INFANT PRIMATE RESEARCH LABORATORY

STANDARD OPERATING PROCEDURE

FOR THE EVALUATION OF

NEONATAL REFLEXES AND REACTIVITY

Document Name: IPRLNurseryVer3.SOP

Begin Date: September 30, 2003

End Date:

This Standard Operating Procedure (SOP) was prepared by Brenda Crouthamel and Kimberly Grant.
Purpose:
The purpose of the Nursery Assessments of the infant primate is to provide an evaluation of the development of early reflexes, behavioral state and general reactivity toward social and nonsocial stimulation. The assessment is modeled after T. Berry Brazelton’s behavioral exam used with human infants (Neonatal Behavioral Assessment Scale, 1995). The groundbreaking work from Brazelton and colleagues showed that infants are active participants in constructing their environment and there are important individual differences in the strength and style of behaviors as they development. Items on this test measure a range of abilities including reflex strength, visual alertness, response to social stimulation and ability to be soothed. This assessment is commonly used in clinical and research settings with human infants as an early screening measure for developmental problems. The IPRL uses this assessment in the nursery to study early differences in neonatal behavior and how these differences may be related to prenatal and perinatal history.

Essential Readings


Supplies and Equipment:

Nursery binder with log sheets, Daily Treatment record, laptop computer, diapers, metal counter top and metal lid, small colorful plastic toy, nipple, spray cleaner (e.g. Sporeklenz), and a pen are required.

Schedule:

This assessment is performed every day, starting at postnatal day 1 until day 19. The assessment is performed at approximately 1pm, 7 days/week. The assessment is not performed on any day that an infant has been sedated or delivered by C-section.
Procedure:

Step 1. Go to the daily schedule and determine which infants are scheduled for Nursery Assessments for that day. Locate the Daily Treatment Record and note if any of these infants are currently receiving medication. Go to the nursery and turn on the laptop computer. Click on the Nursery Assessment Access file and open a blank Nursery Assessment form.

General note: If an infant has been sedated, note this on the infant’s Temperament log sheet and go on to the next animal scheduled for testing.

Step 2. Decide which animal will be tested first based on age and health status. Record the first infant's animal number, eartag, tester number, the date and the start time of the assessment on the computer data form.

Animal number
Eartag
Tester number
Date
Start time

Enter a "1" if medications are being administered or a "2" if the infant is not receiving any medications. This includes oxygen therapy. Check the infant's housing condition and enter a 1 for incubator or a 2 for cage.

Medication
1--on medication
2--not on medication

Housing
1--incubator
2--cage

Step 3. Approach the infant's incubator or cage and assess the State Prior to Testing for the infant. According to the codes for Predominant State, determine which code best describes the infant's current behavioral state. Record the score in the designated box on the data form.
Predominant State
1--asleep
2--drowsy (falling asleep)
3--passive (awake but inactive)
4--active (awake, active, calm)
5--agitated (alert but agitated)
6--extremely agitated (jerking, screeching)

Step 4. Retrieve a diaper and remove the infant from either the incubator or cage. Wrap the diaper around the infant's torso and securely hold the infant upright. Place your finger in the infant's left palm, stroking it if necessary. This procedure is done to elicit grasping behavior from the infant. Observe how the infant responds and score the behavior according to the codes listed for Grasping.

Grasping
1--none, no grasp
2--partial, digits not closed completely
3--weak, digits closed but loosely
4--strong, digits closed tightly

Record the scores in the designated box on the data form. Repeat this procedure for the infant's right hand.

Continue to hold the infant by the torso and lift the diaper up so that the infant's feet are exposed. Place your finger on the bottom of the infant’s left foot. Perform a stroking motion to elicit the grasping response. According to the codes listed above, score the infant's response. Record the scores in the designated box on the data form. Repeat this procedure for the infant's right foot.

Step 5. With the infant being held in an upright position, grasp the infant's left hand and gently pull the arm out until it is fully extended. Feel how the infant resists the extension. This action should be performed only once. According to the codes for Resistance to Passive Movement, score the infant's response. Record the score in the designated box on the data form. Repeat this procedure for the infant's right arm and record the appropriate score for the response.

Resistance to Passive Movement
1--none, no resistance
2--weak resistance
3--strong resistance
4--rigid, difficult to move
Continue holding the infant around the torso. Reposition the diaper so that you can see the infant's legs and the diaper does not interfere with the task. Grasp the infant's left foot and gently pull the leg out until it is fully extended. Feel how the infant resists. According to the codes for Resistance to Passive Movement, score the infant's response. Record the score in the designated box on the data form. Repeat this procedure for the infant's right leg.

Step 6. Continue to hold the infant around the torso. The diaper should still be wrapped around the infant. At this time, the infant should be facing away from the tester. Gently touch or stroke the left side of the infant's cheek near the corner of the mouth. This procedure is done to elicit the rooting response from the infant. When the rooting reflex is present, the infant will turn their head toward the cheek that is being touched. Observe the infant's head turning behavior. According to the codes listed for Rooting, score the infant’s response. Record the score in the designated box on the data form. Repeat this procedure for the infant’s right cheek.

**Rooting**
1--none, no rooting
2--partial, stops before completing movement to the side
3--weak, slow or intermittent head turning
4--strong, quick turning of head

Step 7. Continue holding the infant around the torso. The infant should still be held facing away from the tester. Gently touch the monkey’s nose above the nostrils. This procedure is done to elicit the snout response (infant should lift head and open mouth). Observe the infant's response to this procedure. According to the codes for Snout, score the infant’s response.

**Snout**
1--none
2--partial response, mouth not open
3--slow response (opens mouth) but sluggish
4--quick, full response (opens mouth)

Step 8. With the infant still in an upright position, carefully insert a nipple in the infant's mouth. This procedure is done in to elicit the sucking response from the infant. Observe the infant's response to this procedure. According to the codes listed for Sucking Reflex, score the infant’s response.

**Sucking Reflex**
1--none, no sucking or mouthing
2--mouthing
3--weal sucking
4--strong sucking, some biting
5--quick, strong sucking
Step 9. Face the infant away from the metal counter top. The back of the infant's head should be about 3 inches away from the counter but even with the counter top. Hold the metal lid approximately three inches from the top of the counter top. Drop the metal lid flat on the counter top. The metal lid should fall directly behind the infant's head and make a loud noise. Observe whether or not the infant startles in response to the noise. Startle responses include whole body jerks, head jerks, eye blinks and earflips. Score the infant’s response according to the Startle to Auditory codes. Record the score on the data form.

**Startle**
1--no startle
2--startle

Step 10. Continue holding the infant around the torso, facing away from the tester. Move the infant so that it is about 3 inches from your right cheek. Starting at the left ear, lipsmack (rapid movement of the lips and tongue up and down to create a smacking sound) 7 to 10 times near the infant's ear. This procedure is done to elicit head turning (orientation) toward the tester’s face. Observe the infant's response to this procedure. Repeat the procedure in the infant's right ear. According to the codes listed for Orient to Auditory, score the infant's two responses. Record the scores in the designated box on the data form.

**Orient to Auditory**
1--none, no orientation
2--partial, looks toward observer
3--full, looks directly in face of tester

Next, score Speed of Auditory on the data form. This is the speed of the infant’s response to the lipsmack. This should be scored as the speed of the head turn, not speed at initiation of the head movement. According to the codes listed for the Speed to Auditory Orient measure, score the infant's response in the designated box on the data form.

**Speed of Orient**
1--none, no orient
2--orients slowly
3--orients quickly (within first 2-3 seconds)

Step 11. The infant should be held around the torso and in an upright position in the tester's left hand. Kneel down or sit in a chair so that both tester and the infant are facing a door or other white backdrop. Place the toy on your right index finger. Bring the toy up and position it approximately 12 inches from the infant's face. Observe the infant's initial response to the toy. If the infant does not orient within 10 sec., move on to the next part of the test. Once the infant has oriented or after 10 seconds have passed, slowly move the toy to the right and then to the
left, approximately 12 inches in both directions. While moving the toy, observe whether the infant visually follows the toy. Score the infant's initial orient response according to the codes for Orient to Visual Stimulus category. The 12-inch distance is considered “Near” for this task so record the score in the designated box on the data form.

**Orient to Visual Stimulus**
1--none, no orientation
2--head moves, difficult to observe contact of infant's eyes with test stimulus
3--direct but brief contact
4--direct, prolonged contact

Record the Follow Visual Stimulus score in the appropriate box labeled “Near” on the data form.

**Follow Visual Stimulus**
1--none, no contact or following
2--partial following
3--follows object completely

With the infant remaining in the same position, repeat the orient and tracking procedure as outlined but now hold the toy approximately 24 inches from the infant's face. According to the codes listed for Orient to Visual Stimulus, score the infant's initial response to the toy. Record the score in the designated box (Far) on the data form. Next, according to the codes for Follow Visual Stimulus, score the infant's tracking of the toy in both directions. Record the scores in the designated box (Far) on the data form.

**Step 12.** Remove the diaper from around the infant's waist. Hold the infant securely around the torso in an upright position, near the counter top with the infant's head level with the counter top. Next, move the infant upwards, making sure that the tops of the infant’s feet softly brush the underside edge of the counter top. Once the top of the feet touch the edge of the counter top, continue the sweeping motion and position the infant so that the feet are approximately ¼ inch from the counter top. This procedure is done in an attempt to elicit a placing response of the feet on the top of the counter. Observe how the infant responds to the feet placement technique. According to the codes for Placing Response of Feet, score the infant's response for both the left and right foot. Record the scores in the appropriate boxes on the data form.

**Placing of Feet**
1--none, no placing or movement
2--moves feet but doesn't place
3--partial placing
4--full placing of feet but does so sluggishly
5--full, quick placing of feet
Step 13. Hold the infant securely around the torso with a diaper, making sure that the arms are free. Position the infant at a 45-degree angle, about 12 inches off the counter top, with the head down. Quickly move the infant in a downward motion toward the counter top (the movement should stop before the infant makes contact with the counter top). This procedure is done to elicit the placing of the infant's hands. Observe how the infant responds to the hand placement procedure. According to the codes for Placing Response of Hands, score the infant's response for both the left and right hand. Record the scores in the designated boxes on the data form.

**Placing of Hands**
1--none, no placing or movement
2--moves hands but doesn't place
3--partial placing
4--full placing of hands but sluggish
5--full, quick placing hands

Step 14. Place a diaper on the metal counter top and roll up another diaper (or two depending on the animal’s size) width-wise. Place the rolled diapers between the infant’s arms and legs lengthwise so that he/she can clasp the diaper roll. The infant’s hands should overlap but the arms should not. Once the infant is positioned on top of the rolled diaper, take the ends of the diaper roll and hold them horizontally about six inches off the counter top. This should be done over the flat diaper on the counter. Turn the diapers clockwise until the infant is up-side-down. Keep the infant suspended for approximately two seconds and observe each limb for clasping behavior. Return the infant to the flat diaper on the counter. If you suspect that the infant might fall off the diaper, do this procedure in the infant’s incubator or cage to ensure a soft landing. Score the infant’s response according to the codes listed for the Clasping category and record the scores in the designated boxes on the data form. Each limb is scored independently.

**Clasping**
1--none, no clasp, falls off diaper roll
2--loose clasp, dangles
3--firm clasp, holds tightly against diaper roll
4--climbs off

Step 15. Keep the flat diaper on the counter top. Place the infant on its back on the diaper. Position the limbs in an attempt to minimize self-clasping. Quickly let go of the infant. This procedure is done to elicit the righting response (rolling over from the back to the stomach). Observe the infant's response to being placed in this position. According to the codes for the Righting, score how the infant responded. Record the score in the appropriate box on the data form.
Righting
1--none, no movement
2--movement, no righting
3--rights in 5 to 15 seconds
4--rights in <5 seconds

Step 16. Return the infant to the incubator or cage. Return to the data form and, according to the codes for Behavior State During Testing, score the overall behavior of the infant during the assessment.

Behavior State During Testing
1--asleep
2--drowsy (falling asleep)
3--passive (awake but inactive)
4--active (awake, active, calm)
5--agitated (alert but agitated)
6--extremely agitated (jerking, screeching)

Also at this time, according to the codes for Consolability, score how easily the infant was to console during the assessment.

Consolability
1--cannot be consoled
2--can be consoled but with difficulty
3--easy to console

Lastly, for Behaviors Observed, the following behaviors are noted, 1) sit, 2) stand, 3) len, 4) earflip, and 5) lipsmack. If the infant exhibited any of these behaviors during the assessment, score a "1". If the behavior was not observed, score a “2”.

Behaviors Observed
1--yes
2--no

Record any additional comments related to the assessment in the designated box on the data form. Next, record the infant's information on the Nursery Assessment log sheet with a pen.

Step 17. Wash the nipple that was used.

Step 18. Repeat steps 2-17 for all of the other infants scheduled for Nursery Assessments for the day.
Step 19. Put the finger toy and metal lid away. Dispose of the diapers that were used during the assessment and wipe down the counter top. Record tester initials and end time on the Daily Schedule.

Training and Reliability:

New Tester Training and Reliability
Prior to testing, both testers should closely review the SOP. The SOP should be available during all training sessions so differences in the codes can be discussed and reconciled.

For training, a minimum of 5 animals should be selected representing a range in ages. This group of animals should be tested over several weeks until training scores indicate 85% reliability for all of the items.

For reliability sessions, testers no longer review the SOP or discuss scores. A minimum of five animals should be selected at birth. Reliability data should be collected Monday through Friday for the 3 weeks that the infants are in the nursery, excluding Saturday and Sunday. This will yield a total of 15 days of reliability testing for each of the infants. The old tester should physically perform the assessments on day 1 of reliability testing. The new tester should observe the testing from a short distance and simultaneously score the infant. On day 2 the new tester should perform the assessments on all subjects while the old tester observes and simultaneously scores. The testers should continue by alternating who physically performs the assessment across the days of reliability testing. Trials should not be repeated during reliability testing unless an outside disturbance distracts the animal or the tester or the tester was unable to see the infant’s response.

To pass reliability testing, there must be an 85% agreement between the scores of the new tester and the scores of the old tester.

Nine-Month Reliability Sessions.
Testers who are routinely taking data partake in reliability sessions every 9 months. Testers should not review the SOP or discuss their coding with other testers prior to reliability sessions. Sessions should be conducted with 5 animals representing an age range for the test (Day 1 to Day 19). This group of animals should be tested over 4 consecutive days. Testers record data independently and do not discuss responses or scores and do not repeat trials.

Changes in SOP:

If testers become concerned about how they (or others) are coding a particular behavior after they have passed reliability, they should discuss their concerns with Kimberly Grant or Noelle Liberato prior to attempting to reconcile the situation. Testers should not discuss or implement changes in scoring without a thorough discussion with one of the above. This is being done to keep testers from changing the procedures which negates reliability. Any changes in testing that come out of these discussions have to be listed in the log of changes section of this document, even if they pertain to only one tester.
Minus Codes

The following codes are recorded on the data sheet when the standard testing codes do not apply to particular testing situations:

-1--No data (tester error or omission)

-9--No data collected due to condition of animal (e.g. mittens or IV)

PDA Headers

<table>
<thead>
<tr>
<th>Animal #</th>
<th>Eartag</th>
<th>Tester #</th>
<th>Date</th>
<th>Start Time</th>
<th>Treatment</th>
<th>Housing</th>
<th>Predominant State</th>
<th>Grasping</th>
<th>Resist Passive Move</th>
<th>Rooting</th>
<th>Snout</th>
<th>Sucking</th>
<th>Startle</th>
<th>Orient Auditory</th>
<th>Speed Orient</th>
<th>Orient Visual</th>
<th>Follow Visual</th>
<th>Placing Feet</th>
<th>Placing Hands</th>
<th>Clasping</th>
<th>Righting</th>
<th>Consolability</th>
<th>Behaviors Observed</th>
</tr>
</thead>
</table>

Log of Changes

Changes to the Nursery Assessment SOP  2002

Whether the animal was fed is no longer recorded.
Asymmetry in Resting Position is no longer assessed.
Sucking reflex is now assessed using a nipple instead of the testers finger.
Startle to Auditory has been changed from
0=no startle
1=ear twitch only
2=eye blink
3 = eye blink, ear twitch
4 = eye blink, head jerk
5 = whole body jerk
to:
0 = no startle
1 = startle.

Two new categories have been added.
Speed to Orient to Auditory
0 = no follow
1 = Orients slowly
2 = Orients quickly
Speed of Visual Follow
0 = no follow
1 = Follows slowly
2 = Follows quickly

Clasping has been changed from placing the animal on your arm to placing them on a rolled up diaper.

The codes for the Righting have changed from
0 = no movement
1 = thrashing but no righting
2 = rolled onto side, no thrashing
3 = thrashing and partial righting
4 = rights in 15 sec or more
5 = rights in 5-15 seconds
6 = rights in <5 sec
to the following.
0 = No movement
1 = Movement, no righting
2 = Righting in 5-15 sec.
3 = Righting in <5 sec.

Irritability is no longer assessed.
Response quality is no longer assessed.