**Appendix**

Modifications to Administration Procedures

*Motor Subscale*

Functional Object Use (FOU): Adult-like familiar instrumental objects (e.g., comb, cup) were replaced with child friendly objects/toys that required specific, differential play (e.g., plastic cup, brightly colored ball, rattle, toy hairbrush). To avoid scoring ambiguity, care was taken not to choose two objects with similar movement trajectories, especially objects that are both placed in the mouth (e.g., cup, spoon).

Automatic Motor Response: For all children, an additional procedure was added to examine automatic motor responses. Children were presented with a toy and given the following alternating commands: “Play with the toy;” “Don’t play with the toy;” “Play with the toy;” “Don’t play with the toy.”

Localization: In addition to applying pressure to the finger for a minimum of five seconds, two less aversive stimuli (ie, ice pack and tuning fork) were introduced to elicit tactile localization.

Flexion Withdrawal/Abnormal Posturing: To minimize discomfort, deep pressure to the nailbed of each extremity was not administered.

*Oromotor/Verbal Subscale*

Intelligible Verbalization: To encourage intelligible verbal responses, the original aural and visual prompts were modified. For example, the questions “How are you today?” and “Where do you live?” were replaced with “How old are you? You are…” The visual prompt, “What part of my body is this?” (when pointing to the examiner’s nose) was changed to “What is this? This is called my…”

Oral/reflexive movement: To promote compliance with placing the tongue blade in the child’s mouth, the examiner oriented the child to the task by saying, “I am putting this in your mouth for just a second. I am going to touch your lips and tongue.”

*Communication Subscale*

Functional Communication: To maximize functional communication (FC), six additional yes-no situational orientation questions were added about drawings in a picture book. The examiner pointed to either a mouse or a cow and asked the child, “Is this a mouse?” or “Is this a cow?” Similar to the original visual and aurally-based item sets, yes responses were correct for half of the picture book-based set.

Modifications to Scoring Procedures

*Motor Subscale*

Functional Object Use (FOU): In the original CRS-R, FOU is scored as present when an individual is able to pantomime use of two different common objects when given the prompt “Show me how to use a (name of object).” The movement sequence associated with each object must be recognizable and specific to the object presented. For the CRS-P, FOU was scored as present if these criteria were met on two different occasions throughout the evaluation, even if these behaviors occurred spontaneously. For example, if a child did not demonstrate functional object use on all 4 trials when the verbal prompt was directly administered but spontaneously played with two toys appropriately on two occasions, credit was given for spontaneous FOU. The CRS-P was scored with and without this modification.

Automatic motor response: We retained the original CRS-R scoring criteria for automatic motor responses but also scored the item as present based on the responding to the additional administration procedure used to prompt a response. We scored this item as present when the participant executed the targeted behavior (i.e., playing with a toy) on the two (of four) trials that require inhibition of the behavior.

*Communication Subscale*

Functional Communication: In the original CRS-R, functional communication is scored as present when an individual’s correctly answers 6/6 visually or aurally-based yes/no questions. For the CRS-P, FC was considered present if the child answered 6/6 yes/no question on either the aurally, visually, or picture book-based sets (described above).

Non-Functional/Intentional Communication: On the CRS-R non-functional intentional communication is scored as present if the participant provides a clearly discernible verbal or gestural “yes” or “no” response on 2/6 questions, regardless of accuracy, on at least two of six situational orientation questions (e.g., “Am I touching my nose/ear?”). The same scoring criteria was used for the CRS-P, except that at least two yes-no responses were provided on either the aurally, visually, or the additional picture book –based item sets. The CRS-P was scored with and without the responses to the picture book-based set.

*Arousal Subscale*

Attention: In the original CRS-R, the attention item is scored as present when there are no more than 3 occasions across the length of the evaluation in which the participant fails to respond to a verbal prompt. For the CRS-P, we modified the criteria to ensure that all behaviors that occurred in response to the examiner’s request, including incorrect responses and refusals to comply, were captured. The new criteria defined a response either as a change from rest to a new behavior (e.g., turning away from the examiner) or a change from a previous behavior (e.g., moving around the room) to a different behavior (e.g., looking at the examiner) in response to a verbal prompt.

**Coma Recovery Scale for Pediatrics (CRS-P) – Modified Items**

*All modifications are shown below in bold.*

Auditory Function Scale ( no changes needed, except for using toys as stimuli commands)

4- Consistent Movement to Command\*

3- Reproducible Movement to Command\*

2- Localization to Sound

1- Auditory Startle

0- None

Visual Function Scale (no changes needed, except using toys as stimuli for object recognition/localization)

5- Object Recognition\*

4- Object Localization: Reaching\*

3- Visual Pursuit\*

2- Fixation\*

1- Visual Startle

0- None

Motor Function Scale

**6- Functional Object UseT**

5- Automatic Motor Response\*

4- Object Manipulation\*

3- Localization to Noxious Stimulation\*

2- Flexion Withdrawal

1- Abnormal Posturing

0- None/Flaccid

Oromotor/Verbal Function Scale

**3- Intelligible Verbalization\***

2- Vocalization/Oral Movement

1- Oral Reflexive Movement

0- None

Communication Scale

**2- Functional: AccurateT**

2- Functional: Accurate (picture book based trial only)T

1- Non-Functional: Intentional\*

1. None

**Arousal Scale**

**3- Attention**

2- Eye Opening w/o Stimulation

1- Eye Opening with Stimulation

0- Unarousable

**Total Score:**

Denotes emergence from MCST

Denotes MCS\*

Motor Function Subscale

|  |  |  |  |
| --- | --- | --- | --- |
| Score | Item | Method | Response |
| 6 | Functional Object Use | Select 2 common, **familiar** objects (e.g. comb, cup**/bottle/sippy cup, ball, book, tissues, crayon, phone, spoon, toothbrush, cause and effect toy**). Place one of the objects in the patient’s hand and instruct the patient to “Show me how to use a [name object].” Next, place the second object in the patient’s hand and restate the same instruction.  **Do not choose two items that are used by putting in the mouth (e.g., cup, toothbrush).**  Repeat the above procedure using the same objects so that a total of 2 trials are administered with each object. | Movements executed are generally compatible with both object’s specific function (e.g. comb is placed on or near the head) on all 4 trials administered.  *If the patient is unable to hold the object because of neuromuscular involvement, this should be noted on the record form and the item should not be scored.*  **Child should also achieve full credit if observed to spontaneously use/play with two different objects on two occasions.** |

Oromotor/Verbal Function Subscale

|  |  |  |  |
| --- | --- | --- | --- |
| Score | Item | Method | Response |
| 3 | Intelligible Verbalization | 1. Tell patient “I would like to hear your voice.” This should be followed by an attempt to directly elicit speech using the verbal prompts shown below. At least one prompt should be selected from the Aural Set and at least one from the Visual Set.  2. A maximum of 3 trials should be administered for each prompt chosen from the Aural and Visual Sets. Prompts should be administered at 15 second intervals.  Aural Set:  a) “What is your name?” **“Your name is…”**  **b) “How old are you?” “You are…”**  **c) “What do you do when you are thirsty?”**  **d) “What do you do when you are sleepy?”**  **e) “Count to four with me, one, two, three…?**  Visual Set:  **a) “What do you call this?” This is called a…” (cup, ball, baby)**  **c) “What is this?” This is called my…” (nose, eyes, mouth).** | Each of the following criteria must be met:  1. Each verbalization must consist of at least 1 consonant-vowel-consonant (C-V-C) triad. For example, “ma” would not be acceptable, but “mom” would. Make sure objects chosen have a C-V-C sequence;  *and*  2. Two different words must be documented by the examiner to ensure that a repetitive word-like sound is not mistaken for a word. Words need not be appropriate or accurate for the context, but must be fully intelligible;  *and*  3. Words produced by writing or alphabet board are acceptable.  *Verbalizations that occur spontaneously or at other times during the assessment and meet the above criteria should also receive a score of 3.* |

Communication Subscale

|  |  |  |  |
| --- | --- | --- | --- |
| Score | Item | Method | Response |
| 2 | Functional: Accurate | Administer the 6 Situational Orientation questions from the Communication Assessment Protocol (page 12). The examiner may use the Visual set, Auditory set or both sets, if appropriate.  **In addition to the above questions, present a picture book (e.g., Goodnight Moon) and ask the child answer yes/no questions about pictures.**  **See Communication Assessment Protocol for questions.** | Clearly discernible and accurate responses (e.g. pointing/directed eye gaze to yes/no cards, head nods/shakes, thumbs up/down) occur on all 6 of the Visual *or* Auditory **or Picture Book** Situational Orientation questions from the Communication Assessment Protocol. |

Arousal Subscale

|  |  |  |  |
| --- | --- | --- | --- |
| Score | Item | Method | Response |
| 3 | Attention | Observe consistency of behavioral responses following verbal or gestural prompts. | There are no more than 3 occasions across the length of the evaluation in which the patient fails to respond to a verbal prompt.  **A prompted response is defined as a change in behavior from rest to a new behavior (e.g., turning away from the examiner) or a change from a previous behavior (e.g., playing with a toy) to a different behavior (e.g, holding the toy closer)** |

**Communication Assessment Protocol**

|  |
| --- |
| **Situational Orientation** |
| **Picture Book Based (for each item pick a page with either a mouse or a cow)** |
| Is this a cow?  (point to mouse)  Is this a mouse?  (point to mouse)  Is this a mouse?  (point to mouse)  Is this a cow?  (point to mouse)  Is this a mouse?  (point to cow)  Is this a cow?  (point to cow) |
| Total \_\_\_/6 |