2 – High interrater agreement with low values in all sections

In this scenario, the observers give similar assessments of the person's competencies to a large extent, with the values lying in the lower range, i.e. between 1 and 2. This means that few reliable forms of expression are available to the person for many of the areas surveyed in the respective section. There can be various causes of this result. On the one hand, it may be that the observers are not sensitive enough with regard to the person's communication signals and thus do not perceive them as such.

Furthermore, it is also conceivable that the person actually does not have reliable ways of expressing their own communicative intentions in the situations covered by the sections, or that situations do not arise in which the person has to express their intentions.

In this case, it is important to regularly create a variety of situations that make it necessary to communicate intentionally. The practical suggestions in module 1 *Situation-specific communication* offer suggestions for different areas. At the same time, these recurring situations also create the opportunity for the caregivers to pay more deliberate attention to signals that may not have been perceived before, and thus become more sensitive to the person's expressive capabilities.

Scenario 3 – Low interrater agreement in individual sections

In the interrater agreement worksheet, disagreement between individual observers is indicated by areas highlighted in yellow or red. It can also be indicated by highly differing means in a radar chart (cf. emotions in Figure 20). There are many conceivable reasons for this. It is possible that individual observers interpreted questions differently than others. Another reason could be a varying sensitivity of the observers towards the person’s behavior. So, the person’s signals might not be noticed in some circumstances. It is also possible that the person did not carry out certain behaviors in the observed situation(s) to express themselves. Finally, the competencies shown by the person might actually differ within the settings observed or in regard to different communicative partners. Children and adolescents, for example, might likely be more motivated during leisure time or in their home environment and therefore communicate differently compared to school or residential home contexts.

When the observers made different assessments it is, first of all, important to address these together. Everyone should clarify what led to his or her assessment. Based on this, the observers can then aim for a mutual interpretation. This discussion can generate ideas for future support: For example, observed high competencies in the home environment could suggest how similar competencies could be encouraged at school. The discussion can also lead to an increased sensitivity towards the person's communicative signals in certain situations. Finally, the observers can also reflect upon how to shape situations that facilitate the expression of certain communicative intentions. Usual practice in certain situations might make the person more or less likely to express themselves. For example, if it is never necessary to refuse actions or objects during leisure time, then the behavior of expressing this can, therefore, not be shown.

Basic tips for supporting children, adolescents, and adults

The results and analyses of the OCS-R can indicate, how to support children, adolescents, and adults in many areas. In this regard, the practical suggestions in the first part of this manual can be used not just to determine the person's abilities, but also to facilitate communicative competencies. Thereby, objects that the person does and does not like play an important role. They can be used as a stimulus, aid, or motivation in interventions. It is crucial to ensure that such reinforcers and stimuli are appropriate, both to the situation and the person's age. Also objects and actions that the person does not like can play an important role. For example, in order to learn to discriminate between alternatives, it is necessary that the decision-making also contains items that the person does not like. A single choice between equally well-liked alternatives is not likely to facilitate an understanding of the concept of decision-making.

Construction of the instrument

Basic principles

The OCS-R is an observation-based tool for assessing the communicative competencies of children, adolescents, and adults. The assessment of competencies is based on long-term observations and focuses on communicative competencies in general and within specific situations. The diagnostic process and the analysis should be coordinated by a central expert (therapist, teacher). A final discussion with all "observers" to identify barriers, plan support measures, and modify existing processes is necessary.

Theoretical framework

Theoretically, the instrument is rooted within the constructivist epistemology of Glasersfeld (1995, 2007). In this view people do not perceive an objective reality, instead reality is highly subjective based on the individual construction of meaning within the brain. Referring to this it is not possible to objectively diagnose the competencies of a person based on observation. Diagnosis, therefore, has to take a look at subjective views as an important perspective besides traditional testing. Because of that, the OCS-R allows to compare different perspectives and perceptions of important persons in the individual`s social setting (e.g. teachers, parents, etc.) in order to identify and visualize agreement and differences in their views. The identification of similarities and differences in the perception of people or in varying contexts can then be used to systematically plan intervention.

History of the OCS-R

In 2005 the 'Beobachtungsbogen zu kommunikativen Fähigkeiten' [*Observation Questionnaire on Communicative Abilities*] (BKF) was developed as part of a collaborative project between the Ludwig-Maximilians University in Munich and the Bavarian State School for the Physically Disabled (Kannewischer & Wagner et al., 2005). The development of the instrument was based on the experience of practitioners and students, which where supervising and supporting the communicative competencies of children and adolescents at school for two years (cf. Wagner & Kannewischer et al., 2005).

The objective of the BKF was to capture individual competencies and personal requirements relevant to communication (Wagner & Kannewischer, 2007, p. 249). The questionnaire was divided into seven areas: motor skills, perception, speech, reading and writing, forms of communication, modalities of expression, and interactional behavior. A central element of the questionnaire was the idea to assess communicative competencies from the perspectives of different observers. The purpose was to uncover possible differences in the assessments of individual observers, as well as deviations in the communicative behavior of the person using AAC in different situations (Wagner & Kannewischer, 2007, p. 251 f.). This information could then be used for further interventions. Experience in working with the BKF, especially in the context of diagnostic processes, led to the revision of the instrument.

Revision

Experiences in using the BKF led to the following aspects, which needed to be revised:

1. Content, scope, and questionnaire design
The BKF was very extensive and, due to the way it had to be filled out, required lots of different responses by users. This meant that it was very time-consuming to fill out, even if only single sections were considered more closely. At the same time, content was redundant in a few places.

2. Manual and analysis
There was no manual with instructions on how to fill out the BFK, which made it difficult to apply it. In the digital version, the assessments were visualized with a profile line (cf. Wagner & Kannewischer, 2007). This made it easy to compare different viewpoints for each question. However, it was difficult to get an overview of all the questions.

Substantial revision

In revision, the aim was to retain the BKF's basic idea, while strengthening its theoretical foundation. It already focused on people's different perspectives. The intention was to make this even more prominent in the OCS-R by emphasizing its constructivist approach, highlighting the differences and similarities of individual perspectives of different observers in the analysis. Further, we decided to identify redundant content and made sure that individual questions fit in their respective sections. We reviewed all questions with the aim to reduce the overall scope and redundancies.

Structural Revision

The revision was meant to have a modularized structure, in order to make it easier for users to work with individual sections. At the same time, attempts were made to identify related questions with the aim to subdivide the modules. Another aspect was the change in the scale. The idea of using a four point scale was to avoid the central tendency in filling out the questionnaire. In addition, the questions' was changed. While the BKF still required numerous responses assessing the "modalities of expression", the new design collects the same amount of information with much less effort.

Revision of the analysis

The original analysis of the questionnaire was carried out with the help of an HTML-based software. Due to its HTML-format it could run on any computer system. The biggest disadvantage was that revising the instrument, for example by adding individual questions, always required a modification by external experts, which was time-consuming and cost-intensive. This is why the analysis of the OCS-R was programmed entirely in Excel. This enables continuous expansion and revision by the team itself. Besides changing the program's basis, the analysis itself was substantially revised. The new radar chart replaces the original profile line and enables to overview the observed competencies at a glance, while visualizing the interrater agreement of different observers. In addition to the radar charts, the individual observer's assessment can be displayed on a separate table of results. Furthermore, the percentage of agreement for the modules 2 to 5 gets calculated. All results can be printed out to document a person's communication development interventions. So, process and change can be documented in the long term.

The outcome of this entire revision process was the free trial version of the BKF-R 0.1. This version was made available online to users free of charge and served as a basis for the following evaluation.

Evaluation

Various methods were used to evaluate the free trial version (online survey of users, qualitative evaluation, and expert feedback).

The online survey started at the end of 2013 and ended in the summer of 2014. All users of the free trial version 0.1 were invited to participate. The survey followed the modules of the questionnaire. Users had the opportunity to review the content, structure, and ease of comprehension on a four point scale, as well as to give any other comments on noticeable problems and improvements. In addition, both the individual modules and the overall questionnaire were meant to be assessed using school grades. Due to the very small number of participants (*N*=19), it did not seem to make sense to conduct a quantitative statistical analysis. The feedback was fundamentally positive, but the less in-depth treatment of the areas of perception, motor skills, and orientation was criticized.

In parallel to the online survey, central elements of the questionnaire were tested in practice. This particularly concerned module 1 (Situation-specific communication). A single instrument, the BKeS, was constructed from this module and tested in practice with a 4-year-old girl and a 23-year-old man as part of a student thesis. The feedback showed that individual questions needed to be formulated more clearly and that a precise description was needed for the classification of forms of expression. Furthermore, additions (e.g. ways of expressing pain) were called for. Overall, the instrument proved to be viable. The benefits were mainly due to the exchange of ideas between the observers. For example, individual barriers to opportunity that arose in specific contexts (cf. Beukelman & Mirenda, 2013) could be identified with the aid of the analysis options.

Expert opinions were obtained as a third element of the evaluation. This was initially done by presenting the instrument at an open workshop in 2014 at the conference "Future perspectives of pedagogy for people with physical and motor impairments". The structural design, which did not start with the central modules on communication in the free trial version, was particularly criticized. The questions and elements of the trial version 0.1 were also revised by Prof. Barbara Ortland.

Experiences from the two evaluation procedures were then used for a further revision of the instrument and the final version (1.0X) was developed. Continuous troubleshooting, adjustment, and improvement takes place on the basis of user feedback via the website www.ocs-r.com.

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