

Joint Attention Skills Assessment: Initiating and Responding to Sounds and Sights

Technical Report 21

Lauren B. Adamson, Ashleigh Kellerman, Katharine Suma, Sarah Vogt, Anita Hasni, and Roger Bakeman

Developmental Laboratory
Department of Psychology
Georgia State University
Atlanta, GA 30303

To reference this report:

Adamson, L.B., Kellerman, A., Suma, K., Vogt, S., Hasni, A. & Bakeman, R. (2016). *Joint attention skills assessment: Initiating and responding to sounds and sights*. Department of Psychology, Georgia State University. <https://sites.gsu.edu/bakeman/adamson-memos/>

Support for the development of JASA was provided by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (R01HD35612). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Child Health and Human Development or the National Institutes of Health. We acknowledge the substantial contributions of Diana L. Robins and Rebecca Williamson.

© Adamson and Bakeman, 2016.

May 24, 2016

Joint Attention Skills Assessment: Initiating and Responding to Sounds and Sights

1 Purpose

This technical report describes multimodal and auditory tasks designed to assess Initiating Joint Attention (IJA) and Responding to Joint Attention (RJA) skills of typically-developing children and children at risk for autism spectrum disorder and other developmental disorders, who are approximately 12 to 48 months of age. This report includes a description of the tasks, procedures for administering the assessment, and criteria for scoring.

In our Joint Attention Skills Assessment (JASA), our goal is to assess IJA and RJA in the multimodal (IJA-M; RJA-M) and auditory domains (IJA-A; RJA-A). The key question in the assessment of IJA is whether the child bids to share an interesting multimodal or auditory spectacle with the examiner. The key question in the assessment of RJA is whether the child follows the examiner's multimodal or auditory bid to share an interesting spectacle.

2 Background

The JASA assesses joint attention skills in typically developing children and children diagnosed with autism spectrum disorder or other developmental disorders. It measures joint attention skills using a standardized procedure that produces 4 comparable scores for IJA-M, RJA-M, IJA-A, and RJA-A.

The JASA is closely related to the Early Social-Communication Scales (ESCS; Mundy et al., 2007), a widely used measure of early communicative functions of joint attention, behavior regulation, and social interaction. Joint attention skills are divided into initiating and responding skills. The ESCS's IJA procedure mixes a series of trials (e.g., the child's response to a mechanical wind-up toy) and spontaneous observations. The child's IJA score on the ESCS is the number of acts both during the specific IJA tasks and acts that "spontaneously occur during testing." To assess RJA, the ESCS examiner presents a series of trials using a procedure derived from Butterworth's (Butterworth & Jarrett, 1991) experimental studies of infants' understanding of pointing and gaze direction. The examiner first glances towards and then points to targets (usually posters, but sometimes toys and pictures in a book) to see whether the child follows his/her gaze and/or point. The child's RJA score on the ESCS is the % trials correct.

Unlike the ESCS, which also identifies acts of behavioral regulation and social interaction behaviors, the JASA specifically measures auditory and multimodal domains of JA. The JASA assessment also retains the ESCS's general structure for the RJA trials by providing specific bids (here divided into multimodal and auditory bids) to specified targets. Similarly, we retain the structure of providing spectacles for IJA trials (again, dividing into multimodal and auditory ones) but, unlike the ESCS, we limit our assessment of IJA only to performance on the specific trials. It is noteworthy that other researchers

(Beuker et al., 2013; Gaffan et al., 2008; Hobson & Hobson, 2007; MacDonald et al., 2006) have also limited the measurement of IJA skills to the child’s performance during specified trials so that it is more comparable to the RJA assessment. The JASA maintains the ESCS’s distinction between IJA lower level and higher level behavior so that we can probe their relation to language (see Pickard & Ingersoll, 2015).

3 The JASA’s Trials

Six trials—3 multimodal and 3 auditory—are presented to assess IJA; a second set of 6 trials—again 3 multimodal and 3 auditory—are presented to assess RJA (see Table 1).

Table 1. JASA Trials

Initiating Joint Attention	Responding to Joint Attention
<u>Multimodal (IJA-M)</u>	<u>Multimodal (RJA-M)</u>
Bunny	Poster/Object [right]
Robot	Poster/Object [left]
Turtle	Poster/Object [behind]
<u>Auditory (IJA-A)</u>	<u>Auditory (RJA-A)</u>
Door Knock	Poster/Object [right]
Electronic Sound	Poster/Object [left]
Phone Ring	Poster/Object [behind]

4 Administration of the JASA

4.1 General Procedures

Before each administration of the JASA, the order of the 12 trials is determined, with orders varied systematically for each administration (see 5.1). Each trial consists of two presentations of the specified prompt.

It is crucial that the auditory and multimodal trials be distinct. If the examiner begins a trial with an RJA prompt using the wrong modality, then the second prompt should match the first and the error should be compensated for later in the assessment if possible. When this happens, the examiner should indicate on the assessment sheet that there has been a deviation in the order of the trials and be sure that the session director knows that this has occurred.

The examiner should proceed as follows (in the following instructions for the trials, “you” refers to the examiner):

Begin the JASA with introductions using the script below as a guide. Ask the caregiver not to respond to any of the prompts directed at the child. Try to distract the child while talking to the caregiver so that the child remains unaware of the trials and objects. Remind the caregiver to silence his/her cell phone.

Script: “Hi, my name is <examiner>, and I will be playing with <child> for this part of the visit. I want to see how <child> communicates with me about various toys and sounds. I also want to see how <child> reacts when I try to call attention to things around the room.

Please try not to interact with your child. If <child> wants to interact with you, please respond briefly and suggest that <child> keep playing with me. Please don’t label or direct <child’s> attention to any of the objects, sounds, or things around the room that I present. The sounds will include a [discreetly point towards door, with knocking motion] at the door and two short audio clips. Remember not to react to these. Also, please silence your cell phone.

As we mentioned at the beginning of the session, we will be recording from behind a one-way mirror. Do you have any questions before we get started? Okay <child> let’s go ahead and get started.”

Highlight the beginning and ending of the assessment in order to cue the assistant who is video recording from behind a one-way mirror. A simple “Okay, let’s get started” and an “Okay, we’re all done with this part. Good Job” is sufficient.

During the assessment, be playful and communicative. During specific trials, it is important not to attract attention to yourself except as prescribed by the trial procedure.

The child should be encouraged to remain seated during the assessment. If the child won’t stay in the chair, or becomes distressed, he or she may stand near the table or, if need be, sit on the parent’s lap. It is most important that the child be facing the examiner at the start of each presentation. In addition, try to ensure that the parent is not blocking the child’s view of any of the RJA stimuli.

Use only the specified objects and distracter toys that are stored in the bin next to the table. The child should not see or play with objects used in the IJA trials that are in the bin before they are used for the appropriate trial.

If the child takes to making noise with a provided distracter toy for a trial (e.g., banging puzzle pieces together), wait to administer the trial. If the child continues to make noise with the distracter, simply replace with another type of distracter (e.g., plush stacking rings), in order to prevent any auditory distractions from the specified trial.

4.2 Examiner Instructions for the IJA Trials

The key aspect of each IJA trial is that there is an interesting spectacle. As noted earlier, there are two presentations of each trial. Each presentation lasts 15 seconds (which the examiner can time by covertly counting slowly). The second presentation should not begin until the first presentation is clearly over.

4.2.1 IJA-M Trials

Bunny:

- Place the bunny to one side of the table (either right or left; being sure not to use the same side for all three IJA-M trials) and keep the pedal out of sight on your lap.
- Activate the toy by pressing the pedal, so that the bunny moves across the table in front of the child for approximately 10 seconds.
- Then release the pedal for 5 seconds so that we can observe the child's reaction to the bunny.
- After the 5-second pause, the child may still be interested in the bunny. Do not give it to the child or encourage prolonged interest.
- Repeat the presentation, waiting, if necessary, until the child is no longer actively requesting the bunny.
- After the second presentation, you may offer the bunny to the child until it is time to begin the next trial.

Robot:

- Place the robot to one side of the table (either right or left; being sure not to use the same side for all three IJA-M trials).
- Activate the robot by turning the switch, so that it moves across the table in front of the child for approximately 10 seconds.
- Deactivate the robot for 5 seconds so that we can observe the child's reaction to the robot.
- After the 5-second pause, the child may still be interested in the robot. Do not give it to the child or encourage prolonged interest.
- Repeat the presentation, waiting, if necessary, until the child is no longer actively requesting the robot.
- After the second presentation, offer the robot to the child.

Turtle:

- Place the turtle to one side of the table (either right or left; being sure not to use the same side for all three IJA-M trials).
- Activate the turtle by slowly pulling the baby turtle away from the mother and then letting go of the entire toy. Activate 2 more times for a total of approximately 10 seconds.
- Pause for 5 seconds without activating the turtle so that we can observe the child's reaction to the turtle.
- After the 5-second pause, the child may still be interested in the turtle. Do not give it to the child or encourage prolonged interest.
- Repeat the presentation, waiting, if necessary, until the child is no longer actively requesting the turtle.
- After the second presentation, offer the turtle to the child.

4.2.2 IJA-A Trials

Door Knock:

- Sing a verse of Baby Bumble Bee with hand motions to cue the assistant outside the room and to distract the child:
 - Verse: “I’m bringing home a baby bumble bee {while clapping}. Won’t my mommy be so proud of me? I’m bringing home a baby bumble bee ... Buzzzzzz {fingers tap across table in 3 sections for buzzing} buzzzzzz, buzzzzzz. Gotcha!” {on ‘gotcha’ you gently tickle the child}.
- After “Gotcha!” the assistant will knock three times and then say “Is anybody in there?” He or she repeats this. The presentation lasts a total of approximately 10 seconds. The knock on the door should be loud enough to be clearly audible inside the room.
- Pause for 5 seconds without acknowledging the door.
- Sing a verse from Wheels on the Bus, with hand motions:
 - Verse: “The wheels on the bus go ‘round and ‘round. ‘Round and ‘round. ‘Round and ‘round. The wheels on the bus go ‘round and ‘round. All through the town.”
- After “town,” assistant will knock three times and then say “Is anybody in there?” He or she repeats this. The presentation lasts a total of approximately 10 seconds.
- Pause for 5 seconds without acknowledging the door.
- Then cheerfully move on to the next trial.

Electronic Sound:

- Provide child with distracter toy prior to presentation, and if necessary, try to engage the child with the distracter toy.
- Once it is clear that the child is not paying attention to the administrator, play the sound clip, which lasts for 15 seconds: 10 seconds of sound followed by 5 seconds of silence.
- Reengage child with distracter toy.
- Repeat the presentation.
- After the second presentation, you may let the child continue to play with the distracter toy until you are ready to do the next trial.

Phone Ring:

- Provide child with distracter toy prior to presentation, and if necessary, try to engage the child with the distracter toy.
- Once it is clear that the child is not paying attention to the administrator, play the sound clip, which lasts for 15 seconds: 10 seconds of sound followed by 5 seconds of silence.
- Reengage child with distracter toy.
- Repeat the presentation.
- After the second presentation, you may let the child continue to play with the distracter toy until you are ready to begin the next trial.

4.3 Examiner instructions for the RJA Trials

The key aspect of each RJA trial is to observe the child's response to clear bids for joint attention. The examiner provides points or contextual statements, depending on the type of trial, to the target selected for each trial. Targets include 3 posters (Banana/Car/Dog) and 3 objects (Baby-Doll/Ball/Bottle) that were selected to depict objects whose names, according to the MacArthur's Child Development Inventory lexical norms (Dale & Fenson, 1996), are highly likely to be understood by typically-developing 12-month-old children.

4.3.1 RJA-M Trials

Each of the three RJA-M trials consists of two identical presentations. The trials differ only in terms of the target and its location (right, left, or behind the child). The child must not be attending to the administrator at the onset of each presentation. Maintain a consistent tone when saying the child's name, as well as a content expression. The procedure for each presentation is:

- Provide child with distracter toy prior to presentation.
- Say the child's name once when it is clear that the child is not paying attention to the administrator.
- Turn to look at the target poster/object and say the child's name twice while pointing towards the target with your index finger and fully extending your arm. Gaze and continue to point towards the target poster/object for approximately 5 seconds.
- Reengage the child with distracter toy.
- Do a second presentation.
- After the second presentation, you may let the child continue to play with the distracter toy until you are ready to proceed to the next trial.

4.3.2 RJA-A Trials

Likewise, each of the three RJA-A trials consists of two identical presentations. The trials differ only in terms of the target and its location. The child must not be attending to the administrator at the onset of each presentation. For the RJA-A trials, it is important that the examiner maintains gaze on the child throughout the entire presentation in order to avoid providing the child the visual cue of gazing towards the target. The procedure for each presentation is:

- Provide child with distracter toy prior to presentation.
- Say three statements in rapid succession:
 - *<child> a X*. Emphasize the target's pre-assigned label ("X").
 - *<child> there's a X*. Emphasize the target's label.
 - *<child> [gasp] a X!!!* Emphasize the target's label.
- Sit idle for 5 seconds after the third presentation.
- Reengage the child with the distracter toy.
- Do a second presentation.

- After the second presentation, you may let the child continue to play with the distracter toy until you are ready to proceed to the next trial.

5 Setting Up and Recording the JASA

5.1 Administration Sheet

The examiner needs the administration sheet from the child's session folder to know the specified order of the trials. This sheet is prepared by the research coordinator.

The order of trials is randomized. We randomize the order of the 12 trials with the constraint that IJA and RJA trials alternate. For the RJA trials, we also randomize the location (Right/Left/Behind) and target type (Poster/Object) with the two constraints that all three locations are used for each modality (M/A) and that each modality has at least 1 poster and 1 object target.

5.2 Preparing the Media Player

The media player used for the IJA-A items must be readied before each visit. Recordings of the electronic sound and the phone ring have been uploaded to the media player. Each clip includes 10 seconds of audio and 5 seconds of silence. The built in 5 seconds of silence serves as a visual cue to the examiner for the end of the presentation, as well as a precautionary measure to prevent another sound stimuli from immediately playing. In order to play the sound again for the second presentation, the clip will need to be restarted.

The research coordinator or someone she assigns needs to ensure that that the media player is charged before the scheduled visit. This person should also confirm that the volume level on the media player is set to 50%. If the volume level has been adjusted, this person adjusts the volume back to 50% with the touch screen option. Volume set at 50% ensures that each clip is 65-70 decibels.

5.3 Preparing the Playroom

The research coordinator will assign a member of the research staff to set up the room before the session. This person should confirm that the room is set up correctly, including the placement of furniture and the target posters and objects. See Figure 1.

The target posters and objects are assigned a location on the administrative sheet which indicates the correct hook for each poster (Banana/Car/Dog) and the correct shelf for the target objects (Baby-Doll/Ball/Bottle).

The three IJA-M toys (Bunny/Robot/Turtle), the distracter toys, and the media player (that has the Electronic Sound/Phone Ring) need to be placed in the toy bin that is kept beside the table. The distracter toys will be used to distract the child between trials and during some trials where a distracter toy is part of the procedure. They have been selected so that they are different than toys used during the trials and in other assessment procedures. They include a buildable cow, cardboard books, large Lego

blocks, stacking rings, shape sorter, animal figurines, connect-toys, and a wooden puzzle.

Before the assessment begins, the examiner needs to ensure that the assistant knows how to administer the Door Knock (IJA-A) Trial.

5.4 The Digital Records

The assessment is recorded using a Canon Vixia HF R52 video camera that is set on a tripod in a room next to the playroom. The camcorder is aimed through a one-way mirror. The person making the video record should wear dark clothing, preferably a black smock, and gloves to minimize reflections on the video record.

The person video recording the session needs to position the camcorder so that the child, profile of the examiner, and the table are in view at all times, as specified in Figure 1. The person making the record should remain vigilant so that they adjust the camera angle if and when the child or examiner moves. However, it is important to try to leave the camera as still as possible since moving or zooming causes a delay in lens focus, which makes the scorer's task more difficult.

As soon as the examiner begins explaining the procedure to the caregiver, the person running the camcorder should start recording. When the examiner indicates that he/she is finished administering the assessment, the recording should be stopped.

If for any reason there is a technical difficulty and digital recording does not begin when the examiner begins the assessment, the person recording should lightly tap on the one-way mirror to alert the examiner of the issue. The digital recording is essential; without a clear record of the entire assessment, we cannot score the assessment.

After the assessment, the file needs to be uploaded to one of the computers in the lab. The Canon Vixia automatically records the file in a high definition media player (MP4) format. The assistant who the research coordinator designates to handle all digital records for the play sessions should copy the MP4 file to the designated external drives, as well as copy to the L: Drive. File names should include the participant's ID, visit

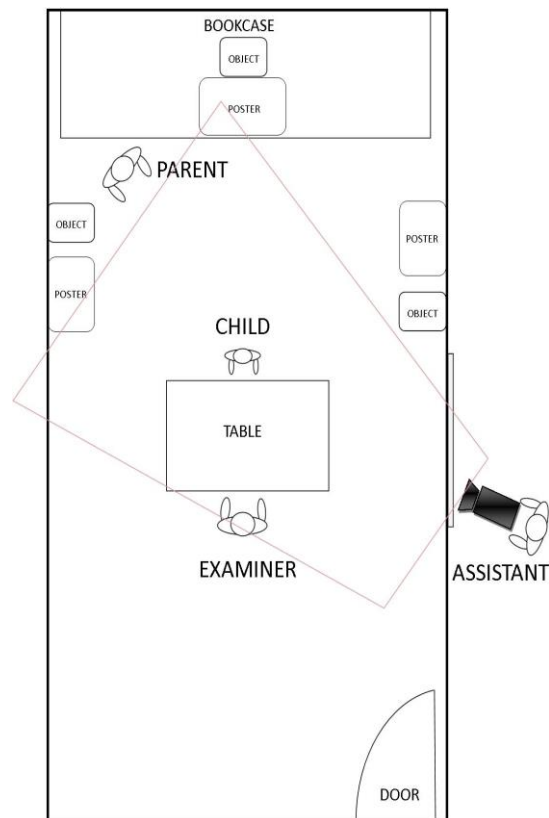


Figure 1. Room and Camera.

number, and JASA (i.e., 035v1JASA; 074.12m.JASA). Scorers will access the recordings for scoring assignments from a network server: L:\CPA Studies\JASA files.

6 Scoring the JASA

The scorer's task is to determine for each presentation whether the examiner administered the item correctly, whether the child passed the presentation, and whether the child appeared aware of the relevant stimulus even if he or she did not pass the presentation. This is done 24 times, twice for each of the 12 trials (i.e., once for each of the two presentations that constitute a trial).

6.1 Scoring Materials

The scorer will have the JASA administration sheet for the session being scored, the JASA score sheet for the session, the JASA manual, and access to the video record of the JASA session.

The JASA administration sheet indicates the physical location in the room of each of the targets for the RJA items. It also contains the examiner's notes about deviations from the order and/or child behavior.

The JASA score sheet is prepopulated with the trials in the intended order of presentation. The scorer should check the JASA administration sheet and note any deviation in the order on the score sheet before scoring. If there was a deviation, the scorer should both note this on the score sheet and tell the research coordinator. The score sheet contains spaces to indicate whether the presentation was appropriately administered (administration fidelity, AF), whether the child met criteria for a pass, and whether the child was aware of the presentation (Aware). There is also space for notes, and a box for each trial where the overall score for the trial is recorded.

The JASA manual (i.e., this document) describes both the procedure for administering each trial and the scoring criteria. It is important that the scorer be very familiar with the manual before scoring and that he or she consults the manual while scoring as needed.

The JASA video record provides a view of the child, the examiner, the parent, and as much of the space containing the RJA targets as possible (see Figure 1). The scorer can likely score many of the presentations in real time. However, there may well be instances when a second or even third review is needed.

6.2 Scoring Criteria

Presentations are scored 0 to indicate not passing, 1 to indicate passing, and—for IJA items only—2 to indicate a higher level pass. To receive a passing score for joint attention, a child must attend to the same event or object as another person. Usually this person is the examiner, but at times the child may get credit for attending to the same event as the parent. The child is credited with passing for orienting towards the same event or object, or by using words or gestures to reference an event or object.

Trials receive a summary score of 0 if the child did not pass either of the two presentations, a 1 if the child passed one or both of the two presentations, and—for IJA items only—a 2 if the pass was higher level in one or both of the two presentations. If a particularly interesting or puzzling action is observed, the scorer should note this on the scoring sheet for later reference.

6.2.1 Aware

Aware is scored either 0 or 1, where 1 indicates that the child appeared aware of at least one of the administrator's two presentations of an item and 0 indicates that the child did not alert to the relevant stimulus in either of the two presentations of an item.

6.2.2 Administrative fidelity (AF)

AF is scored either 0 or 1, where 1 indicates that the examiner's presentation was adequate to allow the child to pass the item. Usually such a presentation follows the instructions presented in the JASA manual. However, if the presentation is only partial (e.g., the examiner says the child's name once rather than twice) and the child meets criterion for passing the presentation, score AF a 1. Score a 0 for AF if the presentation is not complete and the child does not meet criteria. Also score AF as 0 if the parent guides a response in a way that invalidates the presentation (e.g., saying "look over here!"), there is an interruption such as a parent's cell phone call, or if the child begins to cry just moments before the presentation starts. If a 0 is scored, the scorer should briefly note why.

Notes should be written when the scorer scores a 0 for AF (see above) and if the scorer observes something that he or she thinks that others might want to view because, for example, the child made an especially clear JA bid, the child made an unusual response, or the scorer found the presentation particularly difficult to score. Include the time stamp, if possible, so that others can readily locate the presentation.

6.2.3 IJA Criteria (IJA-M; IJA-A)

To receive credit during an initiating joint attention trial, a child must attend to both a shared event ("an interesting spectacle", or target that the examiner presents) and a person, either the examiner or the child's parent. The scorer should credit the child with a pass when the child attempts to share the target item with a person during an IJA trial; this attempt to share is called a bid. An IJA bid may be as fleeting as a brief glance between the target and the examiner's face, or it may be as elaborate as a glance, smile, gesture and speech combined. All IJA bids are classified as either lower or higher level.

An IJA-Lower Level (IJA-LL) bid occurs when the child's IJA bid consists solely of a coordinated gaze shift between the target and either the examiner or the child's parent. During an IJA-M presentation, this will include a gaze shift from the target object to the adult. Likewise for an IJA-A presentation, the child must shift gaze between where the child orients to the target sound and the adult. Also note for IJA-A, a child may be aware of the target and orient, but he or she does not share the event with a person; this behavior should not be credited as passing.

An IJA-Higher Level (IJA-HL) bid occurs when the child clearly attempts to share a target. This attempt usually includes coordinated gaze shifts (IJA-LL), but it need not. What is essential is that the child clearly communicates the intent to share using gestures and/or speech. Gestures may be deictic (e.g., pointing to the target object or event) or conventional (e.g., cupping hand to ear to mean “listen”). Speech related to the spectacle may include labeling (e.g., “a bunny!”) commenting about the event (e.g., “Who was at the door?”), the child’s desire (e.g., “I want a turn!”), or the adult’s activity (e.g., “did you see it?”). If the primary intent of the child’s communication is to request the target object (e.g., the child reaches for the object while saying “I want”) rather than a comment, the child should not be credited with passing.

The child’s attention to the other person must be related to the target for an IJA bid to count as passing. Should the examiner or parent do something during a presentation that might call attention to him- or herself and the child then attends to this person, the scorer should not count this as an IJA bid (e.g., the examiner coughing; parent saying “look”). Unless there is clear indication that the child was attempting to share the target before the person attracted attention, the presentation should be scored a 0 on AF.

Bids usually occur during the presentation of the object or event, or during the 5-second pause following the presentation. If the examiner has given the child the stimulus, or moved on to another stimulus, then the child can no longer receive a passing score for initiating joint attention.

To pass an IJA trial, there must be at least one example of an IJA bid during a minimum of one of the trial’s two presentations. Score a 2 if the child demonstrates a HL pass in one or both of the presentations. Score a 1 if the child demonstrates a LL pass in one or both of the presentations but does not score HL in either presentation.

Aware is scored with a 0 to indicate the child did not attend to the interesting spectacle in either of the two presentations, or a 1 to indicate the child at least alerted to the spectacle in one or both of the two presentations.

6.2.4 RJA Criteria (RJA-M; RJA-A)

To receive credit for responding to joint attention, a child must follow the examiner’s bid by engaging with the target object. Passing responses for RJA-M and RJA-A trials will often be evident by the child’s orientation towards the target using a head turn and gaze. However, it is conceivable that a child could also respond appropriately to a bid by scanning the room for the object, or responding verbally or through use of gestures in a way that distinctly displays the child is sharing the target with the examiner (e.g., the child says, “woof woof” while making eye contact in response to a bid targeting the dog, the child pretends to drive while making eye contact in response to a bid targeting a car, the child says, “where is X?” or “what are you pointing at?” in response to a bid, etc.). The child does not receive credit for mistaking a distractor toy for the target because the child must demonstrate that he or she understands that the examiner’s bid is to share something new.

During a RJA-M presentation, a passing response almost always includes following the examiner's point to the target poster/object. If the child attends to the examiner's pointing by looking at his or her arm or finger but does not shift gaze in the correct direction, the child is not credited with passing the trial. During a RJA-A presentation, a passing response requires that the child engage with the target object by seeking to locate or otherwise acknowledge the examiner's bid.

Usually the child's response occurs during the RJA bid but it may be slightly delayed. Occasionally the delay may even be longer than the allotted 5 second period after the bid as when, for example, a child continues an on-going activity (such as building a tower) until he or she reaches a goal and then indicates clearly the sharing of the target (such as turning toward the correct picture). Delayed responses should be credited as passing if it is evident that the child is attending to the target in response to the examiner's bid.

To pass a RJA trial, there must be at least one example of a response to the examiner's bid during at least one of the trial's two presentations.

Aware is scored with a 0 to indicate the child did not attend to the examiner during either of the two presentations, or a 1 to indicate the child alerted during one or both of the two presentations.

6.3 Training

Scorers are considered trained when they successfully code three consecutive assignments at 80% agreement with a reliable scorer for overall summary scores of IJA and RJA.

6.4 Reliability

At least 15% of the total number of assignments should be designated as reliability checks. It is important not to alert the scorers of upcoming reliabilities within the assignment lists. Once a reliability assignment is complete, it is important to review any disagreements with the other scorer(s).

7 Toy Inventory

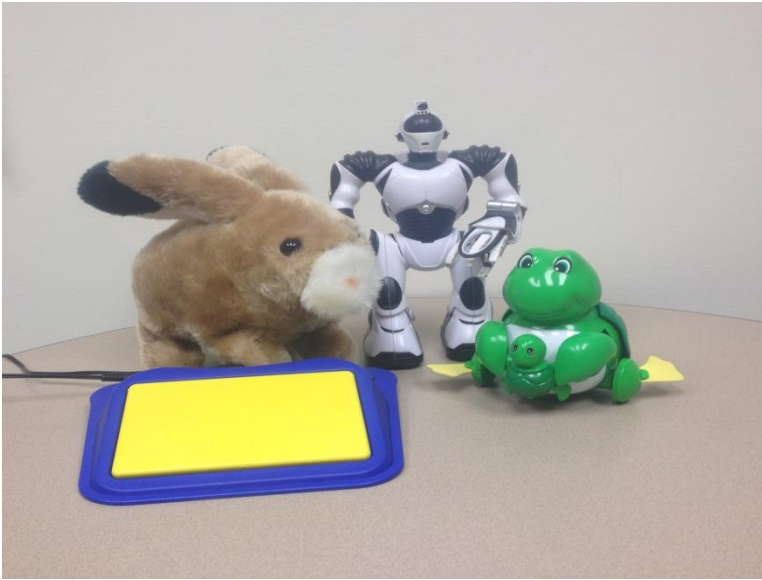
Room Layout with Toys



Distracter Toys



IJA-M Objects



RJA Objects



RJA Posters



8 References

- Beuker, K.T., Rommelse, N.N.J., Donders, R., & Buitelaar, J.K. (2013). Development of early communication skills in the first two years of life. *Infant Behavior and Development, 36*, 71–83.
- Butterworth, G., & Jarrett, N. (1991). What minds have in common is space: Spatial mechanisms serving joint visual attention in infancy. *British Journal of Developmental Psychology, 9*, 55–72.
- Dale, P. S., and Fenson, L. (1996). Lexical development norms for young children. *Behavioral Research Methods, Instruments, & Computers, 28*, 125–127.
- Gaffan, E.A., Martins, C., Healy, S., & Murray, L. (2008). Early social experience and individual differences in infants' joint attention. *Social Development, 19*, 369–393.
- Hobson, J.A. & Hobson, R.P. (2007). Identification: The missing link between joint attention and imitation? *Development and Psychopathology, 19*, 411–431.
- MacDonald, R., Anderson, J., Dube, W.V., Geckler, A., Green, G., Holcomb, W., Mansfield, R., & Sanchez, J. (2006). Behavioral assessment of joint attention: A methodological report. *Research in Developmental Disabilities, 27*, 138–150.
- Mundy, P., Block, J., Delgado, C., Pomares, Y., Van Hecke, A.V., & Parlade, M.V. (2007). Individual differences and the development of joint attention in infancy. *Child Development, 78*, 938–954.
- Pickard, K.E. & Ingersoll, B.R. (2015). Brief report: High and low level initiations of joint attention, and response to joint attention: Differential relationships with language and imitation. *Journal of Autism and Developmental Disorders, 45*, 262–268.