Mental Health Intergenerational Transmission

Mental Health Intergenerational Transmission (MHINT) Process Manual

***Use alongside the MHINT Micro-Coding Scheme provided as Observer XT© file**

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Introduction

Within this manual you will find a descriptive guide to the MHINT coding procedure, general rules for coding, and detailed descriptions of each 'behaviour group' with illustrative examples.

This manual aims to capture as many relevant behaviours for the evaluation of an interaction as possible, with the underlying hypothesis that individual differences in behaviours can occur subtly and that micro-behaviours are of great importance because they provide specific targets for intervention.

The coding scheme can be applied to footage obtained from video cameras installed in the home, those used by an observer, or as in our own research, through wearable headcams and a 'spy' photo-frame video camera (Lee et al., 2017). Combined, these methods give the observer the opportunity to code behaviours from different perspectives and, interestingly, to obtain the perspective of the participants. The advantages of this approach are explained in Lee et al. (2017).

For ease of use, this manual has been divided into five different sections: perspectives, independent variables, subjects, behaviours, and modifiers. To begin, each of these terms is defined.

Glossary

Perspectives: There are four possible viewpoints associated with different cameras and, thus, videos that are produced. In order to understand behaviours most accurately, we have suggested which behaviour groups we recommend coding from each perspective. However, each coder should use their own judgement and refer to other perspectives if the video quality is poor from the recommended perspective.

Independent Variables: These are variables indicating fixed aspects of the observation, including who is present (e.g., family members, siblings/pets, etc), location (e.g., living-room, kitchen, etc), and activity (e.g., feeding, playing, etc).

Subjects: These are the individuals who the coder will focus on, e.g., the child, the caregiver 1, and caregiver 2. From this point forward, caregiver 1 will be used interchangeably with mothers as this is the focus of our study. However, there is no gender restriction in defining who the primary caregiver is. Each subject must be coded separately so that no information is lost.

Behaviour groups: These are the main modes of behaviours. Each behaviour group must be coded separately. Within each behaviour group, only one option can be chosen (i.e., mutually exclusive principle). Some of the options within a behaviour group will also have several potential modifiers.

Modifiers: Modifiers allow for more detailed categorisation within a behaviour group. For example, within the 'Vocalisations' behaviour group, modifiers allow the coder to categorise the tone of the speech as positive, negative, or neutral. If a modifier group is associated with a behaviour group, both the behaviour group and the modifier group must always be coded. Some modifier groups can be associated with multiple behaviour groups. For example, caregiver tone can be a modifier of speech as well as of imitation (as imitation is not always verbal).

Focus Object: This includes any object pertaining to the activity specified in the independent variables, i.e., the main activity around which the interaction is centred. Depending on the activity, the focus object may change. For example, focus objects associated with:

- Feeding includes any food, bowl, cutlery, or any other object associated with mealtimes.
- Stacking task includes the stacking toy and any of its components.
- Bedtime includes the bed, pyjamas, or any other object associated with going to bed/sleeping.
- Free play includes any toys or other objects involved in the play interaction.
- Reading/Photo book activity includes the book and its content.

Important Information

Within each behaviour/modifier description you will find the definition and description of the behaviour and the source from which the definition comes. You may also find the following instructions:

- **Do NOT code:** some behaviours which should be not considered during coding are specified.
- **N.B.:** the coder is asked to pay attention to a subtle characteristic of the behaviour or coding.
- **Priority rules:** when more than one behaviour could be coded within the same behavioural group, priority rules define which behaviours should be coded over and above others.

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1 Introduction

The MHINT Manual is a micro-behavioural observation coding system created to provide an in-depth evaluation of the components of parent-child interactions to use in ecological settings or the laboratory.

1.1 Format of the Manual

This manual is intended for field workers and specialists (e.g., psychologists and psychiatrists) for research purposes, and not as an instrument to clinically assess parent-child behaviours. The system is a detailed, exhaustive, and mutually exclusive method of registering micro levels of granularity of caregivers' and infants' behaviour. We provide some general guidelines for coding behaviour in the way that we deem best, though the manual may be adapted flexibly, dependent on different settings and cultures, or with different types of footage. Below, we provide our guidelines for the application of the MHINT Manual to headcam footage.

1.2 Headcam

Traditional observational studies require the presence of an observer in the house of the participants or require the participants to come to a research lab. These factors influence the type and frequency of behaviours displayed by participants. It has been demonstrated that the use of headcams without an external observer is an effective method for reducing participants' reactivity (Lee et al., 2017). Parents demonstrate a wider range of behaviours, including more neutral and negative behaviours, as well as behaviours that are usually considered embarrassing, e.g., speaking using infant register and singing.

1.3 Perspectives

The subject and behaviour groups that should be coded will differ depending on the point of view (P.O.V.) of the camera from which the footage has been captured. However, the quality of the footage may vary considerably across perspectives. If a behaviour can be seen more clearly from a P.O.V. other than that which is recommended, use this perspective as the basis for that code. The coder should use their 'best guess' to gain the most accurate and complete picture possible.

1.3.1 Caregiver 1 + 2 headcams

View: Code everything that concerns the infant: vocalisations, physical behaviours, facial expressions, and touching behaviours. Also use the direction of the caregiver's headcam as a proxy for the caregiver's visual attention. Refer to the infant's headcam and photo frame footage to determine the caregiver's gaze direction to confirm visual attention codes.

Audio: Mute the audio of the mother's headcam and the photo frame while coding infant vocalisation; only use the audio from the infant's headcam. Combining the audio of the infant's headcam with the view from the caregiver's headcam will give the coder the clearest audio and the clearest image, allowing them to derive information both from the mouth movements observed by the caregiver's headcam and from the audio captured by the infant's headcam (which is placed the closest to the infant).

1.3.2 Infant headcam

View: Code everything that concerns the caregivers: vocalisations, physical behaviours, facial expressions, touching behaviours. Also use the direction of the infant's headcam as a proxy for the infant's visual attention. Refer to the caregiver's headcam and photo frame footage to determine the direction of the infant's gaze to confirm visual attention codes.

Audio: Mute the audio of the infant's headcam and the photo frame while coding the caregiver vocalisation; only use the microphone from caregiver 1 or 2's headcam. Combining the audio of the caregiver's headcam with the view from the infant's headcam will give the coder the clearest audio and the clearest image, allowing them to derive information both from the mouth movements and from the audio.

1.3.3 Photo frame 3rd perspective

View: Code anything that could not be coded from headcam footage. Also, code Caregiver Proximity to the Infant and Face to Face interactions. Some physical behaviours such as touch behaviours and visual attention behaviours may potentially need to be coded from this P.O.V.

Audio: In most circumstances, the vocalisations will have been coded using either headcam, meaning that photo frame audio can be muted.

Figure 1. P.O.V. guidance

2 The Observer®

[The Observer](#)® is a general-purpose software package for event recording and data analysis in behavioural research (Noldus, 1991). The software permits both time-sampling and continuous event-based observations using video and audio data. Furthermore, [The Observer](#)® allows one to import event/time data from many different sources (e.g., physiological data recorded from other devices). Therefore, it is a very useful tool for studying interactions in detail. To implement this coding scheme, we use The Observer. However, feel free to use the software package is suitable to you.

3 Coding steps

3.1 Choose the perspective

Each perspective should provide unique information about the interaction. However, in the interest of gaining as much accurate information as possible, it may be necessary to switch to a perspective

other than that which is recommended if video or audio quality of the recommended footage is suboptimal.

Upload all available footage of the chosen activity to The Observer®. Then, decide which perspectives you will use for coding.

3.2 Begin coding

Different research teams may want to code interactions of various length (e.g., from two minutes to 30 minutes) depending on the scope of their research, the number of behaviours coded and the quality of the data obtained. For our research aims, five minutes of micro-coding has been initially selected to trial our coding scheme. However, depending on the scope of the research question and on the quality of the footage obtained other researchers may want to code more or less than 5 minutes. Once you have selected the best 5 minutes to code, begin coding one behaviour of the subject from the perspective you have decided to code first. Participants taking part in our research are asked to announce out-loud the day, time and activity before starting the interaction. The coding should begin from that point. However, not all caregivers announce this clearly. In this case, start coding when the activity has clearly begun. Every researcher/coder has their own unique coding style. We suggest coding one behavioural group, or a small number of related behavioural groups at a time, e.g., 'visual attention' and 'facial expression'. Each coder should report whether any behavioural groups were coded simultaneously.

3.3 Slow it down

The Observer XT 15® allows one to play videos in slow motion. We recommend using this function for facial expression, visual attention, and touch. Many of the behaviours coded using this manual can change within a matter of milliseconds. By playing the footage in slow motion, an extremely accurate picture of each behaviour can be attained.

4 Coding Independent Variables

Once the observation starts, you will be asked to select options from a list of independent variables. It is likely that you will not have all the information necessary to complete this list until the entire video has been viewed. In this case, take note of the independent variables, and watch for them as the video progresses. Once you have finished coding, go back to the independent variables list and fill in the missing information.

4.1 Caregiver 1 relationship to the child

Caregiver 1 is the caregiver that leads the activity. This system enables you to code more than one caregiver (e.g., same-sex couples, mother and father, mother and grandmother, etc) by selecting the code for caregivers 1 and 2.

- Mother
- Father
- Other
- Not present

4.2 Caregiver 2 relationship to the child

Caregiver 2 is the one who participates in the interaction but does not lead the main task (play, feeding, etc).

- Mother

- Father
- Other
- Not present

4.3 Presence of siblings

Code for this variable even if a sibling is present only for a short period of time.

- Yes
- No

4.4 Environment 1

Select in which of the following environments the activity takes place. It is possible that the parent moves to another setting during the activity. 'Environment 1' is the setting in which the activity began and 'Environment 2' the setting in which the activity is concluded.

- Bedroom
- Living room (includes living/dining and living/dining/kitchen combinations)
- Kitchen (includes breakfast rooms and dining/kitchen combinations)
- Bathroom
- Dining room
- Activity room/basement
- Outside (includes yards, patios, porches, gardens, balconies or any other setting outside the home)
- Other (any room or setting which is not included in the above list)
- Not possible to code environment

4.5 Environment 2

If a change of location occurs, code 'Environment 2' by selecting one of the following options:

- Bedroom
- Living room (includes living/dining and living/dining/kitchen combinations)
- Kitchen (includes breakfast rooms and dining/kitchen combinations)
- Bathroom
- Dining room
- Activity room/basement
- Outside (includes yards, patios, porches, gardens, balconies, or any other setting outside the home)
- Other (includes any room or setting which is not included in the above list)
- Not possible to code environment

4.6 Activity 1

Select the activity from the following list. It is possible that a video will contain more than one activity. In that case, code 'Activity 1' the first activity and 'Activity 2' the activity that comes later, temporally speaking.

- Free play
- Feeding
- Bedtime
- Stacking task play

- Photo-book

4.7 Activity 2

If more than one activity is present in the same footage, code as 'Activity 2' the activity that comes later.

- Free play
- Feeding
- Bedtime
- Stacking task play
- Photo-book

Note about home environment:

MHINT coding system version 1.0 has been developed observing parent child interactions in the context of high-income countries (i.e., US, UK). However, the observed behaviours we describe in this manual are applicable to a wide range of cultural contexts and child ages.

5 Coding Behavioural Groups

Before coding any behaviour, select the subject of said behaviour. Caregiver 1 is the leader of the interaction, either the mother or father. Infant is the target child of the interaction. Do not code the behaviour of any other children that may be present. Note that because T Observer XT 15[®] only allows the coding of events (usually behaviours) along with a subject, we have created the subject 'environment' in order to code the timing of the presence of distractions such as the television or radio and to code the "view" and "audio" quality of the photo-frame.

Code one subject at a time.

Subjects:

- Infant
- Caregiver 1
- Caregiver 2
- Environment

There are 27 behavioural groups, as shown in Table 1. Each behaviour group is stand alone and it is possible to choose how many behavioural groups to code. However, once a behavioral group is started being coded it should be completed for the duration of the footage. At each time point (i.e., second by second), all behavioural groups can be coded (exhaustive). Within each behavioural group, only one individual behaviour should be coded (mutually exclusive). Some behavioural groups apply to both the caregiver and the infant, while other behavioural groups refer to the same broad range of behaviours but have separate groups for caregiver and infant. Within the compiled groups, the same behaviours apply to both the infant and the caregiver. However, in the case of split groups, different behaviours apply to different subjects, or a modifier may apply to one subject but not the other. Many behaviours are linked to modifiers. These must be coded in the same way, i.e., all modifier groups should be coded, but just one individual modifier should be coded within the same modifier group.

Before coding any other behaviour groups, you should evaluate the video and audio quality **for each perspective (e.g., you select infant if you are coding the infant's headcam, you select caregiver x if you are coding caregiver's headcam, you select environment if you are coding photo-frame perspective)**. This will provide you and the other coders with an idea of the quality of the footage and

of the level of uncertainty with which behaviours may have been coded, allowing you to extract the best data. It could also be used to examine the amount and patterns of missing data.

Like all other codes in the scheme, these codes can change throughout the video. This information is essential for defining which segments will be used in different analyses.

Behavioural Groups	NUMBER OF CODES		
	Infant	Caregiver	Environment
View	3	3	3
Audio	3	3	3
Distractions	0	0	3
Alertness State	5	5	0
Caregiver Proximity to Infant	0	4	0
Caregiver Body orientation	0	6	0
Infant Body Orientation	6	0	0
Head orientation	8	8	0
Visual attention	11	11	0
Facial expression	10	10	0
Caregiver Posture/action	0	12	0
Infant Posture/action	12	0	0
Touch with right hand	5	5	0
Touch with left hand	5	5	0
Hand movements/gestures	9	9	0
Non-verbal Encouragement/discouragement of attention	0	9	0
Agitation/soothing	4	4	0
Non-verbal acknowledgement	3	3	0
Physical imitation	3	3	0
Physical play	3	3	0
Rough and Tumble play	4	4	0
Caregiver Vocalisation	0	11	0
Infant Vocalisation	10	0	0
Caregiver unusual behaviours	0	14	0
Infant unusual behaviours	10	0	0
Non-verbal Role reversal	3	3	0
Eating	3	3	0

Table 1: Behavioural groups with number of codes for each subject.

5.1 View

The quality of the footage is important for obtaining information about all non-verbal behaviour. You should code the entire length of the video for quality, from full view to non-view. The evaluation of the quality should be based on the three criteria mentioned below: the position of the camera, the quality/definition of the image and the luminosity of the footage. Firstly, if all three criteria are met (e.g., the camera is well positioned, the quality is good or enough to identify subtle behaviours and the luminosity is good enough to allow the coder to identify behaviours) code 'Full view'. Secondly, if one or more criteria are not fully met but it is still possible to code most of the behaviours code 'Partial view'. Finally, if one or more criteria are not met and this compromises the ability of the coder to capture any behaviour, code 'No view'.

5.1.1 Full view

You can see the scenario clearly.

- ✓ *Position*: the camera is well positioned, centred, and not covered by objects which obstruct the view. It is pointing neither at the floor nor the ceiling.
- ✓ *Quality*: the image is definite, clear. The objects within the image are distinct.
- ✓ *Luminosity*: the lighting is good. The image is neither too dark nor too bright.

5.1.2 Partial view

You can partially see at least one behaviour, but the information is not complete or clear.

- ✓ *Position*: The camera is not well-positioned, but the coder can view some behaviours. It should not be pointing at the floor or ceiling.
- ✓ *Quality*: The general quality of the image might be opaque, blurry, vague, or unclear.
- ✓ *Luminosity*: The lighting may be too dark or too light, but the scene can still be seen. Some subtle behaviours might be more difficult to observe.

5.1.3 No view

You cannot see any behaviour of interest.

- ✓ *Position*: The camera is not well positioned. It is pointing at the wall, ceiling, or floor.
- ✓ *Quality*: The image is so blurry or indefinite that behaviours are indistinguishable and cannot be coded.
- ✓ *Luminosity*: The image is so dark or bright that any behaviours are indistinguishable and cannot be coded.

No view should be coded when the camera is off or goes off during the interaction (e.g., it turned off due to low battery).

5.2 Audio

The entire video should be heard in order to categorise the quality of the acoustics and the reception of the sound in order to code verbal behaviour.

5.2.1 Audible

You can clearly hear all characteristics and features of the audio

- ✓ *Content*: The speech is distinguishable and clear - you can hear the exact words the caregiver has said. There is nothing covering the audio.
- ✓ *Sound*: You can hear all features of the speech, i.e., tone/register.

5.2.2 Partially Audible

The content of the speech is not entirely audible, but you can guess some aspects. It might be possible to code some, but not all modifiers of the speech, e.g., direction (i.e., to whom the subject is speaking to), tone, and register.

- ✓ *Content*: the speech is partially distinguishable – the coder cannot hear and/or understand exactly all the words/parts of the speech, but some characteristics can still be captured. For example, you might be able to distinguish to whom it is directed but it is not possible to code any other aspect of the speech.
- ✓ *Sound*: the quality of the sound is good. It is possible to code the pitch (tonality and register).
 - It may also be the case that it was clear that something has been said. You can either hear something or you can see mouth movements, but you cannot deduce any characteristics of the speech. This may be because the quality of the audio is too low, the volume is too low, or other sounds are covering the speech, etc.

5.2.3 No audio

There is no audio present in the recording and/or for some reason the microphones were not working.

- ✓ *Content*: it is impossible to understand any characteristic of the speech due to the low quality of the audio. Nothing can be coded.
- ✓ *Sound*: the sound is not clear. It is impossible to obtain any information about what has been said.

5.3 Distractions

Any potential external stimulus, not part of the interaction or of the task, is present in the environment and/or the subjects' attention is drawn by that distraction.

Modifier Groups	Modifier
Type of distraction	Phone/iPad used
	Social media notification
	Computer
	TV on (children's programme)
	Radio on
	TV on (adult's programme)
	Presence of a pet
	Other distraction

Table 2: Distraction modifier group and modifiers.

5.3.1 Yes, presence of distractions

Caregiver and/or infant's attention is drawn by a distraction present in the environment (e.g., pet, music, TV programme, game, etc). Code "yes, presence of distractions" also when a distraction is present in the environment, but the subjects are not paying attention to that (e.g., TV is on in the same room, the phone is receiving notifications, etc).

5.3.2 No, distractions absent

The subject's actions and/or the environment are not characterised by the presence of a distraction or an evident distraction (e.g., TV) has just been turned off.

5.3.3 Not possible to code distractions

The quality of the footage does not allow the coder to evaluate the presence of a distraction or the type of distraction.

5.4 Alertness State

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

Alertness reflects the infant's capacity to benefit from or respond to stimulation at any given point. The infant's level of alertness is recorded using behavioural criteria adapted from Brazelton's (1973) conceptualisations of infant state. Code each change in alertness. Score conservatively, recording a code only after being certain that a change has occurred. Within this behavioural group select one out of the 4 behaviours for each subject coded. For caregivers, it is always assumed that he/she is 'alert/wakeful' for the entire duration of the observation.

Alertness Behaviour Options (must be one of these):

5.4.1 Asleep state

Eyes closed, regular breathing, little or no spontaneous activity, no sucking.

N.B.

During feeding assume the infant is NOT sleeping.

5.4.2 Drowsy/semi-dozing state

Eyes closed or open (but dull, glassy or heavy-lidded); eyes fluttering, occasional startles or limb movements.

N.B.

Commonly occurs during feeding. When: during nursing, the infant's face is not visible if there are very few movements code 'Drowsy'.

Do NOT code:

Do not code 'asleep' unless the caregiver indicates that the infant is asleep.

5.4.3 Alert/wakeful state

Alert: eyes open, gross motor activity or limb movements may be present or not. Wakeful: intense motor activity, vocal activity.

Figure 2. Example of alert infant

5.4.4 Crying state

Infant exhibits full-blown distress. This includes crying, sobbing, kicking and facial expressions of distress for a duration of 5 seconds or more. Code until the infant is quiet/calm.

5.4.5 Not possible to code alertness state

The quality of the video does not allow the coder to identify the state of alertness of the subject. The state of alertness is not clear or definable.

5.5 Caregiver Proximity to Infant

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

This code refers to the relationship in space between the caregiver and the infant.

Priority rule: 'Loom' pre-empts 'Within reach'.

Caregiver Proximity Behaviour Options (must be one of these):

5.5.1 Out of reach

Caregiver is out of the infant's arm's reach. The caregiver could be off camera, but it is still possible to tell that there is enough space around the infant that she/he is not "within reach" (Figure 3).

Figure 3. Out of reach: the caregiver is more than one arm's distance from the infant.

5.5.2 Within reach

Caregiver is within his/her own arm's reach of the infant, and he/she might be engaged in touching and holding (see definitions below) but not in looming (Figure 4 & Figure 5). This last behaviour should be coded separately.

Figure 4. Within reach: the caregiver is in reach but not holding or touching.

Figure 5. Within reach: the caregiver is in reach and she is holding the infant.

5.5.3 Loom

Source: (Beebe et al., 2010)

Priority rule: 'Loom' pre-empts 'Within reach'.

While within reach of or touching the infant, caregiver intentionally moves her/his face to within 12 inches (30 cm) of the infant's face in either a face-to-face or a cheek-to-cheek orientation, while also looking at the infant (Figure 6). Face-to-face or cheek to cheek orientation-> focused, closer, social connection with the infant.

Figure 6. Caregiver Loom

5.5.4 Not possible to code caregiver proximity

Impossible to determine caregiver's proximity to the infant.

5.6 Caregiver Body Orientation

Source: (Beebe et al., 2010)

This code refers to the degree to which a communicator's shoulders and legs are turned in the direction of, rather than away from, his/her addressee (Mehrabian, 1968, 1969).

Priority rule: when the body is oriented to more than one person/object simultaneously, the person always pre-empts the object and when there is more than one person or more than one object, follow this order:

1. Infant
2. Other caregiver
3. Sibling
4. Other person
5. Object (focus of the activity)
6. Other object

N.B.

Guess the best: if the upper or lower body are not visible but you can still understand the orientation of the body, code what you can see.

Behaviour Options (must be one of these):

5.6.1 Body oriented to infant

Caregiver's shoulders and legs are directed toward the infant.

5.6.2 Body oriented to other caregiver

Caregiver's shoulders and legs are directed toward the other caregiver.

5.6.3 Body oriented to sibling

Caregiver's shoulders and legs are directed toward a sibling of the target child.

5.6.4 Body oriented to other person/object

Caregiver's shoulders and legs are directed toward another person, e.g., another relative, child, or stranger, another object, a pet, a distraction, or the wall.

5.6.5 Body oriented to object (focus of the activity)

Caregiver's shoulders and legs are directed toward the object which is the focus of the activity.

5.6.6 Not possible to code caregiver body orientation

The position and body orientation of the caregiver is not visible. This mode does not concern the visual attention, so the face might be pointing to the infant, but the body might be oriented to another object or activity.

N.B. If you can't see at least the shoulders, do not code.

5.7 Infant Body Orientation

Source: (Beebe et al., 2010)

The degree to which a communicator's shoulders and legs are turned in the direction of, rather than away from, his addressee Mehrabian (1969).

Use your best guess if you are not sure.

Priority rule: when the body is oriented to more than one person/object simultaneously, the person always pre-empts the object and when there is more than one person or more than one object follow the below order:

1. Caregiver 1
2. Caregiver 2
3. Sibling
4. Object (focus of the activity)
5. Other person/object

N.B.

Guess the best: when the upper or lower body are not visible, but you can still understand the orientation of the body, code what you can see.

5.7.1 Body oriented to caregiver 1

Infant's shoulders and legs are directed toward caregiver 1

5.7.2 Body oriented to caregiver 2

Infant's shoulders and legs are directed toward caregiver 2

5.7.3 Body oriented to sibling

Infant's shoulders and legs are directed toward a sibling of the target child.

5.7.4 Body oriented to object (focus of the activity)

Infant's shoulders and legs are directed toward the object which is the focus of the activity.

5.7.5 Body oriented to different person/object

Infant's shoulders and legs are directed toward another person or object, e.g., another relative, child, stranger, another object, a pet, a distraction, or the wall.

Figure 7. Body oriented to object: selfie, joint attention

5.7.6 Not possible to code infant body orientation

The body orientation of the infant is not visible. This mode does not concern visual attention, so the orientation of the face is irrelevant. **N.B.** If you cannot see at least the shoulders, do not code. However, during some activities, i.e., feeding in a highchair, the body orientation of the infant is mostly fixed, so it is possible to guess with good accuracy the orientation of the infant's body.

Priority rule: If the infant's body is facing both the object which is the focus of the activity and one of the caregivers, code 'body oriented to caregiver X'.

5.8 Head Orientation

Source: (Beebe et al., 2010; Væver et al., 2015)

Orientation of the head of both infant and caregiver. It contains five categories of horizontal and vertical directions of head.

5.8.1 Vis-à-vis Orientation

Subject's head is oriented directly towards the other subject (en-face) in a range of 0-30 degrees.

5.8.2 Slight (30-90 Degree) Aversion Right

Subject's head is oriented approximately 30 degrees but not more than 90 degrees from the vis-à-vis orientation from the subject's right.

5.8.3 Slight (30-90 Degree) Aversion Left

Subject's head is oriented approximately 30 degrees but not more than 90 degrees from the vis-à-vis orientation from the subject's left.

5.8.4 Full (90 Degree) Aversion Right

Subject's head is oriented fully (approximately 90 degrees) from the vis-à-vis orientation from the subject's right. The subject's head is turned all the way away to the shoulder. This head orientation is rare as it takes considerable energy for a person to move his/her head this far.

5.8.5 Full (90 Degree) Aversion Left

Subject's head is oriented fully (approximately 90 degrees) from the vis-à-vis orientation from the subject's left. The subject's head is turned all the way away to the shoulder. This head orientation is rare as it takes considerable energy for a person to move his/her head this far.

5.8.6 Arch Aversion

Code when the subject's (usually only the infant) whole body and head are arching away from vis-à-vis. This is the most extreme aversion posture and is rare.

5.8.7 Head not in view of other

When the caregiver is not interacting with the infant, ignore infant's head movements.

5.8.8 Not possible to code head orientation

The subject (caregiver and/or infant) are not visible or just partially visible and it is impossible to assess how the head is oriented. However, if from the visual attention and body's cues it is possible to deduce the head orientation use your best guess.

5.9 Visual Attention

Visual attention means that focused fixation is evident. Active components include the brightening of the infant's face or widening of the eyes when he/she first looks toward something.

Patterns of prolonged look duration from 3 to 6 months are related to less extensive visual scanning. Infants who look for longer durations have been shown to rely on local elements or features in visual stimuli for recognition.

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.) & (Colombo, 2001)

Modifier Group	Modifiers
Gaze direction	Direct
	Avert
	Not possible to code gaze direction
Joint attention	Same object/joint attention
	Different object/no joint attention
	Not possible to code joint attention

Table 3: Visual Attention modifier groups and modifiers.

Behaviour Options (must be one of these):

5.9.1 Look at infant

Caregiver looks at infant's face or head area. The infant does not need to return the caregiver's gaze or respond in any manner.

Figure 8. Caregiver looks at infant

5.9.2 Look at caregiver 1

Infant looks at caregiver's face or head area. The caregiver does not need to return the infant's gaze or respond in any manner. The caregiver need not be continually on film for this to be scored.

N.B.

When caregiver's location is not certain code 'not applicable'.

If uncertain whether the caregiver's face is within the infant's view, code as 'Look at object outside of view'.

When the location of the person is uncertain code as 'Not possible to code visual attention'.

Figure 9. Infant looks at caregiver

Figure 10. Infant looks at caregiver and caregiver looks at infant

5.9.3 Look at caregiver 2

Infant looks at caregiver 2's face or head area. The caregiver does not need to return the infant's gaze or respond in any manner. The caregiver need not be continually on film for this to be scored.

N.B.

When caregiver's location is not certain code 'not applicable'.

If uncertain whether the caregiver's face is within the infant's view, code as 'Look at object'.

When the location of the person is uncertain code as 'Not possible to code visual attention'.

5.9.4 Look at focus object

Infant and/or caregiver are focusing their attention on the object of the prescribed task. The focus of the task varies across activities.

- ✓ The focus for the feeding activity is the food and all food-related objects, e.g., containers, plates, cups, cutlery, etc.
- ✓ The focus for the stacking task is the stacking toy and all its related components.
- ✓ The focus of the photobook activity is the photobook.
- ✓ The focus of the free-play session is the game in which the dyad is engaged and the caregiver-infant interactions. This might change throughout the session.

Figure 11. Look at object focus of the activity (stacking task)

5.9.5 Look at other object

Look at object which is not the focus of the activity.

5.9.6 Look at object outside of view

You cannot see whether the caregiver and infant are looking at the same or different objects, but their visual attention is directed at some object out of the camera's view. Code **'look at object outside of view'** both when the object is out of view or when unsure about what object the infant or caregiver are looking at.

5.9.7 Look at sibling

Infant/caregiver looks at sibling's face or head area. The sibling does not need to return the infant's/caregiver's gaze or respond in any manner. The sibling does not need to be continually on film for this to be scored.

N.B.

When sibling's location is not certain code 'not applicable'.

If uncertain whether the sibling's face is within the infant's view, code as 'Look at object outside of view'. When the location of the person is uncertain code as 'Not possible to code visual attention'.

Figure 12. Look at object outside view

5.9.8 Look at other person

Infant or caregiver look at the face of a familiar or unfamiliar person, child or adult.

5.9.9 Look at distraction

Modifier Group	Modifiers
Type of distraction	Phone/iPad used Social media notification Computer TV on (children's program) TV on (adult's program) Radio on Presence of a pet Other distraction

Table 4: Look at Distraction modifier group and modifiers.

Infant or caregiver are looking at a distraction source. Identify then through the modifier which distraction. For example, they could be looking at a domestic animal, at the TV, phone, computer etc.

Figure 13. Look at pet

Figure 14. Caregiver looks at phone

Figure 15. Infant looks at TV

5.9.10 No Visual Attention

The caregiver or infant aren't looking at anything codable (e.g., looking down or have eyes closed).

5.9.11 Not possible to code visual attention

The visual focus is unclear, the camera is off or pointing at the floor or ceiling.

5.10 Facial Expression

Facial expressions and their accurate identification are relevant for social interactions. They may be particularly important in caregiver-infant interactions where the preverbal child uses crying and facial expressions to communicate his/her needs to the carer. Pregnancy and motherhood have been associated with improved abilities in skills related to social mind (e.g., accuracy and velocity in identifying facial expressions, responsivity to salient sounds, etc) (Anderson & Rutherford, 2012; De Carli et al., 2019). An innate and universal recognition of facial expressions for an initial limited set of emotions has been recognised in infants across cultures (Ekman, 2002; Ekman & Cordaro, 2011; Oster & Ekman, 1978). The most commonly used method of testing universal patterns of facial expressions shows that adults can identify a group of undifferentiated emotions from infant pictures in different cultures and contexts. This includes positive (e.g., surprise, enjoyment, interest) and negative emotions (e.g., disgust, pain, anger) (Ekman, 2002; Ekman & Cordaro, 2011; Izard et al., 1995; Valenza et al., 2014)

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.), (Ekman, 2002; Izard et al., 1995; Valenza, Citi, Lanatá, Scilingo, & Barbieri, 2014)

N.B.

When the face is visible for more than one second, try to code as accurately as possible all the emotional variations you observe, even when they last for less than one second. Code micro-expressions which are facial expressions that occur within 1/25th of a second.

Only code facial expressions from headcam perspectives. Do not code facial expressions from photo-frame footage unless it is necessary (e.g., due to poor quality of the headcams).

Behaviour Options (must be one of these):

5.10.1 Neutral/Alert

The infant's and/or caregiver's face lacks clear indication of positive or negative affect. A neutral expression is defined as an overall relaxation of facial musculature, open eyes, and lips closed or slightly parted. It includes expressions of interest, concentration or seriousness, questioning looks.

N.B.

At least one eye, the nose, and one cheek must be visible.

Figure 16. Infant's neutral facial expression

Figure 17. Caregiver's neutral facial expression

5.10.2 Positive

The infant and/or the caregiver displays a positive facial expression: expressions of joy-enjoyment, (positive) interest and excitement, amusement, fun, happiness, sensory pleasure and others. At least one eye, the nose and the mouth should be visible. The zygomaticus muscle must be activated because it is present across every type of happiness and positive expressions (Ekman, 2002). Open-mouth positive attention (positive interest) should be coded under positive facial expression. Positive affects include interest/excitement and enjoyment/joy.

Priority Rule:

When there is a clear indication of a smile, code: 'Smile'.

Figure 18. Infant's positive facial expression

5.10.3 Smile

The infant and/or caregiver smiles broadly, clearly, and unambiguously. The corners of the mouth are extended outward and upward; the eyes 'brighten' and are focused, the eyebrows are relaxed or raised. To code smile, both zygomaticus and orbicularis muscles must be activated, i.e., the mouth and eyes must be engaged in the smile (Ekman, 2002; Hiatt et al., 1979).

Figure 19. Infant's smile

Figure 20. Infant's smile

Figure 21. Caregiver's smile

5.10.4 Negative

Negative affects include here distress/anguish (crying), fear/terror (eyes frozen open in fixed stare or averted, pale cold skin, sweating and trembling, erect hair), anger/rage (frown, clenched jaw, red face), contempt (sneer), and shame/humiliation (eyes and head lowered). The infant and/or caregiver displays a negative expression: distress, sadness, discomfort, pain, anger, rage, contempt, scorn, wariness, fear, terror, irritation, or a frowning expression. In both anger and discomfort/pain the brows are lowered and drawn together, the cheeks and lower eyelids are raised, the upper lip is raised,

the nasolabial furrow is bowed outward, and the mouth is opened and horizontally stretched (Ekman, 2002; Hiatt et al., 1979). Negative facial affects include frown, grimace, pre-cry, and cry face (Beebe et al., 2010, 2016).

Do NOT code:

Negative vocalisations and vocal cues.

N.B.

At least one eye and the mouth must be visible.

Figure 22. Infant's crying facial expressions (to code under 'negative')

Figure 23. Infant's distressed facial expression (to code under 'negative')

5.10.5 Disgust

Source: (Sullivan, Margaret Wolan, & Lewis, 2003)

The subject displays an expression of disgust/revulsion. In infants, this is like the response to bitter and sour tastes. As the individual gets older it is more like revulsion. A facial reaction to bitter taste usually involves turning away from the stimulus inducing the reaction and gaping of the mouth and lower lip. Nose-wrinkling and upper-lip-raising are other components of a disgusted expression (Sullivan, Margaret Wolan; Lewis, 2003).

Figure 24. Infant's disgusted facial expression

5.10.6 Surprise

The subject displays a surprised expression, characterised by a specific combination of action units: raised inner and outer brow, raised upper eyelid and open mouth. The surprise therefore involves 2 major components: wide eyes and open mouth. The sense that is conveyed by the expression is of novelty and unexpectedness. Surprised and fearful expressions share some features: they both present open eyes and mouth. Nonetheless, fearful expressions only seem to be characterised by low brows and stretched lips.

5.10.7 Woe face

The caregiver presents an empathetic facial expression in response to the baby. The Woe face is characterised by slightly turned down corners of the mouth with pursed lips (Beebe et al., 2010).

5.10.8 Mock surprise

The caregiver displays a surprised facial expression which does not represent an actual surprise. Mouth is open and eyebrows are slightly or evidently raised (Beebe et al., 2016). It usually occurs in playful interactions as "peek-a-boo".

5.10.9 None of the above

The infant's/caregiver's facial expression is not described above, e.g., mixture of expressions, surprise, imitation, startled, shame/shyness, prolonged coughing, sneezing, etc.

Figure 25. Infant is sneezing (code as 'none of the above')

Figure 26. Infant is coughing (code as 'none of the above')

5.10.10 Face not visible

The camera is off/the face is out of the camera's focus. Less than one eye and the mouth are visible. Blurry images. The face is seen for **less than one second**. Infant and/or caregiver moved head to side or camera out of focus. Continue coding as 'face not visible' when the face re-appears for less than 1 sec.

Figure 27. Face not visible

5.11 Caregiver Posture/Action

Posture and/or motor action (e.g., walking, dancing and running, etc) of the caregiver should be coded here. Sources: all definitions have been extracted from the Oxford and Collins Dictionaries (Oxford and Collins Dictionaries, n.d.)

Modifier Group	Modifiers
Speed	Slow
	Medium
	Fast
	Not possible to code speed
Intensity	Light intensity
	Moderate intensity
	Vigorous
	Not possible to code intensity

Table 5: Caregiver's and infant's modifiers groups and modifiers behaviours linked to Jump, walk, run, moving in another way, physical play, and rough and tumble play.

5.11.1 Lying down

The caregiver is lying down horizontally, either in a supine (face upwards) or prone (face downwards) position.

5.11.2 Lie on side

The caregiver is lying on either side, with the body straight or bent/curled forward or backward. They could be also in a reclined position.

5.11.3 Sit on floor

The caregiver is seated on the floor, or on pillows or soft objects that are on the floor, with the body supported by the buttocks or thighs.

5.11.4 Sit on object

The caregiver is seated on a chair, sofa, couch or other object that is meant to or can be used to sit on, with the body supported by the buttocks or thighs.

5.11.5 Stand up

The caregiver maintains an upright position, supported by their feet.

5.11.6 Crawl

The caregiver moves forward on the hands and knees or by dragging the body close to the ground.

5.11.7 Crouched down

The caregiver adopts a position in which the knees are bent, and the upper body is brought forward and down.

5.11.8 Walk

The caregiver moves at a regular pace by lifting and setting down each foot in turn, never having both feet off the ground at once.

5.11.9 Jump

Jumping or leaping is a form of locomotion or movement in which an organism or non-living (e.g., robotic) mechanical system propels itself through the air along a ballistic trajectory. Jumping can be distinguished from running, galloping and other gaits where the entire body is temporarily airborne, by the relatively long duration of the aerial phase and high angle of initial launch.

5.11.10 Run

The caregiver moves at a pace faster than a walk, never having both feet off the ground at once.

5.11.11 Dance

The caregiver moves rhythmically to music, typically following a sequence of steps.

5.11.12 Not possible to code caregiver posture

The caregiver's motor behaviour is not visible.

5.12 Infant Posture/Action

Posture and/or motor action (e.g., walking, dancing, and running etc) of the infant should be coded here.

Modifier Group	Modifiers
Physical Support	With physical support Without physical support Not possible to code physical support
Restriction	Yes, restriction No restriction Not possible to code restriction
Speed	Slow

Intensity	Medium Speed
	Fast
	Not possible to code speed
	Light intensity
	Moderate intensity
	Vigorous
	Not possible to code intensity

Table 6: Infant Posture modifier group and modifiers.

5.12.1 Lie-down

The infant is lying down horizontally, either in a supine (face upwards) or prone (face downwards) position.

5.12.2 Lie on one side

The infant is lying on either side, with the body straight or bent/curled forward or backward. He/she could be also in a reclining position.

5.12.3 Sit on the floor

The infant is seated on the floor, or on pillows or soft objects on the floor, with the body supported by the buttocks or thighs.

5.12.4 Sit on an object

The infant is seated on a chair, couch or other object that is meant to or can be used to sit on, with the body supported by the buttocks or thighs.

5.12.5 Standing

The infant maintains an upright position, supported by their feet.

5.12.6 Crawling

The infant moves forward on the hand and knees or by dragging the body close to the ground.

5.12.7 Jumping

Jumping or leaping is a form of locomotion or movement in which an organism or non-living (e.g., robotic) mechanical system propels itself through the air along a ballistic trajectory. Jumping can be distinguished from running, galloping and other gaits where the entire body is temporarily airborne, by the relatively long duration of the aerial phase and high angle of initial launch.

5.12.8 Walking

The infant moves at a regular pace by lifting and setting down each foot in turn, never having both feet off the ground at once.

5.12.9 Running

The infant moves at a pace faster than a walk, never having both feet on the ground at the same time.

5.12.10 Held/in hold

The infant is held by the caregiver or another person. The infant should not be touching the ground or a third object e.g., a chair with his/her legs. His/her entire body should be lifted from the floor by the caregiver or by another person. There is no modifier for type of physical support for held.

5.12.11 Try to move in another way

The infant is trying to move, shuffling, rocking, try to stand etc or generally try to move from the sitting or in held position.

5.12.12 Not possible to code infant posture/action

The infant motor behaviour cannot be coded as his/her body is not visible.

5.13 Touch with right (R) hand

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

To come into contact or maintain physical contact with a person or object using the right hand. Code every 'touching' behaviour visible for at least 1 second. Right is defined by the index person's right.

Modifier Groups	Modifier
Type of infant touch	Touch Object Mouth Object Touch Focus Object (Infant) Touch Other Person's Face/Head Touch Other Person's hand/Body Touch Own Head/Body
Type of Caregiver Touch	Touch Same Object as Infant Touch Different Object to Infant Mouth Object (c) Touch Focus Object Touch Infant Touch Own Body Stroking Routine Care Object Mediated Touch Pick up/Hold Infant Not Possible to Code Caregiver Touch
Physical Affect Tonality	Positive/Warm Negative/Harsh Neutral physical contact Not Possible to Code Physical Affect Tonality
Pushing Away	Yes, Pushing Away No Pushing Away Not possible to code pushing away
Physical Intrusiveness	Physical Intrusiveness Evident No Physical Intrusiveness Evident Not Possible to Code Physical Intrusiveness

Table 7: Touch Right (R) Hand modifier groups and modifiers.

Behaviour Options (must be one of these):

5.13.1 Infant touch R

The infant mouths or actively and purposefully manipulates a stimulus object (object/body) with the right hand.

5.13.2 Caregiver touch R

The caregiver actively and purposefully touches anything with the right hand.

5.13.3 No infant touch R

The infant is not actively or purposefully touching anything with the right hand.

5.13.4 No caregiver touch R

The caregiver is not actively or purposefully touching anything with the right hand.

Figure 28. Caregiver's left hand touches object and caregiver's right hand should be coded as "no caregiver touch R".

5.13.5 Not possible to code touch R

The right hand of the caregiver and/or of the infant is not visible.

5.14 Touch with left (L) hand

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

To come into contact or maintain physical contact with a person or object using the left hand. Code every 'touching' behaviour visible for at least 1 second.

Modifier Groups	Modifier
Type of infant touch	Touch Object Mouth Object Touch Focus Object (Infant) Touch Other Person's Face/Head Touch Other Person's hand/Body Touch Own Head/Body
Type of Caregiver Touch	Touch Same Object as Infant Touch Different Object to Infant Mouth Object (c) Touch Focus Object Touch Infant Touch Own Body Stroking Routine Care Object Mediated Touch Pick up/Hold Infant Not Possible to Code Caregiver Touch
Physical Affect Tonality	Positive/Warm Negative/Harsh Neutral physical contact Not Possible to Code Physical Affect Tonality
Pushing Away	Yes, Pushing Away No Pushing Away Not possible to code pushing away
Physical Intrusiveness (caregiver only)	Physical Intrusiveness Evident No Physical Intrusiveness Evident

Table 8: Touch Left (L) Hand modifier groups and modifiers.

Behaviour Options (must be one of these):

5.14.1 Infant touch L

The infant mouths or actively and purposefully manipulates a stimulus object (object/body) with the left hand.

Figure 29. Infant's left hand and infant right-hand touch focus object.

Figure 30. Infant's left-hand touches focus object and infant's right hand should be coded as "no infant touch".

5.14.2 Caregiver touch L

The caregiver actively and purposefully touches anything with the left hand.

Figure 31. Caregiver's left hand and caregiver right hand touch object.

Figure 32. Caregiver's left hand touches object. Caregiver's right hand touches other person's hand/body.

5.14.3 No infant touch L

The infant is not actively or purposefully touching anything with the left hand.

5.14.4 No caregiver touch L

The caregiver is not actively or purposefully touching anything with the left hand.

5.14.5 Not possible to code touch L

The left hand of the caregiver and/or of the infant is not visible.

5.15 Hand movements and gestures

Source: (Babik et al., 2017; Blake et al., 1994; Corbetta et al., 2016; Fitzpatrick et al., 1996; Hirai & Kanakogi, 2018; Karl et al., 2018; Kita, 2003; Lobo & Galloway, 2013; Roemer et al., 2018; Thomas et al., 2015; von Hofsten & Lindhagen, 1979; Wallace & Whishaw, 2003; Williams et al., 2015)

Movements and actions obtained mainly from arms movements of the caregiver and/or infant.

5.15.1 Pointing

Pointing is a gesture done through a body movement with the "shape" of a vector which points to a certain object, person, or direction. Code pointing when caregiver and/or infant have the index finger extended and the other fingers of the hand are slightly or firmly curled. There should also be a certain extension of the arm (which does not have to be complete) and a directedness towards a person or

an object (no contact with the person/object). Whether the object is a book or a photo-book, code pointing even when there is contact with the object.

Do NOT code:

Pre-pointing: when the index finger is extended, the other fingers can or cannot be curled and the arm is not extended.

5.15.2 Reaching

The infant tries to grasp a stationary or moving object throughout a reaching behaviour. The movement of the arm must be intentional and not the result of a random movement of the arm. It should be visually directed and goal-directed and may not necessarily end with the grasp of the object (von Hofsten & Lindhagen, 1979). The infant reaches for an object and he/she may grab it or touch it. When he/she misses it, the hand should be arrested in mid-air, with the arm stretched as if attempting to touch the object. The act of reaching can be described as a movement which moves the hand to a target location while the hand is open and ready to grasp the target-object. Code under reaching also pre-reaching and pre-grasping movements: for example extending the arm and hand to establish body contact with someone else's body, extending a fist to swat at a distal target without contacting the objects, and possibly extending the arm and open hand to touch distal targets (Babik et al., 2017; Corbetta et al., 2016; Thomas et al., 2015; Williams et al., 2015).

Figure 33. Infant's reaching

5.15.3 Clapping

Code clapping (Fitzpatrick et al., 1996) when the caregiver and/or the infant are clapping the two hands together. Whereas for the adult it will be relatively easy to recognise this behaviour because he/she will be able to do it properly, the infant might be in the early stage of learning how to coordinate these movements, so more precision in the definition of what should be coded is needed. Clapping presents a rhythmic coordination pattern; it is defined as an in-phase coordination pattern since homologous muscle groups are extending or flexing at the same time during the clapping movement.

Figure 34. Clapping

5.15.4 Waving

Hand-waving gestures can be seen as other ostensive signals. Communication is ostensive when “we not only provide evidence for our intended speaker meaning but we also manifest our intentions to do so” (Dezecache et al., 2013). In fact, different research has demonstrated that early in infancy, infants follow not only faces and direct gazes but also hand gestures (Dezecache et al., 2013). Hand-waving and particularly horizontal hand-waving gestures have been found relevant in mother-infant interactions across cultures. Code as waving every lateral/horizontal hand movement from one side to another one. Do not code vertical waving (movements of hand up/down) (Hirai & Kanakogi, 2018).

5.15.5 Gesticulating

Code gesticulating when the infant and/or the caregiver are moving their hands and/or arms. You should include all the bodily gestures not otherwise specified in other categories (see waving, clapping, etc). These movements might be simple gestures (e.g., pointing) or could be more meaningful communicative and/or symbolic actions (Roemer et al., 2018).

5.15.6 Banging

The subject is banging two or more objects together or one object against a surface (e.g., subject’s hand or body part, table, another toy, etc).

5.15.7 Stacking Attempt

The infant is trying to stack the circle into the cone when playing with the stacking task. Code regardless of the success of the attempt. This code is context specific as it can be applied only in the situation the dyad is asked to play a stacking-task game. If believed useful, other researchers could adapt this code to the completion of their activity of interest (e.g., card game, ball game etc).

5.15.8 Other hand movements

Some type of hand movement not listed above is occurring but unlike gesticulating these movements are not perceived to be for communication.

5.15.9 No hand movements

None of the above hand movements are occurring. The hands and arms are still.

5.15.10 Not possible to code hand movements

The quality of the footage or the position of the subjects does not allow the coder to evaluate whether some hand movements are occurring.

5.16 Non-verbal Encouragement/Discouragement of Attention

Physical attempts of encouragement and discouragement of attention made by the caregiver should be coded here.

Modifier Groups	Modifier
To whom behaviour is directed	Directed to Caregiver 1
	Directed to Caregiver 2
	Directed to Infant
	Directed to Sibling
	Directed to Other People
	Directed to Object
	Not Possible to Code Direction
Physical Affect Tonality	Positive/Warm
	Negative/Harsh
	Neutral Physical Contact
	Not Possible to Code Physical Affect Tonality

Physical Intrusiveness (caregiver only)	Physical Intrusive Evident
	No Physical Intrusiveness Evident
	Not Possible to Code Physical Intrusiveness

Table 9: Non-verbal encouragement/discouragement modifier groups and modifiers.

N.B. No verbal attempts of encouragement and discouragement of attention made by the caregiver should be coded here. It is also possible that the coder thinks multiple codes are occurring simultaneously. For example, the caregiver may be discouraging infant's attention from toys and trying to draw attention to themselves. Our recommendation is either to try to capture at best the temporal sequence of this interaction: firstly coding the discouragement from the toys and secondly coding the encouragement to the person (in this case the self). However, sometimes they may be occurring so close together in time that it is impossible to distinguish them based on temporality. We recommend then to decide what is the main aim of the action and code accordingly.

Behaviour Options (must be one of these):

5.16.1 Caregiver encouragement to focus object

Caregiver attempts to draw infant's attention to the object which is the focus of the activity. Depending on the activity the focus might vary. Physical attempts of encouragement include any movement of the caregiver toward the focus object of the activity, for example:

- ✓ pointing to the object;
- ✓ placing or holding the infant in an end-face position with the object;
- ✓ using animated gestures near the object to attract the infant's attention;
- ✓ turning the infant's head toward the object.

Figure 35. Caregiver encouraging attention to object focus of the activity (stacking task)

5.16.2 Caregiver encouragement to other object/person

The caregiver attempts to draw the infant's attention toward a person (also themselves) or toward another object which is not the focus of the activity. When selecting this behaviour the coder will be asked to code the modifiers presented in table 8. Using "To whom behaviour is directed" the coder can choose whether the caregiver is trying to draw attention toward themselves (coding "Directed to

Caregiver 1”), to another person (e.g., “Directed to sibling”) or to another object (i.e., “Directed to Object”).

In order to code physical encouragement *directed to caregiver*, he/she should be encouraging infant’s attention into a face-to-face interaction with themselves. It must be clear that the caregiver’s primary goal is face-to-face social engagement with the infant.

Physical attempts involve intentionally moving her/his face toward the infant or moving the infant toward her/his face. This may include:

- ✓ pointing to the self, moving own body back and forth in front of infant’s face;
- ✓ placing or holding the infant in an en-face position (within 2 feet of the infant’s face);
- ✓ animated gestures to attract the infant’s attention;
- ✓ leaning over the infant to engage social interaction;
- ✓ turning the infant’s head toward her/his face;
- ✓ waving or playing peek-a-boo.

Do NOT code:

- merely turning, placing, or supporting the infant in positions without the intention of socially engaging the child;
 - non-verbal sounds;
 - mouthing actions or surprise expressions unless accompanied by ‘looming’;
 - object play even if it facilitates interaction;
 - watching the infant;
 - face-to-face during feeding or nursing, unless there is a break in the activity that is clearly for social purposes;
 - face-to-face when caregiver’s intention is not to socialise;
 - hugging and kissing unless they occur during an ongoing social interaction.
-
- ✓ Caregiver attempts to draw the infant into face-to-face social interaction *with another familiar adult or child*. Physical attempts include any movement of the caregiver toward the person’s face or manipulations directed toward the person, for example:
 - ✓ pointing to the person;
 - ✓ placing or holding the infant in an en-face position with the person;
 - ✓ using animated gestures near the person’s face for purposes of attracting the infant’s attention;
 - ✓ turning the infant’s head toward the person’s face;

Do NOT code:

- merely turning the infant in positions near the person;
 - object play even if it facilitates the interaction.
-
- ✓ When the caregiver is trying to draw infant’s attention *toward an object* that is not the object focus of the activity, he/she may be physically moving the infant or an object so that the infant can see or touch said object. Objects may include toys, household objects, body parts, articles of clothing, eating utensils, etc. Physical actions include:
 - ✓ showing how an object works;
 - ✓ shaking or moving an object near the infant;
 - ✓ moving an object closer to the infant;

- ✓ moving the infant closer to an object;
- ✓ pointing to an object;
- ✓ showing a distant object to the infant;
- ✓ moving the infant's hand toward the object/person to draw his/her attention to it;
- ✓ repositioning the infant for object exploration;
- ✓ putting the infant in a playpen or play area to facilitate looking or touching;
- ✓ positioning a body part for the infant's exploration;

Do NOT code:

- simply putting the infant in a play area;
- passively supporting an object within the infant's reach/view;
- passively supporting the infant for postural stability;
- caregiver holding an object near the infant for own purposes;
- caregiver hands as objects if they are primarily for supporting the infant;
- food, drink, used during feeding process;
- removing a toy;
- caregiver holding a toy without the intention of showing/offering it to the infant.

Figure 36. Caregiver encouraging attention to object

5.16.3 Caregiver encouragement of infant motor skills

The caregiver encourages the infant on his/her postural control, on fine and gross reaching and grasping actions and on locomotion. This may include:

- ✓ Encouraging young infants to roll;
- ✓ Physically assisting the baby into a sitting position;
- ✓ Letting go while the baby is in a standing position;
- ✓ Pulling the baby from sitting down to standing up position;
- ✓ Physically assisting the baby to crawl by pulling the baby by the arms or legs across the floor/mat.

5.16.4 Caregiver discouragement from focus object

Physical attempts of the caregiver to move the infant's attention away from the focus object of the activity. Depending on the prescribed activity (e.g., feeding, stacking task, free-play, photobook), the

focus object will vary (e.g., utensils, stacking task components, various toys, photobook). This may include:

- ✓ blocking infant's attempt to touch, grasp, move the focus object;
- ✓ hiding the focus object from infant's view, not with a playful intent;
- ✓ moving infant's head and/or body away from the focus object;
- ✓ moving the focus object away from the infant.

5.16.5 Caregiver discouragement from other person/object

The caregiver attempts to discourage infant's focus of attention from another person present (including themselves). This may include:

- ✓ blocking infant's visual capacity;
- ✓ moving infant's head;
- ✓ covering infant's eyes with hands;
- ✓ physically moving another person to whom the infant was paying attention from the infant's field of vision.

The caregiver physically tries to direct the attention of the infant from an object. This may include:

- ✓ blocking infant's attempt to touch, grasp, move the object;
- ✓ hiding the object from the sight of the infant;
- ✓ moving infant's head and/or body away from the object;
- ✓ moving the object away from the infant.

5.16.6 Caregiver discouragement of infant motor skills

Physical attempts of the caregiver to stop the infant performing a motor activity. This may include:

- ✓ blocking the physical freedom of the infant with a specific protective motivation: e.g., infants falling from the highchair, crawling towards dangerous objects etc;
- ✓ gently discouraging infant's attempts to start a physical movement/action: e.g., lowering the leg, moving the arms, moving the infant in a less movement-free position.

5.16.7 No encouragement/discouragement

No physical encouragement/discouragement has occurred.

5.16.8 Not possible to code encouragement/discouragement

The quality of the footage does not allow the coder to identify whether a physical encouragement/discouragement of attention has occurred or not.

5.17 Agitation/Soothing

Caregiver's and infant's signs of agitation and/or self-soothing behaviours should be coded here.

5.17.1 Agitation

Any physical behaviour of infant and/or caregiver which indicates an agitated/heightened arousal state.

Modifier Group	Modifiers
Type of Agitation	Turning away Picking/pulling hair/clothing/skin, nail biting Pacing Handwringing Unconscious movement

Outbursts
Shuffling feet
Clenching
Not possible to code types of agitation

Table 10: Agitation modifier group and modifiers.

5.17.2 Self-soothing

Any physical behaviour of infant and/or caregiver that seems to have the purpose of soothing themselves.

Modifier Group	Modifiers
Type of Soothing	Thumb-sucking Rocking Hand-banging Biting Compressed lips Cracking knuckles Twirling hair Not possible to code soothing

Table 11: Self-soothing modifier group and modifiers.

5.17.3 No agitation/soothing

Neither agitated behaviours nor soothing behaviours are emitted by any subject.

5.17.4 Protest

Stopping caregiver behaviour by blocking, stiffening, or turning away.

5.17.5 Not possible to code agitation/soothing

The quality of the footage or the position of the camera does not allow the coder to identify whether an agitated or soothing behaviour is occurring.

5.18 Non-verbal acknowledgment

Acknowledgment is a confirming behaviour (e.g., by nodding, smiling). It is usually displayed verbally but it may occur also non-verbally. Code here every non-verbal form of acknowledgment of another person's experience. It is more than simply recognition of another person's state and does not necessarily include endorsement. Acknowledgment is an action that conveys that the subject is aware of and is showing interest in the other person's perceptions, feelings, or states.

5.18.1 Yes, non-verbal acknowledgment

The subject has just displayed a nonverbal behaviour/action/facial expression which acknowledges the other person's state of mind, feeling, perceptions, etc. For example, the infant starts to cry, and the caregiver responds with an "owe face". The caregiver is non-verbally acknowledging the distressed state of the baby.

5.18.2 No, non-verbal acknowledgment

The subject's action does not include the purpose of acknowledging the other person's state of mind, action, or feelings. For example, the infant coughs and the caregiver does not react in any way (e.g., by changing facial expression, posture, body orientation, etc).

5.18.3 Not possible to code

Given the quality of the footage or other characteristics of the environment/interaction, it is not possible to code whether a non-verbal acknowledgment has occurred.

5.19 Physical Imitation

Physical imitation/mirroring/action repetition or its absence should be coded here. Source: (Meltzoff & Marshall, 2018).

Behaviour Options (must be one of these):

5.19.1 Physical imitation evident

The infant and/or the caregiver is physically imitating, repeating, mirroring other's action/facial expression/gesture/manual behaviours. Imitative acts may occur a few milliseconds after the execution of the action by the other person.

5.19.2 No physical imitation

The infant/caregiver is not imitating, repeating, mimicking, mirroring other's action/facial expression/gesture.

5.19.3 Not possible to code physical imitation

The quality of the footage does not allow the coder to identify whether a physical imitation is occurring or not.

5.20 Physical Play

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.), (Quinn & Kidd, 2018)

Caregiver and infant behaviour must be purposeful, not simply incidental to touching, holding or carrying the baby.

Behaviour Options (must be one of these):

5.20.1 Physical play evident

Caregiver: The caregiver directs physical behaviour to the infant or an object with the purpose of amusing them, e.g., to elicit smiles, positive vocalisations, laughter, or motoric excitement in the context of a primarily social dyadic interaction. Caregiver plays a game with the baby that involves physical manipulation of the baby's body e.g., 'Pattycake,' 'This Little Piggy'.

N.B.

Playful behaviour of any duration should be coded.

Infant: The infant is playing. It is clear that the infant is approaching the other person and/or object with a playful purpose.

Modifier Group	Modifiers
To whom behaviour is directed	Directed to caregiver 1 Directed to caregiver 2 Directed to infant Directed to sibling Directed to other people Directed to object Not possible to code direction
Types of play	Functional Play Constructive Play Symbolic Play Other type of play No types of verbal play Not possible to code types of play
Sociality of play	Social Play

	Solitary Play No Sociality of Play Not Possible to Code Sociality of Play
Speed	Slow Medium Speed Fast Not possible to code speed
Physical Affect Tonality	Positive/Warm Negative/Harsh Neutral physical contact Not possible to code physical affect tonality
Intensity	Light intensity Moderate intensity Vigorous Not possible to code intensity

Table 12: Physical Play modifier groups and modifiers.

5.20.2 No physical play

Neither the caregiver nor the infant is playing. They can be touching toys simultaneously, but unless they are interacting with the toys with the purpose of entertainment, joy, exploration or amusement, code 'no physical play'. The caregiver can be touching and moving objects but there is no intention of amusing the infant. The infant is touching and/or mouthing objects without exploring them in a playful way.

N.B.

When coding the caregiver's behaviour, the distinguishing factor 'Physical Play' versus 'No physical play' is the intention behind the interaction. Is the caregiver trying to amuse the infant? Is the caregiver using gestures, body movements and/or objects to entertain the infant? If yes, code 'Physical Play'. When the caregiver is using his/her body or toys in the interaction but in a flattered way and not with a clear purpose of amusing the infant, code 'no physical play'. When you are coding the infant, the criteria are different. The infant might be playing by him/herself and he/she might not look amused by the action. In fact, when the infant is playing functionally with the object, it looks more as if he/she is exploring the quality of the object. However, you should still code 'Yes, physical play'.

5.20.3 Not possible to code physical play

Code 'Not possible to code physical play' when you are not sure whether the behaviour has been displayed or whether it is not possible to see the behaviour. For example, the subject is off the camera, the quality of the footage is too low, etc.

5.21 Rough and Tumble Play

This is a specialised type of play that involves playful physical contact or interaction (Pellegrini, 1987).

Modifier Group	Modifiers
Speed	Slow Medium Speed Fast Not possible to code speed
Intensity	Light intensity Moderate intensity Vigorous Not possible to code intensity

Table 13: Rough and tumble play modifier groups and modifier behaviours.

5.21.1 Suspense/surprise

Interact so that the element of surprise, suspense of quick release of stimuli is dominant. Examples of suspense and surprise are:

- ✓ riding the baby on a bouncing leg, lifting the baby high into the air;
- ✓ 'flying the baby through the air';
- ✓ Rocking the infant with suspense features;
- ✓ Throwing the infant in the air (arms extended, high up);
- ✓ Turning the infant upside down in the air;
- ✓ Lifting the infant in the air and swinging side-to-side;
- ✓ Pretending to 'drop' the baby;
- ✓ Pretending to 'drop' the baby while holding in the air.

5.21.2 Manipulation of infant's part of the body

Initiating physical contact that has a fun-like quality. Examples of manipulations of infant's part of the body with a playful purpose are:

- ✓ Tickling;
- ✓ Jiggling, nibbling;
- ✓ Blowing 'raspberries' on the baby's tummy, exaggerated kisses;
- ✓ Tickling and 'eating' the infant at the same time;
- ✓ Singing a nursery rhyme, other child's song, or adult song directly to the baby;
- ✓ Re-enacting nursery rhymes using baby's body (e.g., hands);
- ✓ Playing a game with the baby that involves physical manipulation of the baby's body, e.g., 'Pattycake', 'This Little Piggy';
- ✓ Shaking parts of the baby's body imitating dancing.

5.21.3 No rough and tumble play

No rough and tumble game is played by caregivers and/or infant. It could be another type of play or it could be that a no play interaction is occurring.

5.21.4 Not possible to code rough and tumble play

The quality of the footage or the position of the caregiver/infant do not allow the coder to capture the nature of the interaction and to understand whether a rough and tumble play is occurring.

5.22 Caregiver Vocalisation

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

Vocalisations include any voluntary or involuntary, and meaningful or non-meaningful sounds emitted by the caregiver. Include all vocal sounds produced.

Behaviour Options (must be one of these):

5.22.1 Speech

Any word or verbal sound emitted by the caregiver. Modifiers of speech include characteristics of the sound (tone and register) as well as the direction and content of the speech (encouragement, criticism, mind-mindedness comments). **Everything that is verbal goes under the speech category.**

Modifier Group	Modifiers
Tone	Positive

	Negative Neutral Ironic and Sarcastic Not possible to code tone
Register	Adult Register Infant Register Not possible to code Register
Type of sentence	Statement/Declarative Question/Interrogative Exclamation/Exclamatory Command/Imperative Other type of sentence Not possible to code type of sentence
Languages	Language 1 Language 2 Language 3 Language 4 Sign-Language Not possible to code language
To whom it is directed	Directed to caregiver 1 Directed to caregiver 2 Directed to infant Directed to sibling Directed to other people Directed to object Not possible to code direction
Acknowledgement	Yes, acknowledgement No acknowledgement Not possible to code acknowledgement
Self	Reference to self No reference to self Not possible to code reference to self
Attribution of Personality	Positive attribution of personality Negative attribution of personality No attribution of personality Not possible to code attribution of personality
Criticism/Praise	Criticism of infant Criticism of sibling Criticism of self Criticism of other caregiver Criticism of environment Criticism of other person Praise of infant Praise of sibling Praise of self Praise of other caregiver Praise of environment Praise of other person No criticism/praise Not possible to code criticism/praise
Humour	Use of humour

	No use of humour Not possible to code use of humour
Odd Content	Suspicion Odd or superstitious beliefs Black and white statements Possible lie Physical complaints Swearing No unusual comments Not possible to code odd comment
Mind-mindedness	Mind-mindedness ambiguous comments Appropriate (attuned) comments Inappropriate (non-attuned) comments No mind-mindedness Not possible to code mind-mindedness
Verbal Encouragement/Discouragement of Attention	Verbal Encouragement to focus object Verbal Encouragement to other person/object Verbal Encouragement of infant motor skills Verbal Encouragement to emotional state Verbal discouragement from focus object Verbal discouragement from other person/object Verbal discouragement from infant motor skills Verbal discouragement from emotional state No verbal encouragement/discouragement Not possible to code verbal encouragement/discouragement
Verbal Intrusiveness	Verbal intrusiveness evident No verbal intrusiveness Not possible to code verbal intrusiveness
Types of Play	Functional Play Constructive Play Symbolic Play Other type of play No types of verbal play Not possible to code types of play
Sociality of Play	Social play Solitary play No sociality of play Not possible to code sociality of play
Globality/Internality	Global Internal Global External Internal Specificity External Specificity Neither Globality/Internality Not possible to code globality/internality
Verbal Role Reversal	Yes, verbal role reversal No verbal role reversal Not possible to code verbal role reversal
Teaching	Telling a story Recall a memory

	Labelling
	Explaining or defining
	Not teaching
	Not possible to code teaching
Name	Real name
	Affectionate nickname
	No affectionate nickname/real name
	Not possible to code name

Table 14: Speech modifier groups and modifiers.

5.22.2 Musical sounds

Code here any rhythmic sound such as singing, whistling, humming, singing softly.

5.22.3 Laugh

Code here any laughing, chuckling or the onset of laughter.

5.22.4 Vocal Imitation

Imitation by primary caregiver to target infant: caregiver attempts to imitate infant's distress or non-distress vocalisation. The caregiver vocalisation must occur soon after (e.g., within 5 sec) or during the infant's vocalisation. Does not need to be identical BUT very similar in intonation pattern. There are no restrictions concerning the type of infant sound a caregiver may imitate.

Modifier Group	Modifiers
Tone	Positive
	Negative
	Neutral
	Irony and Sarcastic
	Not possible to code tone

Table 15: Vocal Imitation modifier group and modifiers.

N.B.

When in doubt whether a vocalisation is an imitation or not, code it as 'adult register' or 'infant register' depending on the pitch rather than 'imitation'.

Priority rule: Coding of Imitation pre-empts all other vocal codes.

5.22.5 Bodily sounds

Vegetative sounds: burping, coughing, sneezing, yawning, tongue clicks. For raspberries blown by the caregiver, code 'non-verbal sounds'.

Modifier Group	Modifiers
Types of Bodily Sounds	Burping
	Coughing
	Sneezing
	Yawning
	Tongue Clicks
	Sigh
	Chew
	Not possible to code bodily sound

Table 16: Bodily sounds modifier groups and modifiers.

5.22.6 Scream

High intensity expression of emotions (both positive and negative) expressed through increased acoustic sound. Screaming and yelling are loud, high-pitched sounds.

5.22.7 Vocal tics

Inappropriate and involuntary noises, e.g., grunting, throat-clearing, whistling, coughing, tongue-clicking, animal sounds, repeating random sounds, words, and phrases.

Priority rule: If the purpose of a vocalisation is involuntary and is not communicative, vocal tics pre-empts all other codes.

5.22.8 Non-verbal sound

Any sound of the caregiver which is not verbal but still has a communicative meaning (not just bodily sound). For instance, sighs, clicks, raspberries, etc.

Modifier Group	Modifiers
Caregiver Tone	Positive Negative Neutral Ironic and Sarcastic Not possible to code tone

Table 17: Non-verbal sound modifier group and modifiers.

5.22.9 Silent

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.).

No 'live' speech is evident, or the source of vocalisation is unclear (e.g., live vs TV-generated speech).

Do NOT code:

Very brief break in the caregiver conversation (less than 1 sec).

5.22.10 Not possible to code caregiver vocalisation

The quality of the audio does not allow the coder to identify any characteristic of caregiver vocalisation.

5.23 Infant Vocalisation

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.), (J. Bruner, 1985; J. S. Bruner, 1974; Oiler, 1986; Oller et al., 1976)

Vocalisations include any voluntary or involuntary, and meaningful or non-meaningful sounds emitted by the infant. Include all vocal sounds produced.

5.23.1 Laughing

Code here any laughing, chuckling, giggling.

5.23.2 Distressed

Vocalisation produced by the infant that indicate protest, complaint, anger or upset. Distress may be indicated by vocal quality, facial expressions, or other negative behaviours, e.g., intense squirming. These vocalisations may be sustained or intermittent, may or may not be accompanied by tears. Vocalisations should sound negative. Code as distress: fretting, whining, fussing, whimpering, crying, sighing, moaning, groaning, irritable sounds, enraged, gritty, complaint, wail, bawl, weeping sounds.

5.23.3 Non-distress

Any positively- or neutrally toned vocalisations produced by the infant. They can be of any duration or loudness and they can be produced in any context. Vocal sounds produced during feeding should also be coded. For example: cooing, peals, squeals, gurgles, babbles, hums, giggles, vocal play, shrieking, sighs, and grunts not indicating distress.

Modifier Group	Modifiers
Tone	Positive
	Negative
	Neutral
	Irony and Sarcastic
	Not possible to code tone

Table 18: Non-distress modifier group and modifiers.

5.23.4 Imitating sounds

Infant attempts to imitate sounds vocally, e.g., trying to mimic caregiver vocalisation, animal sounds, object sounds.

Modifier Group	Modifiers
Tone	Positive
	Negative
	Neutral
	Irony and Sarcastic
	Not possible to code tone

Table 19: Imitating sounds modifier group and modifiers.

5.23.5 Babbling

The infant makes some sound in which the coder can identify at least one syllable containing one consonant and one vowel. Babbling can include sounds containing alternations of vowels and consonants, for example, "baba" or "bobo". Canonical babbling consists of repeated syllables consisting of consonant and a vowel such as "da da da da" or "ma ma ma ma". If the sound is a meaningful word, or an approximation of a meaningful word, code 'first words'.

Modifier Group	Modifiers
Tone	Positive
	Negative
	Neutral
	Irony and Sarcastic
	Not possible to code tone

Table 20: Babbling modifier group and modifiers.

5.23.6 First words

Any meaningful sounds emitted by the infant with the intent of naming something. The sound does not have to be a real word – it could simply be an approximation of a real word. If it is clear that it has a communicative value and purpose, code as 'first words'. For example, 'dada', 'mama', 'uh-oh'.

Modifier Group	Modifiers
First word type	Sounds like "mama"
	Sounds like "dada"
	Sounds like "up"
	Not possible to code first word
Tone	Positive
	Negative

	Neutral Ironic and Sarcastic Not possible to code tone
Type of sentence	Statement/Declarative Question/Interrogative Exclamation/Exclamatory Command/Imperative Other type of sentence Not possible to code type of sentence
Languages	Language 1 Language 2 Language 3 Language 4 Sign-Language Not possible to code language
Verbal Role Reversal	Yes, verbal role reversal No verbal role reversal Not possible to code verbal role reversal

Table 21: First words modifier groups and modifiers.

N.B.

When you code first words you will be directly directed to 'first word type' and you will be asked to pick just one modifier from the modifier's category.

5.23.7 Screaming

High intensity expression of emotions (both positive and negative) expressed through increased acoustic sound. Screaming and yelling are loud, high-pitched sounds.

Modifier Group	Modifiers
Tone	Positive Negative Neutral Ironic and Sarcastic Not possible to code tone

Table 22: Screaming modifier group and modifiers.

5.23.8 Bodily sounds

Meaningless, involuntary sounds produced by the body. Vegetative sounds including burping, coughing, sneezing, yawning, tongue clicks.

Modifier Group	Modifiers
Types of Bodily Sounds	Burping Coughing Sneezing Yawning Tongue Clicks Sigh Chew Not possible to code bodily sound

Table 23: Bodily sounds modifier group and modifiers.

N.B.

When you code bodily sounds you will be directly directed to 'Types of Bodily Sounds' and you will be asked to pick just one modifier from the modifier's category.

5.23.9 Silent/none of the above

No 'live' speech is evident as the infant is silent, or the source of the vocalisation is unclear, for example, when there is TV-generated speech.

Do NOT code:

Pauses caused by infant inhaling during a vocalisation.

5.23.10 Not possible to code infant vocalisation

The quality of the audio does not allow the coder to identify enough characteristics of infant vocalisation in order to code any of the above-listed behaviours.

5.24 Caregiver Unusual Behaviours

Source: (Association & Association, 2013; Huang et al., 2009; Regier et al., 2013; Zor et al., 2011)

Behaviours enacted by the caregiver which appear odd given the context and the activity in place.

5.24.1 Exaggerated emotional expression

Caregiver seems to act as if on a stage. He/she may act flamboyantly and theatrically, exhibiting an exaggerated degree of emotional expression which is inappropriate for the context.

5.24.2 Hoarding

The caregiver seems to acquire an excessive number of items and store them in a chaotic way. The environment confirms this. The organisation of the room appears to impair access and normal everyday living.

5.24.3 Washing (compulsively)

In order to categorise a behaviour as 'compulsive' it should be numerically and/or temporally greater than its potential functionality to the task/activity, i.e., an excessive frequency of the act and/or a lack of functionality should be evident. The caregiver may wash his/her hands or objects in the environment compulsively.

5.24.4 Checking (with no functionality)

In order to categorise a behaviour as 'compulsive' it should be numerically and/or temporally greater than its potential functionality to the task/activity, i.e., an excessive frequency of the act and/or a lack of functionality should be evident. The caregiver checks that the infant is breathing or that the door is locked compulsively.

5.24.5 Counting (with no functionality)

In order to categorise a behaviour as 'compulsive' it should be numerically and/or temporally greater than its potential functionality to the task/activity, i.e., an excessive frequency of the act and/or a lack of functionality should be evident. The caregiver counts aloud with no clear object in mind, the caregiver counts objects repeatedly.

5.24.6 Arranging and ordering objects (with no functionality)

In order to categorise a behaviour as 'compulsive' it should be numerically and/or temporally greater than its potential functionality to the task/activity, i.e., an excessive frequency of the act and/or a lack of functionality should be evident. The caregiver arranges toys during a play session without this being part of the interaction with the infant.

5.24.7 Physical tics

The caregiver displays any of the following involuntary physical movements, which may be accompanied by vocalisations: blinking, eye-rolling, grimacing, shoulder-shrugging, jerking of the head or other limbs, jumping, twirling, touching objects and/or other people in an inappropriate way/context.

5.24.8 Bared teeth

Teeth of the subjects are revealed. It is an expression of anger, violence, and/or threat (Beebe et al., 2010, 2016). This expression is rare in parent-child interactions and can be only observed using a microanalytic approach.

5.24.9 Submissive behaviour

Extreme submission to other's desires and behaviours. Permissive and dependant behaviours. Extreme agreement with other's decisions, assistant behaviours. Behaviours that recall submissiveness, separation anxiety, anxiety.

5.24.10 Praying

Not in an appropriate context. Do not code if praying before starting a meal or during routine family praying.

5.24.11 Caregiver involuntary movements

Any involuntary movement. These movements can be anything from quick, jerking tics of the body to longer tremors and seizures. These movements can be observed in almost all the parts of the body, including neck, face and limbs.

5.24.12 Chase & dodge

Source: (Beebe et al., 2010)

The infant may initiate the chase and dodge sequence with a "dodge" that consists of at least a 30-degree lateral head aversion from the vis-à-vis orientation with the caregiver. A caregiver "chase" requires that caregiver is already in a forward or loom spatial orientation and that she/he alters the position of her/his head or body in the direction of the infant's head aversion. The caregiver must begin chasing within 1 sec of the infant's head aversion. If more than 1 second elapses between the infant's head aversion and the caregiver's movement, then the chase and dodge sequence is said to be initiated by the caregiver's movement. Chase and dodge movement focuses only on lateral movement. This refers to movement away from the vis-à-vis position toward the side from which the infant has just moved. "Chase and dodge" is present if movement by at least one partner continues within 2 seconds (e.g., the infant turns his head from side to side). Even if the infant's head is averted or the caregiver is in a "chasing" position, "chase and dodge" is not considered present if there is no movement for 2 seconds or more. "Chase and dodge" is no longer coded when either the caregiver or the infant are in the vis-à-vis position for 1 second. A minimum of 2 seconds duration is required to code chase and dodge.

5.24.13 No caregiver unusual behaviours

The caregiver does not display any unusual behaviours or any of the above-mentioned behaviours and seems to be appropriate to the cultural context (e.g., lunch prayer in a religious family) and/or to the specific situation (e.g., chaotic environment in which the family just moved into the new house and/or there is work in progress).

5.24.14 Not possible to code caregiver unusual behaviours

Code 'Not possible to code caregiver unusual behaviours' when you are not sure whether the behaviour has been displayed or when it is not possible to see the behaviour. For example, the subject is off the camera, the quality of the footage is too low, etc.

5.25 Infant unusual behaviours

Very low frequency behaviours. A range of unusual and potentially pathological behaviours are listed below.

Source: (Association & Association, 2013; Regier et al., 2013), (Association & Association, 2013),(Hesse & Main, 2000; Thelen, 1980)

5.25.1 Frightened behaviours

The infant behaviour indicated he/she is frightened of a caregiver. Examples of frightened behaviour include, but are not restricted to:

- ✓ Freezing/stilling in response to caregiver's action;
- ✓ Attempting to get move away from the caregiver, not in the context of a game;
- ✓ Resisting holding/physical contact;
- ✓ Leaning/turning away from the caregiver;
- ✓ Forming a barrier between themselves and the caregiver, using their own body or an object;
- ✓ Appealing to another person in the room.

5.25.2 Clingy behaviours

The infant demonstrates excessive need for physical contact with a caregiver. Examples of clingy behaviour include, but are not restricted to:

- ✓ Protesting if separated from caregiver;
- ✓ Excessive physical contact;
- ✓ Excessively appealing to the caregiver for attention/contact.

5.25.3 Rocking

Rhythmic stereotypies are considered normal in the first year of life. Nonetheless, they are relevant when charting the later developmental course of the infant and of the caregiver-infant relationship. Code every repetitive movement of the head and face, arms, hands, fingers, legs, feet or whole torso in various postures.

5.25.4 Physical tic

Involuntary movements including blinking, wrinkling the nose, grimacing, jerking/banging the head, clicking the fingers, eye-rolling, shoulder-shrugging, jumping, twirling, crouching, grunting or sniffing (not due to a cold). These movements may be accompanied by vocalisations.

5.25.5 Excessive physical movements

The infant is unable to stay still and be quiet and calm. He/she displays excessive physical movements, excessive attention wandering (for their age), with little or no sense of danger. If the movements appear to be involuntary code 'Physical tics'.

5.25.6 Infant involuntary movements

Any involuntary movement. These movements can be anything from quick, jerking tics to longer tremors and seizures. These movements can be observed in almost all the part of the body, including neck, face, and limbs.

5.25.7 Hyper-tonality

Hypertonia refers to an increased tension of the muscles and lack of flexibility and relaxation.

5.25.8 Hypo-tonality

Hypotonia refers to decreased muscle tone and too much flexibility. Children with hypotonia may be difficult to pick-up and they may appear floppy when held and with difficulties in performing gross and/or fine movements as well as in maintaining a head and neck lifted position.

5.25.9 No infant unusual behaviours

The infant is not performing any of the above-mentioned unusual behaviours or the behaviours are appropriate for the context.

5.25.10 Not possible to code infant unusual behaviour

Code 'Not possible to code infant unusual behaviour' when you are not sure whether the behaviour has been displayed or when it is not possible to see the behaviour. For example, the subject is off camera, the quality of the footage is too low, etc.

5.26 Non-verbal Role Reversal

Infant and/or caregiver inversion of roles. There is no neat and clear distinction of roles. The subject can be either the infant and/or the caregiver. When the infant inversion of role is observed, we can notice caregiving and/or punitive behaviours towards the caregiver; while when is the caregiver who displays a role reversal, we may see an infantilisation of his/her role (Macfie et al., 2005, 2008). This behaviour is going to be more frequent as the infant grows.

5.26.1 Yes, role reversal

Infant role reversal:

The child exhibits controlling behaviours toward the caregiver. This behaviour may be of punitive nature (e.g., the child bullies/harasses/coerces the caregiver, the child humiliates/demeans the caregiver) or caregiving (e.g., the child comforts, supports, leads the caregiver or is overtly trying to please the caregiver by displaying an exaggerated positive mood).

Examples:

- ✓ The infant physically moves/directs the caregiver actions during a game and does not allow the caregiver to lead the interaction;
- ✓ The infant displays extreme condescendence towards the caregiver;
- ✓ The infant acts in a caregiving way (e.g., pat on the back of the caregiver in a supporting way, adjust clothes of the caregiver etc).

Caregiver role reversal:

The caregiver is not setting limits, he/she does not support nor provides a structure to the interaction. The caregiver is acquiescent to infant's action and is passively led by the child in the interaction. Alternatively, the caregiver acts as a peer and joins the child in the action without a clear distinction of who sets limits and provides a structure for the interaction.

Examples:

- ✓ The infant violently removes the book from the caregiver's hands. The caregiver does not react and waits passively for the next action of the infant;

- ✓ The caregiver plays with the infant as a peer would do. He/she gets offended by criticism in interactions and waits for child's directions. The body and verbal language of the caregiver are not adapting to the developmental age and role.

Example: mum asks the baby what type of cup they use: **"do you mind using this one today?"**

5.26.2 No, role reversal

Infant not inversion of role:

It is clear who is the infant and who is the caregiver. The infant neither harasses nor takes care of the caregiver. The infant uses the caregiver as reference point for limits and support and not the opposite.

Examples:

- ✓ The infant listens to caregiver's indications on how to play a game, the infant imitates caregiver's action and/or follows limits.

Caregiver not inversion of role:

The caregiver can scaffold and support the interaction with the infant.

He does not behave as a peer even when in a playful interaction. It is always clear who is the infant and who is the caregiver. The caregiver may be teaching, structuring, supporting the interaction but also simply monitoring infant's action without need to be emotionally or practically supported by the infant.

5.26.3 Not possible to code role reversal

The quality of the footage does not allow the coder to evaluate whether an inversion of roles is occurring in the interaction.

5.27 Eating

The infant is drinking/eating something.

Do not code: if the caregiver is drinking/eating something ignore that behaviour.

5.27.1 Yes, eating

The infant is eating/drinking something. Code each time you see the actual food going into the mouth and/or the object through which he/she has been fed going into the mouth deeply enough to be sure that he/she tasted/received food.

Do not code:

- an object/hand with food that is close to the infant, but the infant is not actually eating/drinking the aliment.

Modifier Group	Modifiers
Dependency/independency	Feeding him/herself Attempt to feed him/herself Being fed Not possible to code dependency and independency
Means of feeding	Hands Spoon/fork/chopstick Feeding bottle/bottle Breast

Table 24: Eating modifier groups and modifiers.

5.27.2 Not eating

The infant is not eating/drinking anything. It could also happen in a feeding interaction when the spoon or other mean of feeding is close to the infant, but his/her mouth is closed.

5.27.3 Not possible to code eating

The quality of the footage and/or the position of the subjects do not allow the coder to understand whether the infant is eating or not.

6 Modifiers

There are 39 modifiers groups, as shown in Table 25. Each modifier group is linked to one or more behaviours. Once the behaviour connected to a modifier is being coded you will be asked to code every modifiers group linked to such behaviour. Within each modifier group, only one individual modifier should be coded (mutually exclusive). Some modifiers groups apply to behaviours linked to both the caregiver and the infant, while other modifiers groups refer to the same broad range of behaviours but have separate groups for caregiver and infant (e.g., 'Types of infant touch' and 'Types of caregiver touch').

Modifier Groups	Behavioural groups linked to modifier groups
Type of distractions	2
Gaze direction	1
Joint attention	1
To whom behaviour is directed	4
Types of caregiver touch	2
Physical intrusiveness	3
Physical affect tonality	4
Types of infant touch	2
Pushing away	2
Physical support	1
Types of play	2
Sociality of play	2
Speed	4
Intensity	4
Restriction	1
Dependency/independency	1
Means of feeding	1
Types of soothing	1
Types of agitation	1
Types of bodily sounds	2
Tone	2
Register	1
Type of sentence	2
Acknowledgement	1
Self	1
Attribution of personality	1
Verbal role reversal	1

Criticism/praise	1
Sense of humour	1
Odd content	1
Mind mindedness	1
Verbal encouragement/discouragement of attention	1
Verbal intrusiveness	1
Verbal play	1
Globality/internality	1
Teaching	1
Name	1
First word type	1
Languages	2

Table 25: Modifier groups with number of behavioural categories they are linked to.

6.1 Type of Distractions

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

MODIFIER OF:

- ✓ within 'Distractions': 'Yes';
- ✓ within 'Visual Attention': 'Look at Distraction'.

Code simply whether a distraction is present. The subject does not need to attend to the distractions.

Modifier Options (must be one of these):

6.1.1 Phone/iPad used

Checked phone/iPad for any purpose: check time, send a message, read a message, take a picture, go on internet, visit any social media, play a game etc.

Figure 37. Phone used

6.1.2 Social media notification

You see and/or hear a notification. It might be the sound of a notification on WhatsApp, Facebook, Instagram, or any other social media. There is no need to see the caregiver looking or touching the phone if there is a sound/vibration/illumination of the screen.

6.1.3 Television on (children's programme)

You can clearly see, hear, or understand by the context that a television is present in the room of the activity and that a children's program is playing. Examples of child TV programs are (in UK): Peppa Pig, Newsround, Thomas & Friends, Bob the Builder, Teletubbies, Pingu, Art Attack, Ben & Holly's Little Kingdom, Paw Patrol.

N.B.

If there is a children's programme on TV but it is not appropriate for the developmental age of the target child, code as TV on (other).

Figure 38. TV on (child program)

6.1.4 Computer

A computer in the room is being used by the target individuals, any other person, or is clearly switched on but is not being used.

Do NOT code

- if the computer is in the room, but it is turned off.

6.1.5 Television on (adult programme on)

You can clearly see and/or hear or understand by the context that a television is present in the room of the activity and that an adult programme is playing. For example:

- ✓ News;
- ✓ Movie not meant for little children;
- ✓ Programmes with any type of inappropriate language, or obscene and/or violent scenes;
- ✓ Documentaries not meant for children;
- ✓ Sport matches.

6.1.6 Radio on

You can clearly hear and/or see (e.g., the caregiver turning on the radio) that the radio is on and that it is playing something.

6.1.7 Presence of a pet

A domestic pet is present in the room of the interaction. Code presence of pet both if you see the pet or if you can hear the pet clearly (e.g., you hear the dog barking or a cat meowing etc).

6.1.8 Other distraction

The subjects had their attention captured by another distraction which is not listed above. In the environment a distraction not listed above is present.

6.2 Gaze direction

Source: (Beebe et al., 2010)

MODIFIER OF:

Within 'Visual Attention':

- ✓ 'Look at Infant',
- ✓ 'Look at Caregiver',
- ✓ 'Look at different Object',
- ✓ 'Look at Focus Object',
- ✓ 'Look at Other Object',
- ✓ 'Look at Other Caregiver',
- ✓ 'Look at Distractions',
- ✓ 'Look at Sibling'.

While coding the caregiver's visual attention, if '**look at infant**' is coded, switch to the infant perspective. If it is possible to see the eyes of the caregiver, then code the direction in which they are looking. While coding the infant's visual attention, if '**look at caregiver**' is coded, switch to the caregiver perspective. If it is possible to see the eyes of the infant, then code the direction in which they are looking.

6.2.1 Direct

If the eyes of the caregiver are pointing at the infant's face or at the camera while he/she is looking at the infant, code 'direct'. If the eyes of the infant are pointing at the caregiver's face or at the camera while he/she is looking at the caregiver, code 'direct'.

Figure 39. Caregiver looks at infant with direct gaze

Figure 40. Infant looks at caregiver with direct gaze

6.2.2 Avert

- ✓ If the eyes of the caregiver are not directed solely at the face of the infant, while 'look at infant' is being coded, code 'avert'.
- ✓ If the eyes of the infant are not directed solely at the face of the caregiver, while 'look at caregiver' is being coded, code 'avert'.

Figure 41. Caregiver 'looks' at infant with averted gaze

Figure 42. Infant 'looks' at caregiver with averted gaze

6.2.3 Not possible to code gaze direction

- ✓ The caregiver's visual attention is coded as 'Look at Infant', but the eyes of the caregiver are not visible from the infant perspective.
- ✓ The infant's visual attention is coded as 'Look at Caregiver', but the eyes of the infant are not visible from the caregiver perspective.

Figure 43. Caregiver looks at infant with gaze not visible (None of those)

Figure 44. Caregiver looks at infant with gaze not visible (None of those)

Figure 45. Infant looks at caregiver with gaze not visible (None of those)

6.3 Joint Attention

Code whether the caregiver and the infant are looking at the same object, person, pet, etc.

MODIFIER OF:

Within 'Visual Attention':

- ✓ 'Look at Infant',
- ✓ 'Look at Caregiver',
- ✓ 'Look at different Object',
- ✓ 'Look at Focus Object',
- ✓ 'Look at Other Object',
- ✓ 'Look at Other Caregiver',
- ✓ 'Look at Distractions',
- ✓ 'Look at Sibling'.

Modifier Options (must be one of these):

6.3.1 Look at same object/joint attention

Both infant and caregiver are looking at the same object which is not the object focus of the activity (as this is better coded separately) and joint attention. Caregiver and infant are actively and purposefully looking at the same object and it is possible to see the direction of the eyes and ascertain that they are indeed looking at the object. If in doubt do not code.

Figure 46. Caregiver and Infant are looking at same object.

6.3.2 Look at different object

The caregiver and the infant are looking at different objects.

6.3.3 Not possible to code joint attention

The quality of the footage does not allow the coder to code whether caregiver and infant are looking at the same object or not. For example, one face could be not in view or one of the cameras is off.

6.4 To whom behaviour is directed

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.).

All participants' actions are directed at a target. This target can include the self, another person, or an object.

Priority rule: when the caregiver is speaking to all the children present in the room, including the index child, code "directed to the infant".

MODIFIER OF:

Within Non-verbal Encouragement/Discouragement:

- ✓ 'Caregiver Encouragement to Focus Object',
- ✓ 'Caregiver Encouragement to other person/object',
- ✓ 'Caregiver Encouragement of infant motor skills',
- ✓ 'Caregiver Discouragement from Focus Object',
- ✓ 'Caregiver Discouragement from Caregiver',
- ✓ 'Caregiver Discouragement of infant motor skills'

Within Physical Play:

- ✓ 'Physical Play Evident'

Within Caregiver Vocalisations:

- ✓ 'Speech'

Within 'Infant Vocalisation':

- ✓ 'First Words'

Modifier Options (must be one of these):

6.4.1 Directed to caregiver 1

- ✓ Any action (including speech) that is directed to the main caregiver. Any behaviour directed from the caregiver to his/herself should be included here.

6.4.2 Directed to caregiver 2

- ✓ Any action (including speech) that is directed to the second caregiver. Any behaviour directed from the caregiver to his/herself should be included here.

6.4.3 Directed to infant

- ✓ Any action (including speech) that is directed to the infant. Any behaviour directed from the infant to his/herself should be included here.

6.4.4 Directed to sibling

- ✓ Any action (including speech) that is directed to a sibling of the infant.

6.4.5 Directed to other people

- ✓ The caregiver's and/or infant's actions (including speech) are directed to another person in the room.

6.4.6 Directed to object

- ✓ Any action (including speech) of either the caregiver or the infant which is directed to an inanimate object. The action should be directed to the object rather than the object being used to communicate something to someone else.

Do NOT Code:

The caregiver encouraging attention of the infant to an object by speaking to the infant. In this instance, the person to whom the speech is directed is the infant.

N.B.

If someone is speaking while looking in a mirror, code based on the intended target of the speech.

6.4.7 Not possible to code Direction

The direction of the action and/or the speech is not clear or cannot be seen or heard.

6.5 Types of caregiver touch

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.) & (Beebe et al., 2010)

MODIFIER OF:

Within Touch:

- ✓ 'Caregiver Touch R',
- ✓ 'Caregiver Touch L'.

The caregiver comes into contact or maintains physical contact with a person or object.

Priority Rule: stroking pre-empts 'touch infant' and 'touch own body'.

Modifier Options (must be one of these):

6.5.1 Touch the same object as infant

- ✓ Caregiver and infant touch the same object. They are both on the camera and you can clearly see that they are touching the same object.

Figure 47. Caregiver touches same object as infant

6.5.2 Touch different object to infant

- ✓ The caregiver is actively touching and/or manipulating an object that is not touched by the infant.

6.5.3 Mouth object

- ✓ An object is in contact with the caregiver's mouth. Code also when the object is very close to the mouth. Mouthing may be active or passive.

Do NOT code: eating

Priority rule: mouth object pre-empts touch objects

Figure 48. Caregiver mouths object

6.5.4 Touch focus object

Depending on the activity, the caregiver is touching the focus object of said activity. For example:

- ✓ Feeding: the caregiver is touching any object associated with feeding, e.g., spoon, fork, bib, infant bottle, food, food/drink container, etc;
- ✓ Free play: toys, books, fabric, or any other object considered the main play object in the interaction;
- ✓ Stacking task: entire object or singular components of stacking toy;
- ✓ Photo-book: photo-book and its components.

Figure 49. Caregiver touches object focus (stacking task)

6.5.5 Touch infant

- ✓ Caregiver touches the infant with her/his hand(s);
- ✓ Touch includes instances when caregiver adjusts the infant's position;
- ✓ If the caregiver is touching the infant using an inanimate object, only code 'Touch infant' if the object is made of paper or cloth and the touching occurs in a caregiving context, e.g., wiping food from the infant's face;
- ✓ Code 'Touch infant' when the infant is sitting on a surface other than the caregiver's body and caregiver is supporting his/her posture with hands;
- ✓ Repetitive playful touching is coded as one continuous touch.

Figure 50. Caregiver touches Infant

6.5.6 Touch own body

- ✓ Caregiver actively touches his/her own body e.g., neck/shoulders and below. He/she touches in an active and purposeful way.

6.5.7 Stroking

Stroking has been defined as lateral soft and gentle movements, as well as the rubbing motion involving strong back and forth or circular movements (Crucianelli et al., 2018). Caregivers commonly stroked their baby's face, back, tummy, arms, and legs.

- ✓ The caregiver might be stroking/caressing the infant's face, limbs, or other parts of the body. The action might be intentional, and it should be specific. Other types of skin-to-skin contact should be coded differently.

Priority rule: "Stroking" pre-empts "Touch infant". Since stroke is always touching, coding touch infant would be redundant, moreover the behaviours are mutually exclusive.

6.5.8 Routine care

Source: (Beebe et al., 2010)

All caregiving types of touch should be coded here:

- ✓ For example, reposition infant in infant seat; wipe infant's mouth; adjust infant's clothing (e.g., socks, shirt, hat, headcam etc); adjust strap in infant seat; burp/wipe; bathe infant; check/change diaper; dress; groom.

Code only if caregiving is appropriate; if mother/father initiates caregiving for no apparent reason, for example pulls infant's socks up and down repeatedly or continuously rubs infant's face with a cloth, code as 'object-mediated touch'.

Do NOT code: simple feeding behaviours.

6.5.9 Object mediated touch

Source: (Beebe et al., 2010; Stepakoff et al., 2000)

Caregiver touches the infant through another object, e.g., a toy, a piece of clothes. The caregiver may be touching the infant also through another part of the infant's body; for example, the caregiver touches infant's face by using infant's hand.

Examples:

- ✓ Caregiver waves cloth in infant's face;

- ✓ Caregiver dangles toy on infant's chest;
- ✓ Caregiver manipulates clothing for non-caregiving purpose.

6.5.10 Pick up/hold infant

Caregiver supports the infant's weight. Start coding as soon as the caregiver picks up the infant and continue until he/she has completed the action of putting the infant down. Examples include:

- ✓ The infant is in a container which is held, worn or carried by the caregiver and the caregiver moves the infant from one container to another;
- ✓ The caregiver holds the infant in a standing position with the infant's feet resting on another surface.

Figure 51. Caregiver picks-up/holds infant

6.5.11 Not possible to code caregiver touch

- ✓ The caregiver's touch cannot be coded, or the type of touch is not listed above.

6.6 Physical intrusiveness

Source: Adapted from (Beebe et al., 2010; Biringen et al., 1997, 2014; Pipp-Siegel & Biringen, 1998). The caregiver physically interrupts the infant's action. The caregiver's action conflicts with the infant's desired outcome. He/she is interfering without respecting the natural break of action, play, exploration, etc. Caregiver is leading the interaction without giving space and time for the infant to participate actively. While the infant is moving, exploring an object, or playing, the caregiver enters the activity abruptly. The caregiver directs the play, physically moves the infant to an object or another person.

MODIFIER OF:

Within Touch:

- ✓ 'Caregiver Touch R'
- ✓ 'Caregiver Touch L'

Within Non-verbal Encouragement/Discouragement of attention:

- ✓ 'Caregiver Encouragement to Focus Object',
- ✓ 'Caregiver Encouragement to other person/object',
- ✓ 'Caregiver Encouragement of infant motor skills',
- ✓ 'Caregiver Discouragement from Focus Object',
- ✓ 'Caregiver Discouragement from Caregiver',
- ✓ 'Caregiver Discouragement of infant motor skills'

Modifier Options (must be one of these):

6.6.1 Physical Intrusiveness Evident

Caregiver is leading the interaction without giving space and time for the infant to participate actively. While the infant is moving, exploring an object, or playing the caregiver enters the activity abruptly. The caregiver directs the play, physically moves the infant and/or the infant's attention to another object or person. For example:

- ✓ The caregiver moves the infant's hand away from a game giving him another one that the infant hasn't acknowledged;
- ✓ The caregiver moves infant's body/body part without this being necessary for his/her safety.
- ✓ The caregiver moves the head of the infant, directing the infant's gaze.
- ✓ The caregiver changes infant's activity through a physical action.
- ✓ The caregiver moves infant's hand away from a game and gives to the infant another toy that the infant hasn't acknowledged.
- ✓ The caregiver moves infant's body/body part without this being necessary for his/her safety.
- ✓ The caregiver moves the head of the infant, directing the infant's gaze.
- ✓ The caregiver changes infant's activity through a physical action.
- ✓ The caregiver moves the infant's hand away from a game giving him another one that the infant hasn't acknowledged.
- ✓ The caregiver moves infant's body/body part without this being necessary for his/her safety.
- ✓ The caregiver moves the head of the infant, directing the infant's gaze.
- ✓ The caregiver changes infant's activity through a physical action, Blocking the physical freedom of the infant without a specific protective motivation: e.g., infants falling from the highchair, crawling towards dangerous objects, etc.
- ✓ The caregiver is forcing the infant to stay in a certain position when the infant clearly wants to change position/start a movement.

- ✓ The caregiver is blocking infant's exploratory behaviours by physically moving the hands of the infant, removing the object from his/her grasp.
- ✓ The caregiver is stopping any physical movement of the infant in a harsh way, using force to re-direct attention of the infant or physically blocking any physical initiative started by the infant.
- ✓ The caregiver moves the infant's hand away from a game giving him another one that the infant hasn't acknowledged.
- ✓ The caregiver moves infant's body/body part without this being necessary for his/her safety.
- ✓ The caregiver moves the head of the infant, directing the infant's gaze.
- ✓ The caregiver changes infant's activity through a physical action.
- ✓ The caregiver moves the infant's hand away from a game giving him another one that the infant hasn't acknowledged.
- ✓ The caregiver moves infant's body/body part without this being necessary for his/her safety.
- ✓ The caregiver moves the head of the infant, directing the infant's gaze.
- ✓ The caregiver changes infant's activity through a physical action.
- ✓ The caregiver moves the infant in order to make him/her roll without a clear fun/playful context.
- ✓ The caregiver encourages the infant to stand-up by pulling him/her by the arms, while the infant didn't give any signs of wanting to be engaged in that activity.
- ✓ The caregiver is pulling the baby from a sitting down to standing up position without respecting infant's lead.
- ✓ The caregiver is physically assisting the baby to crawl by pulling the baby by arms or legs across the floor/mat not synchronised to the will of the infant.

Do NOT code:

The caregiver preventing any potentially dangerous situation.

6.6.2 No Physical Intrusiveness Evident

- ✓ The caregiver does not physically and abruptly interrupt infant's activity;
- ✓ He/she leaves the infant leading the game and directing his/her action;
- ✓ Caregiver can physically move or stand the infant if he/she is going to be in danger, e.g., the infant is crawling toward an electric socket and the parent raises the infant;
- ✓ The caregiver supports the infant's behaviour, e.g., holding the hand or holding the infant in the right position to explore the environment.

6.6.3 Not possible to code Physical Intrusiveness

- ✓ The quality of the footage or the position of the subjects does not allow the coder to identify the presence of intrusive behaviours.

6.7 Physical Affect Tonality

Source: (Beebe et al., 2010)

MODIFIER OF:

Within Non-verbal Encouragement/Discouragement of attention:

- ✓ 'Caregiver Encouragement to Focus Object',
- ✓ 'Caregiver Encouragement to other person/object',
- ✓ 'Caregiver Encouragement of infant motor skills',
- ✓ 'Caregiver Discouragement from Focus Object',
- ✓ 'Caregiver Discouragement from Caregiver',

- ✓ 'Caregiver Discouragement of infant motor skills',

Within Touch (R/L):

- ✓ 'Caregiver Touch R'
- ✓ 'Caregiver Touch L'
- ✓ 'Infant Touch R'
- ✓ 'Infant Touch L'

Within Physical Play:

- ✓ 'Physical Play Evident'

The general manner with which a caregiver approaches one of the above-mentioned situations (Reece & Whitman, 1962).

Modifier Options (must be one of these):

6.7.1 Positive/warm

- ✓ The caregiver directs warm and loving tactile behaviour toward the infant. Affectionate physical gestures, e.g., kissing the infant, stroking, caressing, tousling the hair, tweaking the cheek, etc.

Do NOT code:

- simply holding the infant's hand or foot and moving it rhythmically;
- moving the infant's hand to a toy;
- kisses that are heard but not actually seen.

6.7.2 Negative/harsh

- ✓ The caregiver directs negative physical behaviour towards the infant. Abrupt, mechanical, cold, harsh handling of the infant, including jerking, shaking, slapping, or hitting the infant.

6.7.3 Neutral physical contact

- ✓ The caregiver directs physical behaviour toward the infant which does not clearly convey any emotional valence. For example, the caregiver simply touches, holds, or tries to draw the attention physically in a neutral way and without displaying any particular affect. The caregiver might appear bored and/or tired.

6.7.4 Not possible to code physical affect tonality

- ✓ The quality of the footage does not allow the coder to identify the affect tonality of the physical behaviour.

6.8 Type of Infant Touch

Source: (CFRS, NICHD Coding Manual)(Bornstein, n.d.).

The infant comes into contact or maintains physical contact with a person or object.

Priority Rules

- ✓ If the infant is simultaneously mouthing and actively touching the same object, score 'Mouth Object';
- ✓ If the infant mouths one object and actively touches another object at the same time, score 'Touch Object';

- ✓ 'Touch Object' has priority over 'Touch other person's head/face' if the two occur simultaneously;
- ✓ 'Touch Object' and 'Touch other person's face/head' pre-empt 'Touch other person's hand/body'.

MODIFIER OF:

Within Touch (R/L):

- ✓ 'Infant Touch R'
- ✓ 'Infant Touch L'

Modifier Options (must be one of these):

6.8.1 Touch object

- ✓ The infant actively and purposefully elicits feedback from an object by touching it. The infant grasps the object and moves it or uses the palm or fingers of the hand to directly explore the object. Touching must be active and purposeful. The coder must be able to see the infant's hand.

Do NOT code:

Pacifiers, bottles or breasts when the nipple is in the infant's mouth.

Figure 52. Infant touches object

6.8.2 Mouth object

- ✓ An object is in contact with the infant's mouth. Code also when the object is very close to the mouth. Mouthing may be active or passive.

Do NOT code:

- If the infant sucks on the thumb or another finger as a pacifier.

Figure 53. Mouth object

6.8.3 Touch focus object (infant)

Depending on the activity of the interaction (e.g., feeding, stacking task) the focus object is the object focus of the activity/interaction. For example:

- ✓ Feeding: the infant is touching any object might be used for feeding, e.g., spoon, fork, bib, bottle, food, food/drink container etc;
- ✓ Free play: toys, books, fabric or any other object that is considered the main play object in that interaction;
- ✓ Stacking task: entire object or singular components of stacking toy;
- ✓ Photobook: photo-book and its components.

Figure 54. Infant touches object focus of the activity (Stacking task)

Figure 55. Infant touches object focus of the activity (spoon during feeding)

Figure 56. Infant touches object focus of the activity (stacking task)

6.8.4 Touch other person's face/head

- ✓ The infant actively touches the face/head of another person, e.g., the area at the base of the neck extending to and including the top of the head.

6.8.5 Touch other person's hand/body

- ✓ The infant actively touches the hand and or the body of another person.

6.8.6 Touch own head/body

- ✓ The infant actively touches his/her own head/body. If infant touches the headcam code touching object only if the infant is intentionally touching the camera, otherwise code touch own body. N.B., Even if touch seems to verge more on a grabbing action, still code as touch.

6.8.7 Not possible to code type of infant touch

- ✓ The quality of the footage does not allow the coder to define whether or which type of infant touch is occurring.

6.9 Pushing away

Caregiver and/or infant are rejecting/pushing away other person's part of the body, another object, clothes etc.

6.9.1 Yes, pushing away

- ✓ The infant/the caregiver actively touches an object or the head/body of a person and actively tries to push it away.

Figure 57. Infant pushing away

6.9.2 No pushing away

The subject is not pushing away any object or other person's part of the body.

6.9.3 Not possible to code pushing away

It is not possible to code pushing away. It might not be visible and/or the subject might be off the camera.

6.10 Physical Support

The level of physical support that an infant requires from a caregiver or external object to maintain a position or perform an action.

MODIFIER OF:

Within Infant Motor Behaviour:

- ✓ 'Lie down'
- ✓ 'Lie on side'
- ✓ 'Sit on floor'
- ✓ 'Sit on an object'
- ✓ 'Standing'
- ✓ 'Crawling'
- ✓ 'Jumping'
- ✓ 'Walking'
- ✓ 'Running'

Modifier Options (must be one of these):

6.10.1 With support

- ✓ The infant is using some method of support. He/she can be using a caregiver's support and/or the support of an object. Code 'With support' when the action of the infant is not totally independent - he/she requires some help to maintain the position and/or perform the action.

6.10.2 Without support

- ✓ The infant is not using any type of support to maintain their position and/or perform an action.

6.10.3 Not possible to code physical support

- ✓ The infant is touching an object or the caregiver's hand, but it is not clear whether he/she is using them for support.

6.11 Types of play

(Frost et al., 2001; Piaget, 2013; Quinn & Kidd, 2018; Rubin, 1989; Smilansky, 1968),

Nature of the playful interaction.

MODIFIER OF:

Within Physical Play:

- ✓ 'Physical Play Evident'

Within Vocalisations:

- ✓ 'Speech'

Modifier Options (must be one of these):

6.11.1 Functional Play

Any repetitive action that the child finds enjoyable is considered functional play. Throwing objects, opening and closing things, stacking blocks and then knocking them over, filling and dumping containers, pushing a toy back and forth, and banging objects together are all examples of functional play (0-24 months).

Figure 58. Infant functional play: banging two objects together

6.11.2 Constructive play

The objects are manipulated to create/build something. To code this behaviour, look at the overall goal of the subject's action. Components of the play might be coded as functional, nonetheless if the purpose is to "create" something new, code as constructive.

- ✓ Examples: "pounding" per se should be considered functional, however "pounding" for the goal of making a "pancake" should be considered as constructive play.

Do NOT code:

Behaviours emitted just for the sensory pleasure derived.

6.11.3 Symbolic Play

Symbolic play is the ability of children to use objects, actions or ideas to represent other objects, actions, or ideas as play. For example:

- ✓ A child may push a block around the floor as a car or put it to his ear as a cell phone (around 8 months);
- ✓ 'Pretend play' is a type of symbolic play. In this case, the child uses objects, actions and ideas to attribute various roles to people or objects;
- ✓ Pretending to 'eat' the infant.

6.11.4 Other types of play

- ✓ Any other type of play which does not fall into the categories above.

6.11.5 No types of verbal play

- ✓ No verbal play is present therefore there is no category of play that can be coded.

6.11.6 Not possible to code types of play

- ✓ It is not possible to code the type of play. It might not be visible and/or the subject might be off the camera.

6.12 Sociality of Play

Independently by the type of play (e.g., functional, constructive, symbolic) code whether it has been conducted in interaction or not.

MODIFIER OF:

Within Physical Play:

- ✓ 'Physical Play Evident'

Within Vocalisations:

- ✓ 'Speech'

Modifier Options (must be one of these):

6.12.1 Social play

- ✓ *Physical*: Social play is any instance (such as the play face, various play body languages, as in domestic dogs i.e., the play-bow with wagging tail) in which two individuals interact with one another purely for the purpose of pleasure or entertainment. This would include inanimate objects or toys if the object is not the focus of the attention. The primary focus is the human (or animal) interaction.
- ✓ *Verbal*: The primary caregiver directs verbal behaviour to the infant, the purpose of which appears to be to amuse the infant, e.g., to elicit smiles, positive vocalisations, laughter, or motoric excitement in the context of a primarily social dyadic interaction. Within the interaction, it may be that the element of surprise, suspense, or quick release of stimuli is dominant (e.g., 'peek-a-boo'). The caregiver may sing a nursing rhyme, children's song, etc.

N.B.

Verbal social play can include an inanimate object or toy if drawing the infant's attention to the object is not the major purpose of the caregiver's behaviour.

6.12.2 Solitary play

- ✓ *Physical:* The subject is physically playing alone. The caregiver and/or the infant are engaged in the game without explicitly interacting with another person. For example: the infant could be playing with objects of every-day life (e.g., spoons, pens, etc) or apposite games (e.g., constructions, dolls etc) without interacting or seeking interaction with any other person. In the same way, the caregiver might be engaged in a playful activity without being engaged socially with the infant or another person.
- ✓ *Verbal:* the caregiver is verbally playing, both by him/her-self and through the use of an object in a solitary way. He/she is not directing his/her vocal play to another person in the room and the purpose of the action seems mainly to amuse him/herself.

6.12.3 No sociality of play

- ✓ No social play is present therefore there is no sociality of play that can be coded.

6.12.4 Not possible to code sociality of play

- ✓ The quality of the footage or the position of the subjects does not allow the coder to clearly identify whether the game is interactive or not.

6.13 Speed

Code the speed in which the caregiver interacts with the infant during physical play. The coder is addressing the question: "is the interaction slow or fast?"

MODIFIER OF:

Within Physical Play:

- ✓ 'Physical Play Evident'

Modifier Options (must be one of these):**6.13.1 Slow**

The physical play acted by the caregiver is represented by a slow pace. It may be characterised by slow, rhythmic and repetitive features.

6.13.2 Medium speed

The caregiver engages the infant in physical play with a medium pace. The game is not fast but has active components and movements at a higher pace.

6.13.3 Fast

The caregiver engages the infant in play with fast movements. The physical play may be rhythmic and repetitive but at a fast pace. With older children we may expect the speed as represented by running, playing football (soccer), playing other sports which require fast movements.

6.13.4 Not possible to code speed

The quality of the footage does not allow the coder to code the speed of the physical play.

6.14 Intensity

Intensity of physical contact and or physical play. It represents the amount of strength/vigour the caregiver uses in the interaction.

MODIFIER OF:

Within Physical Play:

- ✓ 'Physical Play Evident'

Modifier Options (must be one of these):**6.14.1 Light intensity**

The caregiver movements express low intensity, they may seem gentle, weak, soft.

6.14.2 Moderate intensity

Caregiver's movements are of moderate intensity. In a context of physical play, the caregiver applies a moderate level of strength in the interaction.

6.14.3 Vigorous

High level of activity expressed by intense movements.

6.14.4 Not possible to code intensity

The quality of the footage does not allow to code the intensity of the interaction.

6.15 Restriction

Code infant's amount of freedom to move.

MODIFIER OF:

Within Body Posture:

- ✓ 'Sit on the floor'
- ✓ 'Sit on an object'
- ✓ 'held/in hold'

Modifier Options (must be one of these):**6.15.1 Yes, restriction**

Infant's movement is restraint: for example, the infant is in a pram or stroller, on a high-chair or strapped on the caregiver's back/front.

6.15.2 No restriction

The infant is free to move.

6.15.3 Not possible to code restriction

The quality of the footage does not allow the coder to identify whether the infant's movements are restricted or not.

6.16 Dependency/independency

Source: (Butte et al., 2004)

The extent of independency of the child in the feeding interaction.

MODIFIER OF:

Within Eating:

- ✓ 'Yes, eating'

Modifier Options (must be one of these):

6.16.1 Feeding him/her-self

- ✓ The infant is feeding him/her-self. He/she can coordinate the food (with hands, spoons, bottle) to his/her mouth and correctly open the mouth to chew/drink the food. Infant is feeding him/herself with finger food, holding a spoon, using a bottle or cup and any other means.

6.16.2 Attempt to feed him/her-self

- ✓ The infant reaches and tries to hold the spoon or the food in the attempt to feed him/her-self.
- ✓ Depending on the developmental stage the infant may or may not be able to feed him/her-self. Nonetheless from this age (around 6 months) active attempts toward independency may be present.
- ✓ During the eating there are demands to spoon-feed him or herself.

Figure 59. The infant is eating and is trying to feed herself.

Figure 60. The infant is eating and is being fed by the caregiver.

6.16.3 Being fed

- ✓ The infant does not attempt to feed him/her-self. Nonetheless we may be able to see the infant recognising the spoon and holding the mouth open as the spoon or another recognisable means of feeding is approaching.

6.16.4 Not possible to code dependency/independency

- ✓ The quality of the footage or the position of the subjects does not allow the coder to identify the degree of dependency/independency during the feeding.

6.17 Means of feeding

The “instrument” that has been used by the caregiver and/or the infant to eat/feed/be fed.

MODIFIER OF:

Within Eating:

- ✓ ‘Yes, eating’

Modifier Options (must be one of these):

6.17.1 Hands

- ✓ The infant is being fed or is trying to feed him/herself using the hands. Manipulation of the food with the hands alone should not be considered eating with the hands. The hands from which the infant is receiving the food can be of a caregiver, the infant, or another person.

Figure 61. The infant is eating, while being fed by the hand of the caregiver.

6.17.2 Spoon/fork/chopsticks

- ✓ The infant is being fed or is feeding him/herself with an object that may vary depending on the culture and ethnicity of the family. Any instrument that may serve the purpose of feeding except the feeding bottle should be coded here.

Figure 62. The infant is eating, being fed by the caregiver with the spoon.

6.17.3 Feeding bottle/bottle

- ✓ The infant is eating/drinking through a feeding bottle.

6.17.4 Breast

- ✓ The infant is breastfed. Code this mode every time you see the infant with the mouth open going to the nipple of the mother.

6.17.5 Not possible to code means of feeding

- ✓ The quality of the footage or the position of the subjects does not allow the coder to identify which means of feeding has been used.

6.18 Types of Soothing

Specific behaviours used by the infant and/or caregiver to self soothe themselves.

Source: adapted from: (Beebe et al., 2010; Brauch Lehman et al., 1995; Pediatrics, 2005)

MODIFIER OF:

Within Agitation/Soothing:

- ✓ 'Self- Soothing'

Modifier Options (must be one of these):

6.18.1 Thumb-sucking

- ✓ The infant is sucking his/her thumb or another finger. The infant could also be holding/sucking a cuddly toy, blanket, or dummy while simultaneously sucking their thumb.

6.18.2 Rocking

- ✓ Rhythmic, repetitive movements with the purpose of soothing oneself.

6.18.3 Head-banging

- ✓ The infant gently knocks his/her head against a soft part of a cot/container to soothe themselves. This is not painful. Alternatively, the infant might bang his/her head against a hard part of their cot, walls or other hard surface to communicate extreme frustration.

6.18.4 Biting

- ✓ Code both infant and caregiver. Usually, we refer to nail-biting that can be done gently, as a means of self-soothing with the added benefit of taking something (i.e. the nail) inside. The biting does not concern exclusively the nails. The infant or the caregiver may be biting nails, lips, cheeks, pencils etc. Many adults often masticate their nails. Caregiver and/or infant may be biting their own lips.

6.18.5 Compressed lips

- ✓ Compressed lips or Tight Lips, Lip Compression, Disappearing Lips, Stiff Upper Lip, Inward Lip Roll, Lip Pursing, Lip Puckering, Pursed Lips, Puckering, Prune Lips (Beebe et al., 2010).
- ✓ They are done by pressing the lips together to the point where they begin to disappear.

6.18.6 Cracking knuckles

- ✓ Cracking joints, i.e., pulling bones apart to release air trapped between the bones. For example, when cracking one's fingers or neck.

6.18.7 Twirling hair

- ✓ Infant and/or caregiver twist their hair without the intention of brushing or tidying it.

Figure 63. Twirling hair

6.18.8 Not possible to code soothing

- ✓ The quality of the footage does not allow the coder to identify whether a soothing behaviour is occurring or not.

6.19 Types of Agitation

Specific behavioural manifestation of infant and caregiver's agitated state.

Adapted from (Beebe et al., 2010; Mayeda, 2013)

MODIFIER OF:

Within Agitation/Soothing:

- ✓ 'Caregiver/Infant Agitation'

Modifier Options (must be one of these):

6.19.1 Turning away

- ✓ The subject actively tries to avoid another person/action. He/she might be turning away the head and/or the entire body.

Figure 64. Turning away

6.19.2 Picking/pulling hair/clothing/skin, nail biting

- ✓ The subject is picking his/her skin with fingers, fingernails, teeth, or with tools. He/she is pulling his/her hair out from the scalp, eyebrows or eyelashes, but also from other body areas. E.g., picking skin and nose, pulling hair, eyebrows and lashes.

6.19.3 Pacing

- ✓ Walking back and forth nervously.

6.19.4 Handwringing

- ✓ The individual is constantly twisting their hands or pulling their fingers.

Figure 65. Handwringing

6.19.5 Unconscious movement

- ✓ Any involuntary movement. These movements can be anything from quick, jerking tics to longer tremors and seizures. These movements can be observed in almost all the parts of the body, including neck, face and limbs.

6.19.6 Outbursts

- ✓ A sudden, violent display of activity or emotion.

6.19.7 Shuffling feet

- ✓ Slight, repetitive movements of the subject's feet. Code this even if the infant does not seem to be agitated.

6.19.8 Clenching

- ✓ Repetitive or maintained tension of the jaws, fists or other body parts. Clenching of some body parts may be more difficult to notice than others.

6.19.9 Not possible to code types of agitation

- ✓ The quality of the footage does not allow identification of whether an agitated behaviour is occurring or not.

6.20 Types of Bodily Sounds

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

Any involuntary noise made/produced as a result of bodily functions.

MODIFIER OF:

Within Vocalisations:

- ✓ 'Bodily sounds'

Modifier Options (must be one of these):

6.20.1 Burping

- ✓ Allowing air from the stomach to escape from the mouth.

6.20.2 Coughing

- ✓ Forcing air from the lungs through the throat with a short, loud sound.

6.20.3 Sneezing

- ✓ A short, sharp noise made as one expels mucus from the nasal passages.

6.20.4 Yawning

- ✓ To open the mouth widely and inhale and exhale slowly and possibly loudly, usually as a result of tiredness or boredom.

Figure 66. Infant is yawning

6.20.5 Tongue clicks

- ✓ A percussive noise made as a result of the tongue being moved quickly from the roof of the mouth to the base of the mouth.

6.20.6 Sigh

- ✓ Exhaling slowly and noisily, expressing tiredness or some other positive or negative emotion.

6.20.7 Chew

- ✓ A repeated biting or gnawing of something.

Figure 67. Infant is chewing

6.20.8 Not possible to code types of bodily sounds

- ✓ The quality of the audio and/or video does not allow the coder to detect whether a bodily sound occurred or not.

6.21 Tone

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.) except for 'ironic and sarcastic'.

Affect temperature of caregiver and/or infant's tone.

MODIFIER OF:

Within caregiver vocalisation:

- ✓ 'Speech'
- ✓ 'Imitation'

Within infant vocalisation:

- ✓ 'Non-distressed'
- ✓ 'Imitating sounds'
- ✓ 'Babbling'
- ✓ 'First-words'
- ✓ 'Screaming'

Modifier Options (must be one of these):

6.21.1 Positive

- ✓ Caregiver and/or infant's tone conveys positive, warm and happy affect.

6.21.2 Negative

- ✓ Caregiver and/or infant's tone conveys distressed, sad, angry, upset, or disgusted affect.

6.21.3 Neutral

- ✓ Caregiver and/or infant's tone lacks clear indication of positive or negative affect.

6.21.4 Irony and sarcastic

- ✓ Caregiver and/or infant's tone is characterised by ironic and/or sarcastic tone. Subtle irony or cruel sarcasm should be coded here. A tone that is ambiguous, incongruent and discordant with the content of the phrase might be included here, where the incongruity is clear. For example:
 - ✓ 'That was smart' (said with a sarcastic tone of voice)
 - ✓ 'That's a nice picture' (said with a sarcastic tone of voice)
 - ✓ 'Oh yeah, it's a really tough life sitting in your highchair getting fed
 - ✓ 'Well, this is fun' (while baby screaming)

N.B.

Code irony or sarcasm even if the purpose is to amuse the infant.

6.21.5 Not possible to code tone

- ✓ The quality of the audio does not allow the coder to identify which tone has been used.

6.22 Register

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

The pattern of intonation associated with speech.

MODIFIER OF:

Within Vocalisation:

- ✓ 'Speech'

Modifier Options (must be one of these):

6.22.1 Infant register

Caregiver vocalisation, words or speech-like sounds that are directed to the infant and are characterised by extremely high pitch or extreme fluctuations in pitch.

Do NOT code:

- ✓ Infant talk;
- ✓ Singing;
- ✓ Sounds that do not fit the pitch requirements.

Priority rules:

- ✓ Infant register pre-empts adult register.

6.22.2 Adult register

Words or speech-like sounds directed to the infant by the caregiver, characterised by normal intonation pattern. This includes:

- ✓ Conversations, single words or parts of words, syllable sounds (e.g., 'brrh', 'brmm', 'tutu', 'hmmm'), whispers, hushing sounds ('sh-sh') and sharp inhalation of air ('ooh!');
- ✓ Infant talk (unless extremes in pitch are noted). Infant talk, known also as motherese, is a modified form of speech often used by adults with young children. Examples: 'froggy' instead of 'frog', 'blankie' instead of 'blanket', 'doggie' instead of 'dog', 'choo-choo' instead of 'train', 'teddy' instead of 'teddy bear', etc.

Do NOT code:

- ✓ Very low tones that are difficult to hear or to distinguish;
- ✓ Lip movement when no sound is heard;
- ✓ Non-speech sounds, such as laughing, chuckling, the onset of laughter unless words can also be heard, whistling, tongue clicks, kissing sounds, 'raspberries', sounded sighs, grunts, groans, effort sounds, vegetative sounds.

Priority rules:

Infant register and imitation may be interspersed within adult register and should be coded as infant register or imitation, respectively.

6.22.3 Not possible to code register

- ✓ The quality of the audio does not allow the coder to identify which register has been used.

6.23 Type of sentence

Caregiver's and/or infant's structure of the sentence.

MODIFIER OF:

Within Vocalisations:

- ✓ 'Speech'
- ✓ 'First words'

Modifier Options (must be one of these):

6.23.1 Statement/Declarative

Most commonly used sentences. Regular type of structure (in English): Subj + verb. Caregiver and/or infant are stating something. For example: "**there is other fruit juice in the fridge**", "**the sky is blue**", "**mummy likes hot chocolate**".

6.23.2 Question/Interrogative

Usually inverted type of structure (in English): verb + subj. Caregiver and/or infant are asking something. For example: "**do you like it?**", "**You are tired, aren't you?**", "**do you want to play with this?**", "**Do you love grandma?**"

6.23.3 Exclamation/Exclamatory

They could be represented with an exclamation mark at the end of the sentence (in English), they represent an emotion. For example: "**I love ice-cream!**" (Communicating excitement), "**Pay attention!**" (Communicating fear), "**this is impressive!**" (Communicating surprise) etc.

6.23.4 Command/Imperative

The sentence represents an order the subject gives to someone else.

For example: "**first finish your soup**", "**tidy your room**", "**leave this toy**", "**look at me**", "**stop it**".

6.23.5 Other type of sentence

The sentence has a structure not represented above/ the intonation does not transmit any of the senses mentioned above. It may not have a subj/verb structure and it could be composed by singular words. For example: "yay", "good".

6.23.6 Not possible to code type of sentence

The quality of the audio does not allow the coder to identify which type of sentence has been said.

6.24 Acknowledgement

This is any description and validation of a state of affairs. Either an emotional or physical state of the infant or an event that has happened.

MODIFIER OF:

Within Vocalisation:

- ✓ 'Speech'

Modifier Options (must be one of these):

6.24.1 Yes, acknowledgement

- ✓ Caregiver recognises and acknowledges infant's action, vocalisation and/or bodily sounds through a vocal response, e.g., '**bless you**', '**oops**', '**oh-oh**', '**ouch**', '**mmmh**';
- ✓ '**Oh Dear**' after infant's cough;
- ✓ For example, '**yes you did it**' is acknowledgement that the infant did something. '**Don't worry you can go to bed soon**' is an acknowledgement of child's tiredness;
- ✓ During feeding: baby didn't want to eat, Mum said '**almost gone, just one more**', she acknowledged that the baby was tired of eating but she is also encouraging him/her to complete the action.

6.24.2 No acknowledgement

- ✓ No verbal acknowledgement of infant's behaviour or vocalisation.

6.24.3 Not possible to code as acknowledgement

- ✓ The quality of the audio does not allow the coder to identify whether an acknowledgement has occurred or not.

6.25 Self

Kind of thought expressed by the first person nominative singular pronoun, the word "I" in English.

6.25.1 Reference to self

- ✓ Any expression which includes a reference to the self.
- ✓ For example: 'I', 'mine', 'me', 'myself', 'mummy' (in case of mum speaking), 'daddy' (in case of dad speaking) or their name.

6.25.2 No reference to self

- ✓ There is no reference to the self.

6.25.3 Not possible to code reference to self

- ✓ The quality of the audio does not allow the coder to identify whether a reference to the self has occurred or not.

6.26 Attribution of Personality

Source: (Meins et al., 2003; Rosenblum et al., 2008; Sadler et al., 2013)

Any mention of a personality type trait, describing that of the infant. Caregiver comments on infant behaviour indicating that it is driven by the infant's own personality and intentions.

MODIFIER OF:

Within Vocalisations:

- ✓ 'Speech'

Modifier Options (must be one of these):

6.26.1 Positive attribution of personality

Caregiver describes any form of personality trait in relation to the infant with some positive attributes.

- ✓ 'Oh, look at this, you painted this wonderful drawing to make me/your mummy proud of you! **You have such an artistic soul!**'
- ✓ 'You play with your sister because **you are so generous**'
- ✓ '**You are a kind baby**'
- ✓ '**You are a funny child**'

It is impossible to know whether the attribution that the caregiver made was correct.

6.26.2 Negative attribution of personality

Caregiver is attributing intentionality to infant's action and this intentionality is indicative of a negative stable trait of the infant. For example:

- ✓ 'Look, you made your sister cry, you are so spiteful!'
- ✓ 'You tease your little brother because **you are jealous of him**'
- ✓ '**You're a grumpy baby**'

It is impossible to know whether the attribution that the caregiver made was correct.

6.26.3 No attribution of personality

The caregiver did not make any statement indicating that the action of the infant was driven by their personality.

6.26.4 Not possible to code attribution of personality

The quality of the audio does not allow the coder to identify whether an attribution of personality has occurred or not.

6.27 Verbal role reversal

Reference: (John et al., 2013; Macfie et al., 2005, 2008)

The roles of the infant and the caregiver, as explained by the verbal interaction, are confused and mixed.

6.27.1 Yes, verbal role reversal

Infant verbal role reversal

The infant is controlling caregiver's action by talking to him/her in a punitive/bullying way and/or by providing caregiving to him/her (e.g., providing emotional and practical support, by being hyper condescending etc). For example:

During stacking task:

I: **"you do not understand how to do it, I know!"** (taking from the caregiver components of the game. The caregiver passively follows the lead of the infant)

I: "No, no, no, **you are reading wrong!** That is a frog" (while reading a story together)

I: "Before eating the ice cream, **you should wash your hands**" (infant is providing caregiving to the parent)

I: **"Don't be sad"**

I: **"I will cure you"** (if caregiver is sick or looks sick/tired)

Caregiver verbal role reversal

The caregiver is asking for lead, support, help to the infant and/or is acting as a peer and the content of the conversation does not reflect the difference in roles that should exist. The caregiver behaves and speaks like an "age-mate". For example:

C: **"Can you help mummy/daddy?"**, **'can you help mummy change nappy'** (The caregiver asks for help from the infant).

C: "Look at what I painted. **Do you think it's good?** (Caregiver looks for child's approval).

6.27.2 No verbal role reversal

There is a clear distinction between who is the caregiver and who is the infant. The caregiver is verbally providing a support, a structure, and/or limits to the infant. Also, in playful interactions the caregiver maintains his/her role and he/she does not talk/act as a peer. The infant is not controlling the caregiver neither through punitive nor caregiving behaviours.

Code "No verbal role reversal" when the verbal interaction does not include enough information to deduce an inversion of roles.

6.27.3 Not possible to code verbal role reversal

The quality of the footage does not allow the coder to assess whether an inversion of role has occurred.

6.28 Criticism/Praise

Source: (Hooley & Parker, 2006), CFRS, NICHD Coding Manual (Bornstein, n.d.)

Any expression or comment which indicates dissatisfaction or dislike toward an object or the infant. This may be expressed verbally or through tone of voice.

MODIFIER OF:

Within Vocalisations:

- ✓ 'Speech'

Modifier Options (must be one of these):

6.28.1 Criticism of Infant

A negative evaluation of the infant or any aspect of his/her behaviour. For example:

- ✓ 'You never listen to me'
- ✓ 'You made a mess with the food, again!'
- ✓ 'You're being naughty'
- ✓ 'Just stropky'.

6.28.2 Criticism of sibling

A negative verbal expression referred to a sibling of the target child that conveys a negative evaluation of the sibling or their behaviour (e.g., 'bad boy', 'naughty girl'). Expressions must be explicit.

6.28.3 Criticism of self

A negative evaluation of the self or any aspect of his/her own behaviour. For example:

- ✓ 'I am not good at playing with you, am I?'
- ✓ 'I often make the wrong decision'.

6.28.4 Criticism of other caregiver

A negative evaluation of the other caregiver or any aspect of his/her behaviour. For example:

- ✓ 'Your dad does not help me; he lays on the sofa watching the tv'
- ✓ 'Dad does not understand you as I do'
- ✓ 'Mum does not do anything the whole day'
- ✓ 'Your mum's cooking is terrible, isn't it?'

Do NOT code:

- ✓ Comments with a critical content but with a clear and explicit positive tone AND with the purpose of amusing the infant. When the comments are clearly made in the context of a play.
- ✓ 'Oh look! Your dad is a monster! He is so evil!'
- ✓ 'Pay attention to your mum, she is a witch!'

6.28.5 Criticism of environment

A negative evaluation of any aspect of the immediate environment. For example:

- ✓ 'This room is always a mess!'

- ✓ **'Look at this awful lamp!'**

6.28.6 Criticism of other person

A negative evaluation of any other person or any aspect of his/her behaviour. This person does not need to be present. For example:

- ✓ **'The neighbour is so unpleasant'**
- ✓ **'Today at the bus stop, the driver didn't stop. He was so obnoxious'.**

6.28.7 Praise of infant

Verbal expressions of praise and endearment. The caregiver directs verbal behaviour to the infant that conveys a positive evaluation of the infant or their behaviour (e.g., **'you did it', 'good job', 'oh, what a good infant', 'you're so sweet', 'good'**). Expressions must be explicit.

Do NOT code:

- ✓ Vague phrase like **'that's it', 'wow',** or **'yes'** unless when accompanied by clapping.
- ✓ Single words used as pet names (e.g., pumpkin, buddy).

6.28.8 Praise of sibling

Verbal expressions of praise and endearment. The caregiver directs verbal behaviour to a sibling of the target child that conveys a positive evaluation of the sibling or their behaviour (e.g., **'you did it', 'good job', 'oh, what a good infant', 'you're so sweet', 'good', 'I love you'**). Expressions must be explicit.

Do NOT code:

- ✓ Vague phrase like **'that's it', 'wow',** or **'yes'** unless accompanied by clapping.
- ✓ Single words used as pet names (e.g., pumpkin, buddy).

6.28.9 Praise of self

Verbal expressions of praise and endearment. The caregiver directs verbal behaviour to the self in order to provide a positive evaluation of his/her own action/behaviour/personal characteristics (e.g., **'I did it', 'good job', 'oh, I am good! 'I am so sweet', 'I like me'**). Expressions must be explicit.

6.28.10 Praise of other caregiver

Verbal expressions of praise and endearment. The caregiver directs verbal behaviour to the other caregiver in order to provide a positive evaluation of his/her action/behaviour/personal characteristics (e.g., **'you did it', 'good job dad'** (said by the mum), **'oh, mum is good!'** (said by the dad), **'you are so sweet', 'mum likes dad'**). Expressions must be explicit.

6.28.11 Praise of environment

A positive evaluation of any aspect of the immediate environment. For example:

- ✓ **'The garden is gorgeous'**
- ✓ **'This play-room is fantastic!'**

6.28.12 Praise of another person

Verbal expressions of praise and endearment. The caregiver directs verbal behaviour to another person in order to provide a positive evaluation of his/her action/behaviour/personal characteristics (e.g., **'Aunt Lucy is so sweet', 'good job grandpa', 'oh, grandad is good! ', 'you are so sweet', 'mum likes your teacher'**). Expressions must be explicit.

6.28.13 No criticism/praise

No comments such as those mentioned above were made.

6.28.14 Not possible to code criticism/praise

The quality of the audio does not allow the coder to ascertain whether a phrase is critical or praising.

6.29 Sense of humour

Evaluation of the sense of humour as expressed verbally with a joke, sarcasm, rhyme and vocal sounds done with the purpose of being funny.

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.28.1 Use of humour

The caregiver makes a joke, tells a funny story, makes a funny rhyme. For example:

- ✓ **"Things fade when they get old, like granny's memory"**

6.28.2 No use of humour

The sentence does not contain any humorous content.

6.28.2 Not possible to code use of humour

The quality of the audio does not allow the coder to identify whether a humorous comment was made or not.

6.30 Odd content

Evaluation of the oddity of the content of a sentence of the caregiver. As something not aligned with the context, the environment, the type of interaction and the cultural and social context of the family.

Source: (Association & Association, 2013)

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.29.1 Suspicion

Caregiver comments are paranoid or suspicious i.e., they reveal distrust of others, beliefs that most people are dishonest and/or potentially harmful. It might occur as a negative interpretation of a kind gesture.

6.29.2 Odd or superstitious beliefs

Caregiver comments reveal an odd superstition or unusual religious belief, which is not relevant to the person's culture or religion.

6.29.3 Black and white statements

Expression of extremely polarised thoughts. There is no space for compromise or shades in the conversation. There is no consideration of multiple and different alternatives. For example:

- ✓ 'I never get anything right'
- ✓ 'I am not brilliant, then I must be stupid'
- ✓ 'A woman can't have a career and be a stay-home mom'
- ✓ 'If he does not love me, then he must hate me'
- ✓ 'If I can't do this perfectly, then I won't do it at all!'

A specific type of 'black and white' thinking is the vacillation between idealisation and devaluation. For example:

- ✓ 'If you are not entirely good, then you must be entirely bad'.

6.29.4 Possible Lie

Guess the best: the caregiver refers to an unbelievable fact. It is unlikely to be 100% sure it is a lie, however code here all unbelievable phrases. For example:

- ✓ 'I couldn't go to the office because yesterday I received my third bypass operation.'
- ✓ 'I see you making fun of me' (referring to the 6-month-old infant)
- ✓ 'The dog ate your cake' (when you observed that this was not the case)

6.29.5 Physical complaints

Caregiver is complaining about some pain or other physical symptoms. For example: He/she might mention headaches, migraines, chronic pain, back pain, gastrointestinal pain, fatigue, dizziness etc.

6.29.6 Swearing

The caregiver uses obscene or vulgar language.

6.29.7 No unusual comments

None of the above-listed behaviours occur.

6.29.8 Not possible to code odd comments

The quality of the audio does not allow the coder to identify whether an unusual comment has been made.

6.31 Mind-mindedness

Source: (Meins, E., & Fernyhough, 2015) except 'mind mindedness ambiguous comments' that has been adapted from (Meins, E., & Fernyhough, 2015; Rigo-Lemini, 2013).

Mind-mindedness is the caregiver's tendency to comment appropriately or inappropriately on the infant's putative internal states during interactions. Mind-mindedness comments include:

- ✓ All comments which focus on the child's internal states;
- ✓ Using an explicit internal state term to comment on what the infant may be thinking, experiencing, or feeling;
- ✓ 'Putting words in the infant's mouth', i.e., the caregiver talks on the infant's behalf. Comments in this category do not necessarily have to contain a statement that reflects the internal state of the infant (language that refers to feeling, interests, desires, emotions etc of the infant);
- ✓ Anticipating the **wants or desires** of the infant. Like, dislike, do not like, love, want, prefer, favourite, hate, can't stand, **'you want the ball, don't you?'**;
- ✓ Commenting on the infant's **cognitions**. Think, decide, making a decision, know, recognise, remember, recall, interested, not interested, notice, focused, intent, expect, working it out, fascinated, obsessed, curious, nosy, **'you're really concentrating on that!'**;

- ✓ Recognising the expression of the infant's **emotions**. Had enough, fed up, shy, solemn, self-conscious, happy, sad, scared, afraid, joyful, gleeful, full of the joys of Spring, serious, grumpy, stressed, moody, in a good/bad mood, stroppy, being difficult, worried, anxious, dazed, confused, excited, cross, not feeling yourself, startled, make you jump, surprised, disgusted, bored, angry, bad tempered, **'you're a happy baby!'**;
- ✓ Teasing, playing games with me, joking, having a joke, playing a joke, **'what a funny joke you made!'**;
- ✓ Epistemic states, i.e., those relating to knowledge of a person's internal states, such as certainty of a person's beliefs and the reasons for them.

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.30.1 Mind-mindedness ambiguous comments

Adapted from (Meins, E., & Fernyhough, 2015).

The caregiver has made a mind-minded comment, but it is not clear whether it is attuned or not to the current state of the infant, for example:

- ✓ **'You love playing with cars, don't you?'** but the infant is off-camera and we cannot see whether he/she is playing with a car toy or he/she has given any indication of attention to a car toy.

6.30.2 Appropriate (attuned) comments

The researcher agrees with the caregiver's reading of infant's current internal state. For example:

- ✓ **'You want the frog'** (said while infant is reaching towards the frog)
- ✓ **'The ball is your favourite thing, isn't it?'** (After the infant has demonstrated a repeated preference for playing with the ball)
- ✓ **'Are you thinking?'** (Said while the infant has a pensive expression)
- ✓ **'You don't like that one'** (after the infant has rejected a toy by pushing it away)
- ✓ **'You like these animals'** (after infant has been focused intently on playing with the animals for several minutes)
- ✓ **'You're such a happy boy'** (said while infant is laughing or smiling)
- ✓ **'Are you going all shy?'** (After infant coyly turns away)
- ✓ **'Did that scare you?'** (After infant was startled by a noisy toy)
- ✓ **'Are you playing games with me?'** (After infant has repeatedly disobeyed the caregiver's request not to put a toy in his mouth, smiling at her each time he raises the toy to his mouth)
- ✓ **'I want to feed myself mummy'** (after infant's attempt to grab the spoon and feed him/herself independently)
- ✓ **'Does it hurt when you cough?'** (Said looking at distressed facial expression of the infant after coughing).

The comment links current activity with similar events in the past or future. For example:

- ✓ **'Do you remember seeing a camel at the zoo?'** (While the child plays with a toy camel)
- ✓ **'You liked going in the car today, didn't you?'** (While playing with a car)
- ✓ **'Do you want to go on the train tomorrow?'** (While playing with a train)

- ✓ **'You recognise this because you've got the same one at home'**
- ✓ **'You like red, don't you?'** (Note that comments such as these where the caregiver is drawing on the child's previous preferences over an extended period should be coded as appropriate even if the child has not obviously demonstrated a liking of red in the play session)
The comment serves to clarify how to proceed after a lull in the interaction. For example: if the infant has been gazing around for several seconds, not focused on any object or event, then a comment such as **'Do you want to play with the farm?'** would be appropriate. Note that such a comment would be non-attuned if the caregiver asked this while the child was already actively engaged in attending to or playing with something else.
- ✓ When the infant shouts for attention, caregiver says: **'he is like: "I am here too!"'**

6.30.3 Inappropriate (non-attuned) comments

The researcher disagrees with the caregiver's reading of the infant's current internal state. For example:

- ✓ **'You're bored with that one'** (referring to a toy with which the infant is still actively playing)
- ✓ **'You really like the duck'** (after the infant has shown no interest in or positive affect towards the duck)
- ✓ **'Are you tired?'** (After the infant has shown no overt signs of tiredness)
- ✓ **'Grumpy boy'** (when the infant appears to be in a good mood)

The comment refers to a past or future event that is unrelated to the infant's current activity. For example:

- ✓ **'Would you like Granny to come and see you tomorrow?'** (Having not previously mentioned Granny)
- ✓ **'Do you want custard for dinner?'** (After no previous play or discussion focused on food)
- ✓ **'Do you want to go swimming when we go on holiday?'** (After no previous play or discussion about holidays or swimming)
- ✓ The caregiver asks what the infant wants to do or suggests that the infant wants to become involved in a new activity when the infant is already actively engaged in playing with or attending to something else.

The caregiver seems to be attributing internal states (epistemic states, emotions or desires) that are not implied by the infant's behaviour and which appear to be projections of the adult's own internal states onto the child. For example:

- ✓ **'Are you thinking about Daddy who you love so much?'**

The referent of the caregiver's comment is not clear. For example:

- ✓ **'You like that'** (when the infant is not playing with or attending to any object or event)
- ✓ **'Do you like that?'** while the infant's face expresses disgust.

6.30.4 No mind-mindedness

The following examples should not be coded as examples of mind-minded speech:

- ✓ Comments on the infant's **perception**, i.e., seeing, watching, looking, listening, touching, tasting
- ✓ Comments about the infant saying something or talking
- ✓ Non-specific references to the infant's internal states. The caregiver has noted a change in the infant's internal state, but the comments do not reflect the specific state being experienced

- ✓ Comments such as **'are you alright?', 'is that better?'**
- ✓ The caregiver comments on the infant's physical state in response to a behaviour from the infant, indicating that such a reading of their physical state is warranted
- ✓ If clever is used merely to give positive feedback for generally behaving well (**'clever boy/girl'**) and a purely non-mentalistic interpretation is possible
- ✓ If cheeky is used generally (**'cheeky boy/girl'**) and is not in response to any clear teasing or playful behaviour
- ✓ Comments on the infant's intentions using phrases such as **'going to'** (**'are you going to play with the car'**), or **'trying to'**.

6.30.5 Not possible to code mind-mindedness

Mind-mindedness comments cannot be coded, the audio might not have been clear enough to detect the content of the speech or it is not possible to code one of the above-listed behaviours.

6.32 Verbal Encouragement/Discouragement of Attention

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.)

The caregiver attempts to direct the infant's attention. The infant's response is not needed to code this behaviour. Encouraging attention may include social play activities with and without use of objects.

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.31.1 Verbal Encouragement to Focus object

The caregiver verbally encourages the infant's attention to the object which is the focus of the activity within the video, e.g., feeding, stacking task, free play. The object must be within the infant's immediate visual environment, which is defined as no more than 12 feet away. The caregiver's vocalisations must highlight a very specific referent. Verbal statements include:

- ✓ Naming or labelling the object
- ✓ Questioning the infant about the object
- ✓ Instructing the infant about an object/object's functions
- ✓ Describing an ongoing object-related event/activity
- ✓ Describing object's characteristics/qualities
- ✓ Commenting a very specific object, must be clearly instructive
- ✓ The caregiver is speaking for a toy **'hi, I'm Micky Mouse'**
- ✓ Nicknames or silly names for objects
- ✓ Stories or songs with specific object references

During a feeding interaction the infant does not want to eat anymore, and the caregiver says: **'almost gone, just one more'**, this might be considered both as acknowledgement of the infant state and as encouragement to complete the action.

Do NOT code:

- ✓ Non-specific references or abstract comments (e.g., **'It's hot today'**, **'all your toys are sleeping'**)

- ✓ References to distant object or objects not in view (**'the phone is ringing', 'there goes a red car', 'someone's at the door'**)
- ✓ References to the camera person
- ✓ References to an object's qualities or characteristics that are not real
- ✓ References to an objects qualities or characteristic that are person-related
- ✓ Mentioning of body parts in the context of dressing or bathing UNLESS it is clearly for instructional purposes
- ✓ Body parts that are hidden from the infant's view
- ✓ Caregiver's vocal animation of a toy that does not include a direct referent.

6.31.2 Verbal encouragement to other person/object

To other person: Caregiver attempts to draw the infant into face-to-face social interactions with another familiar adult or child. Verbal attempts include direct vocalisations about the person to direct the infant's interest. These must be very specific references to a person. Examples:

- ✓ **'Look at.... /her'**
- ✓ **'Look at.... /her hair'**
- ✓ **'Where is.....?'**
- ✓ **'Talk to.... /her'**
- ✓ **'Say hello to /her'**

Do NOT code:

General statements, such as:

- ✓ **'Hi....' Or any greeting**
- ✓ **'I see....'**
- ✓ **'.... /she's going to'**
- ✓ **'That's.... /her'**
- ✓ **'.... /she's hurrying.'**

To object: The caregiver verbally refers to an object or object-related event or activity using a noun or pronoun. The object must be within the infant's immediate visual environment, which is defined as no more than 12 feet away. The caregiver's vocalisations must highlight a very specific referent. For example:

- ✓ Naming or labelling the object
- ✓ Questioning the infant about the object
- ✓ Instructing the infant about an object/object's functions
- ✓ Describing an ongoing object-related event/activity
- ✓ Describing object's characteristics/qualities
- ✓ Commenting on a very specific object, must be clearly instructive
- ✓ The caregiver is speaking for a toy **'hi, I'm Micky Mouse'**
- ✓ Nicknames or silly names for objects
- ✓ Stories or songs with specific object references

Do NOT code:

- ✓ Non-specific references or abstract comments (e.g., **'It's hot today', 'all your toys are sleeping'**)
- ✓ References to distant object or objects not in view (**'the phone is ringing', 'there goes a red car', 'someone's at the door'**)

- ✓ References to the camera person
- ✓ References to an object's qualities or characteristics that are not real
- ✓ References to an object's qualities or characteristics that are person-related
- ✓ Mentioning of body parts in the context of dressing or bathing unless it is clearly for instructional purposes
- ✓ Body parts that are hidden from the infant's view
- ✓ Caregiver's vocal animation of a toy that does not include a direct referent.

To caregiver: The caregiver attempts to draw the infant into face-to-face social interaction. It must be clear that the caregiver's primary goal is face-to-face interaction and social engagement of the infant.

- ✓ Verbal attempts include direct vocalisations about herself to attain the infant's interest. These must be very specific references to self or to the head/neck area (e.g., **'look at mummy/me'**, **'look at mummy's/my hair'**, **'where is mummy?'**, **'talk to mummy'**, **'say hello to mummy/me'**, **'that's mummy's mouth'**).

Do NOT code:

- ✓ General self-statements (e.g., **'I see you'**; **'mummy/I am going to...'**; **'that's mummy's/my...'**; **'Mummy's/I'm hurrying'**; **'what's mummy/me doing?'**; **'mummy has a green t-shirt on'**)
- ✓ **'Hi'** or any greeting
- ✓ Non-verbal sounds or imitations of the infant's sounds
- ✓ Calling the infant's name

6.31.3 Verbal encouragement of infant motor skills

The caregiver verbally encourages the infant on her/his postural control, on fine and gross reaching and grasping actions and/or on locomotion.

- ✓ Examples: **'raise your hand'**, **'look how strong you are'**, **'there you are, almost reached the toy'**, **'point to dad, tell me where he is'**, **'can you grasp the spoon all by yourself?'**, **'jump!'**, **'come to mummy, yes one step per time'**, **'can you stand?'**

6.31.4 Verbal encouragement to emotional state

The caregiver verbally encourages the infant to feel/express an emotional state.

Examples: **'come on, smile at mummy'**, **'if you laugh again, I'll make you a cake 'that's it let the emotion out, it's OK to cry'**.

6.31.5 Verbal discouragement from focus object

The caregiver tries to move the attention away from the object which is the focus of the activity. The object varies depending on the activity. For example:

- ✓ Feeding: food, container, cutlery etc.
- ✓ Stacking task: The stacking toy or one of its components
- ✓ Free play: The focus object can vary. It might be a toy, the caregiver, or any object around which the play centres.
- ✓ Photo-book: The photo-book or any of its components.

6.31.6 Verbal discouragement from another person/object

- ✓ From primary caregiver: The caregiver attempts to discourage/distract/shift the attention of the infant away from him/herself, (e.g., **'do not look at me'**, **'do not touch mum's face'**).
- ✓ From other person: The caregiver attempts to discourage infant's focus of attention from another person present in the room (e.g., **'do not look at your sister, look at mummy'**). This

should be coded as discouragement to other person and as encouragement to primary caregiver. For example, the caregiver (mum) says, **'Do not touch dad's hands while you are eating'**.

- ✓ From object: The caregiver verbally tries to direct the attention of the infant from an object he/she is attending to (e.g., **'do not take the spoon'**, **'do not look at the tv'**, **'leave this toy'**).

6.31.7 Verbal discouragement from infant motor skills

The caregiver attempts to discourage the infant from performing or starting to perform a motor activity. Examples: **'don't move'**, **'leave this'**, **'stop crawling'**, **'lower your hands'**, **'stop moving'**, etc.

6.31.8 Verbal discouragement from emotional state

The caregiver attempts to draw/shift/discourage/distract infant's attention from his/her current emotional state. Examples: **'come on'** (said while infant is crying), **'stop being so fussy'**, **'don't shout at me'**, **'stop being angry please'**.

6.31.9 No verbal encouragement/discouragement

The caregiver does not verbally attempt to engage or disengage the infant socially or didactically.

6.31.10 Not possible to code verbal encouragement/discouragement

Verbal encouragement/discouragement cannot be coded because the audio quality does not allow a clear identification of the content or the type of encouragement/discouragement is not listed above.

6.33 Verbal Intrusiveness

Caregiver intrusiveness conveyed through verbal communication.

Adapted from (Biringen et al., 1997, 2014; Pipp-Siegel & Biringen, 1998)

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.32.1 Verbal intrusiveness evident

The caregiver verbally interrupts infant's action. Caregiver's speech conflicts with the infant's desired outcome. He/she is interfering without respecting the natural break of action or conversation. The caregiver acts out of time, interrupting, or changing the topic, caregiver is leading the interaction without giving space and time to the infant to participate actively. While the infant is vocalising, the caregiver enters the conversation abruptly and interrupts. For example:

- ✓ He/she gives commands (e.g., **'leave that toy'**, **'take this spoon'**). Imperative mode is often used.
- ✓ He/she talks at the infant rather than to the infant. One-way communication in which the caregiver does not expect a response from the infant but responds to themselves (e.g., **'Can you give me that toy? Yes, give it to me.'**)
- ✓ The infant is focused on one activity, but the caregiver tries to direct his/her attention toward a new activity, in which the infant has shown no previous interest.

6.32.2 No verbal intrusiveness

Caregiver respects the timing of conversation and play, gives suggestions and advice to the infant if necessary but does not interrupt the infant's activity and waits until the right moment to start the

interaction. The caregiver can follow the lead of the infant (e.g., ‘What do I do now?’, ‘Oh, so you want me to put this doll on the car?’).

6.32.3 Not possible to code verbal intrusiveness

From the conversations or actions or because of the quality of the footage/audio, it is unclear whether speech was intrusive or not.

6.34 Verbal play

Source: CFRS, NICHD Coding Manual (Bornstein, n.d.), (Quinn et al., 2018; Quinn & Kidd, 2018)

The caregiver plays with the infant verbally.

MODIFIER OF:

Within ‘Caregiver Vocalisations’:

- ✓ ‘Speech’

Modifier Options (must be one of these):

6.33.1 Verbal Functional Play

The primary caregiver directs verbal behaviour to the infant, the purpose of which appears to be to amuse the infant, i.e., to elicit smiles, positive vocalisations, laughter, or motoric excitement in the context of a primarily social dyadic interaction. The type of play is functional because they are imitating some characteristic inherent to the game played. For example:

- ✓ ‘Broom-broom’ (while rolling a car)
- ✓ ‘Bang-bang’ (while banging two objects together)

6.33.2 Verbal Symbolic Play

The caregiver directs verbal behaviour to the infant, the purpose of which appears to be to amuse the infant, i.e., to elicit smiles, positive vocalisations, laughter, or motoric excitement in the context of a primarily social dyadic interaction. The play is symbolic when the caregiver emits a sound that stands/symbolises something else. For example:

- ✓ ‘Choo-choo’ while pretending that the spoon is a train
- ✓ ‘We’re wearing crowns, like princesses’ while putting on the headcams.

6.33.3 No Verbal Play

None of the forms of parental behaviour described above occur.

6.33.4 Not possible to code Verbal Play

The quality of the audio does not allow the coder to detect whether the dyad is engaged in verbal play.

6.35 Globality/Internality

This is related to the globality vs specificity of a statement together with the agency of the causal attribution: does the caregiver make it specific to the situation or globalise to all situations. The subject is the active agent/cause of his/her own action/emotional state.

Source: (Abramson et al., 1978; Beck, Aaron T., Rush J., Shaw B.F., 1987; Beck et al., 1961; T. et al., 2018)

Globality: Expressions that convey a sense of absolutism and/or generalisation.

Specificity: Expressions that are characterised as specific events, with a discernible beginning and end.

Internality: Degree to which the cause of an event is internal to the person.

Externality: Degree to which the cause of an event is external to the person.

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.34.1 Globality internal

A statement implying the attribution persists across different situations and affects many areas of life. Any generalised statement with negative/positive/neutral connotations. Globality can be expressed using adverbs such as always, as usual, never, ever, again, anything, everything, everybody, anybody, all. For example:

- ✓ 'I never make the right choice'
- ✓ 'You are crying as usual'
- ✓ 'You are always happy'
- ✓ 'Everything is so easy for you!'
- ✓ 'You can do anything if you want to'
- ✓ 'The politicians never agree amongst themselves'

Moreover, it expresses to a certain degree that the cause of an action is internal to the agent. Any statement that refers to the person's belief that the problem/issue is attributable to him/her, for example:

- ✓ 'it's my fault if you are not eating'
- ✓ 'You are crying because I am not good'
- ✓ 'You hurt yourself because I wasn't watching you'
- ✓ 'it's my fault if we didn't win the game'
- ✓ 'You are crying because you didn't sleep enough'

6.34.2 Internal Specificity

The action is identified as a specific event with both a clear temporal starts and end and with a specified reference to the particular event, without further generalisation. The causal attribution to an event is specific to the context where the situation occurs and is not generalised to other events nor is it supposed to have consequences on other aspects of the life of the subject or of someone else. Specificity might be expressed using adverbs and expressions such as: '**now/on this occasion/this time/sometimes, X is affected, but not Y**', etc. The content could be negative, for example:

- ✓ 'You are being naughty now'
- ✓ 'If you don't eat all your dinner, you won't get ice cream later'
- ✓ 'Today you are distracted'
- ✓ 'Yesterday, I wasn't able to focus properly'
- ✓ 'My colleague was upset with me because I didn't warn him about the strike'

Same as above but a positive context. The content of the phrase has a positive, optimistic connotation. It does not need to be said with a positive tone. For example:

- ✓ **'I like you when you smile in this way'**
- ✓ **'Gnam-gnam we do like this today, don't we?'**
- ✓ **'He is laughing because of you', 'mummy is happy because you kissed her'**
- ✓ **'Your sister received a good mark because she studied a lot for that exam'**

Same as above but in a neutral context. The content of the phrase has a neutral connotation. It might be expressed with different tones. For example:

- ✓ **'This program today has less advertisement than usual'**
- ✓ **'You are tired because you ate a lot, aren't you?'**
- ✓ **'You should eat more fruit when you are sick'**

6.34.3 Globality External

A statement implying the attribution persists across different situations and affects many areas of life. Any generalised statement with negative/positive/neutral connotations. Globality can be expressed using adverbs such as always, as usual, never, ever, again, anything, everything, everybody, anybody, all. The causal attribution is external to the caregiver and/or infant. For example:

- ✓ **'It's your sister's fault if you (infant) didn't receive more presents'**
- ✓ **'You are crying because your brother is really noisy in the morning'**
- ✓ **'You are hungry because dad/mum hasn't cooked yet, he/she is never organised'**
- ✓ **'I am upset because your dad/mum never stops complaining about work'**
- ✓ **'It's your uncle's fault if your dad is late because he always speaks too much'**

6.34.4 External Specificity

The action is identified as a specific event with both a clear temporal start and end and with a specified reference to the particular event, without further generalisation. The causal attribution to an event is specific to the context where the situation occurs and is not generalised to other events nor is it supposed to have consequences on other aspects of the life of the subject or of someone else.

Specificity might be expressed using adverbs and expressions such as: **'now/on this occasion/this time/sometimes, X is affected, but not Y', 'this time', that occasion'** etc.

For example:

- ✓ **'It's the fault of this bad weather if you are cold!'**
- ✓ **'Did your sister make you cry this time?'**
- ✓ **'Your brother lost this game because he was unlucky'**
- ✓ **'It was destiny that your brother got that position'**

6.34.4 Neither Globality/Internality

- ✓ *No globality:* The caregiver uses specific statements that do not reflect global thinking.
- ✓ *No specificity:* There is no reference about a causal attribution to a specific event or reason. There is no specific and delimited temporal evaluation. The phrase might be a generalisation, or it might not contain any reference to code as to whether it is specific to a particular context, event, occasion.
- ✓ *The causal factors* implied by the speaker cannot be determined, or the phrase does not imply any attribution of agency.

6.34.5 Not possible to code Globality/Internality

The quality of the audio does not allow the coder to detect and/or identify whether a global or specific comment has been done.

6.36 Teaching

The caregiver is communicating in a way in which he/she may educate/pass some knowledge.

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.35.1 Telling a story

To hold a conversation about past or future events which are not directly within the immediate topics and are not directly observable in the environment (e.g., past or future) within the context of fantasy play or factual events narrated with a clear sequence of events that constitute a story. It can also be a: narration of a clear sequence of events (past or future) which are not present within the immediate context but situated within the context of fantasy play or factual events. For example:

- ✓ **'Two little boys went to the park. They played on the swings and the slide. They had lots of fun and made new friends.'**
- ✓ **'Once upon a time, a little girl made a wish that she could sing beautifully. Suddenly, a fairy appeared and cast a spell to grant her this wish. From that day on, she sang wherever she went, and all of the people in her village loved to listen to her beautiful voice'.**

6.35.2 Recall a memory

In order to code this behaviour the caregiver should be discussing no observable attributes of objects or persons present in the environment or linking past or future events related to the present shared by both subjects. The caregiver could also be remembering previous events or linking past or future events to the present. For example:

- ✓ **'We went on holiday last year, didn't we?'**
- ✓ **'I remember when I was little, I used to play with stacking toys, like this.'**

6.35.3 Labelling

It can include assigning numbers, shapes, colours, or nouns that are used in the context of showing (encouraging attention) or indicating **'this is a dog'** with a clear reference to labelling an object in the present.

6.35.4 Explain or define

The caregiver describes and explains what something is/how something works/what something does, etc. For example:

- ✓ **'Spoons are used for eating'**
- ✓ **'Dogs bark'.**

6.35.5 Not teaching

There is no clear intention of explaining something to the infant or teaching them.

6.35.6 Not possible to code as teaching

The quality of the footage does not allow the coder to evaluate whether the caregiver is trying to teach something.

6.37 Name

How the caregiver is referring to the infant.

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Modifier Options (must be one of these):

6.36.1 Real name

The caregiver calls the target infant with his/her real name or an abbreviation of it. For example:

- ✓ 'Josh' for 'Joshua', 'Becky' for 'Rebecca', 'Rick' for 'Richard'

6.36.2 Affectionate nickname

The caregiver refers to the infant using an affectionate nickname. For example:

- ✓ There is a change made to the name beyond a simple abbreviation ('joshy-woshy' for Josh)
- ✓ The child is named after an object ('angel', 'sunshine', 'sweetie')
- ✓ A term of endearment is used ('dear', 'darling', 'sweetheart')

6.36.3 No affectionate nickname/real name

No name or nickname is used.

6.36.4 Not possible to code Name

The quality of the audio makes it impossible to ascertain whether the caregiver has used a nickname or real name.

6.38 First word type

Any expression made by the infant in which one or more key syllables or sounds from a real word is made.

MODIFIER OF:

Within 'Infant Vocalisation':

- ✓ 'First Words'

Modifier Options (must be one of these):

6.37.1 Sounds like 'mama'

Any sounds made by the infant which seem to be an attempt to form the word 'mama', 'mummy', or any other word typically used to refer to a female primary caregiver.

6.37.2 Sounds like 'dada'

Any sounds made by the infant which seem to be an attempt to form the word 'dada', 'daddy', or any other word typically used to refer to a male primary caregiver.

6.37.3 Sounds like 'up'

Any sounds made by the infant which seem to be an attempt to form the word 'up', possibly as a request to be picked up by a caregiver.

6.37.4 Not possible to code first word

It is not possible to code whether the infant said/attempted to say a word.

6.39 Languages

Languages (e.g., English, Scots, Welsh, Afrikaans, Portuguese, Zulu, Spanish, Italian, etc) used by the caregiver. Include dialects within the main spoken language. Specify the actual language used in the comments section available in the Observer XT®.

MODIFIER OF:

Within 'Caregiver Vocalisations':

- ✓ 'Speech'

Within 'Infant Vocalisation':

- ✓ 'First Words'

Modifier Options (must be one of these):

6.38.1 Language 1

Main language of the interaction or native language of the speaker. It is possible to specify the actual language used in the comments section.

6.38.2 Language 2

Second language used in the interaction. It comes temporarily after the language 1 even though it may be more frequent. It is possible to specify the actual language used in the comments section.

6.38.3 Language 3

Third language for appearance in the interaction. It comes after language 1 and 2. It is possible to specify the actual language used in the comments section.

6.38.4 Language 4

Fourth language for appearance in the interaction. It comes after language 1,2 and 3. It is possible to specify the actual language used in the comments section.

6.38.5 Sign-language

Independently by the specific sign language used, code here if caregiver is using sign language.

6.38.6 Not possible to code language

The quality of the footage does not allow the coder to assess which language has been spoken.

Ethic Statement

No primary or secondary data have been used in this work. However, we used images provided by an ALSPAC-G1(Boyd et al., 2013; Fraser et al., 2013) participant who has provided full access in the use of images and data for publication purposes, media usage and teaching scopes the images cannot be connected to any other data. Approval in the usage of images relating to the child were also obtained. The child is enrolled in the second generation of ALSPAC (ALSPAC-G2, also known as Children of the Children of the '90s – COCO90s)(Lawlor et al., 2019).

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Conflict of interest

All the authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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