

General Guidelines

Definitions

Occluder: opaque barrier that prevents the dog from viewing the baiting/sham-baiting process, or the location of the hidden reward (as in Working Memory). Types include “small”, “standing”, and “long standing”. We typically make these out of white or black foam core boards.

Container: bucket, can, or funnel under which (or in which) reward is hidden

Bait: hide reward at pre-determined location

Sham-bait: pretend to hide reward at pre-determined location

Trial: a trial begins when E engages the dog (e.g. presents reward, begins play session as in Mutual Gaze, etc.) and ends when the dog makes a choice *OR* the choice time limit elapses

Testing team: the experimenter (E) and a dog handler (H) pair that conducts the experiment

Admin: the individual within a testing team that primarily interacts with the non-dog parts of the experiment; sets up apparatuses, baits containers, and records data; referred to as “E”

Handler: the individual within a testing team that primarily interacts with the dog; referred to as “H”

Note:

In all cases, “left” and “right” are relative to the experimenter’s perspective, as if they were standing at the Admin start line and facing the center of the room (see Testing Room Diagram).

Testing team odor restrictions

Neither member of the testing team should wear large amounts of perfume or cologne while testing.

Reward

The reward consists of a small piece of food placed next to an associated marker. To accommodate both food and toy motivated dogs, the associated marker is a Kong® Classic, or – for certain tasks - a tennis ball. ***For 42 dogs, the marker was an Extra-Small Plush Kong®Duckie for part or all of the battery.*

Dog treats used in testing

Jerky Treats: Used for all object choice tasks. Treats are cut into standard size pieces, approximately 1cm x 1cm. A good guideline for sizing is about the size of your pinky nail. It can be smaller for little dogs to avoid over-filling them and diminishing motivation, but be sure that for each dog, the size is kept consistent throughout the battery.

Peanut Butter or Kong Stuff’n: Used for tube laterality task.

Yummy Chummy Salmon Treats: Used for smearing cups. Used only with working dogs if dog will not work for other treats.

Cameras

Camera 1: Wide Angle – behind and to the left of H start line such that the dog, E’s face, and H are visible. H starts this camera.

Camera 2: Coding Angle – behind and to the left of E start line such that the dog and the choices/apparatus are visible. E starts this camera.

Additional vocalization during testing

Standard experimenter vocalizations include ‘look!’ when presenting the reward, ‘ok!’ to release the dog, and other task-specific vocalizations. The experimenter should also announce trial numbers and, in the case of Warm-Ups, trial numbers and letters. In addition, the experimenter can snap, call the dog’s name, or say ‘Hey!’ in order to get the dog’s attention when presenting the reward, but the last thing said prior to beginning baiting should be ‘look.’ Once baiting begins, neither the experimenter nor the handler should speak or make any accessory sounds until after the ‘ok’ is given, unless otherwise noted, even if the dog ceases to pay attention after the initial ‘look.’ If accessory sounds occur unexpectedly (e.g. E sneezes while baiting), the trial should be repeated to avoid biasing the dog to one side. E can give an additional ‘ok!’ or similar release command approximately 3s after the first if the dog hesitates to leave the start line. These 3s are counted toward the choice time limit per trial. At this point, if the dog still doesn’t leave the start line, the handler can give additional release commands and non-directional encouragement, such as a forward push on the back of the dog’s neck.

Eye contact

Experimenter: makes eye contact with the dog when presenting the reward at the beginning of each trial, but then only looks at the dog if specified in the methods. E looks down while baiting and saying ‘ok!’ Unless otherwise noted, while the dog is choosing, the experimenter should be looking down with her palms flat against the sides of her thighs (if standing) on her thighs (if seated).

Handler: avoid eye contact with dog at all times during trials, except when vocalizing during human social preference.

Balanced behavior

Unless otherwise noted, any time two containers are used, always go to both containers to balance motion, even though only one is being baited. The only exceptions are in the two-cup occluded Warm-Ups and the familiarization trials of rotations. If only one container is used (i.e. in causality and funnel task familiarization trials), only go to that side. Also, all containers used in non-olfactory choice tasks, should be smeared with Yummy Chummies at the start of each day so that they smell as similar as possible regardless of the location of the hidden treat.

Choice criteria

In all cases, the handler should aim to call “choice”, in a neutral tone, when the dog makes a choice. This procedure exists in case the experimenter is unable to see the dog’s choice, but if the experimenter happens to see the choice before the handler does, then she should immediately vocalize appropriately (e.g. “wrong”, or praise). Upon hearing the start of the experimenter’s vocalization, the handler should then immediately call “choice”.

1) If the reward being chosen is not in a container, choice is defined as the dog consuming the food or making physical contact with the marker using her mouth, snout, or front paws. Ears do not count as a choice.

2) If the reward is hidden under a container, physical contact with the container using the mouth, snout, or front paws constitutes a choice. For funnel tasks, contact with the funnel itself OR the handle of the funnel apparatus constitutes a choice. For marker cue, contact with the container itself OR the marker on top of the container constitutes a choice.

Applicable to all tasks unless otherwise noted.

Choice contingencies

1) Correct/Incorrect. If the dog chooses the correct location she is allowed to obtain the reward and is vocally praised by the E and H (e.g. “good girl!”). If the dog chooses incorrectly E says ‘wrong’ in a flat tone of voice, and H leads the dog back to the H start line while E recovers the food from the correct location, unless otherwise noted. Though the goal should be to avoid the dog seeing where the reward was, it is not a problem if the dog does see it. However, neither E nor H should intentionally show the dog where the reward was located.

2) No Choice: In the event that the dog does not choose within the allotted time (usually 15s), the trial is repeated unless otherwise noted. However, in these cases, E visits each choice location in the order that they were baited and occludes the location as she recovers or pretends to recover the reward. This procedure occurs on all repeat trials so that the dog does not receive information as to where the reward will be when the trial is repeated.

Applicable to all tasks unless otherwise noted. Remember that Warm-Ups should be used to enforce choice criteria; if needed, dogs should be encouraged to touch containers unambiguously.

Leads

Long Line: 8ft to 15ft long leash – used in choice tasks. When dog is released for a choice, release all slack on the long line so that the dog is allowed to make a choice with no tension on the leash.

Note: this can be changed to the handler’s discretion. The handler should use whichever lead she sees fit for the best control of the dog without biasing the dog during testing.

Handler position

The handler should try to straddle the dog. If the dog doesn’t tolerate this, she should stand directly behind the dog. If both of those attempts fail, the handler should stand with the dog on her left side and center the dog on the start line. In all cases, the handler should pull up/straight back on the lead while at the start line to avoid biasing the dog to one side or another, and the handler should not stand in front of the dog’s feet or head. The first priority should always be that the dog is centered at the start line and the handler is not biasing them to one side or another. While the dog is choosing, H should remain at the start line.

Use of Occluder to Unbait

In the event of a no choice or experimental error, the occluder should be used to unbait if it was used during the initial baiting process. For example, Two-Cup Visible Warm-Ups do not require use of the occluder to unbait.

Experimental error policy

If an experimental error occurs *at any point* during a trial (e.g. the experimenter baits the wrong cup, the dog’s leash knocks over a cup, etc.) the experimenter immediately aborts the trial, visits both containers with the occluder to unbait them (as needed), and repeats it. Before recommencing the repeated trial, the experimenter should turn over both cups to show that there is no food under either of them. The experimenter should announce the repeated trial as such, e.g. “Trial 2, repeat”. A repeated trial due to an experimental error does not count towards the dog’s abort criteria on the task.

If the experimenter realizes that she baited the wrong cup after the dog has chosen, then she should (if possible) rebalance the trials such that the right and left sides are baited an equal number of times.

Testing breaks

If necessary, dogs may leave the testing room for bathroom breaks in between tasks. If it is an emergency, you can take the dog out of the testing room within a task.

Recording numerical data

Times should be recorded to the nearest tenth of a second.

Abort Definitions

Task abort: dog aborts a task attempt. Warm-Ups are counted as a task in this regard.

Session abort: dog aborts a day of testing.

Battery abort: dog does not complete the battery in its entirety

Behavioral abort criteria

If at **any** point during testing a dog becomes aggressive (bared teeth, growling, snarling, snapping, or raised hackles) or severe anxiety (fear urination or defecation, fear aggression), they will **immediately** be excluded from the remainder of the battery. Safety of both the humans and dogs is the highest priority in all cases; no data collection is worth your safety, the dog's, or the future of the project.

If at **any** point the experimenter or handler cannot safely retrieve an object from the dog (e.g. ball or Kong), the dog should be excluded from the remainder of the battery.

If a dog shows mild anxiety (e.g. whimpering, stress yawning, persistent pawing at door, excessive panting) on two days over the course of testing, the dog should be excluded from the remainder of the battery.

If at any point the dog refuses to eat food from the experimenter's hand and/or the floor, the session will be terminated for the day, and the dog can try again the next day. If this occurs on two separate days, the battery is discontinued. Several food items will be tried to rule out aversion to any particular item.

If a dog is fearful only of a task-specific apparatus (e.g. the laterality box), that task will be aborted and the dog will be allowed to finish the rest of the session; an abort of this type also does not count toward battery-wise abort criteria.

No-choice abort criteria

In all tasks where the dog is required to make a choice, the allowable number of no-choices is equal to the number of test trials for that task, regardless of the number of familiarization trials included in the task. However, no-choices in the familiarization trials *will* count against the dog with regards to the no-choice abort criterion. If a dog does not make a choice on two consecutive test trials, do two additional relevant familiarization or warm-up trials (two-cup visible Warm-Ups for object choice tasks, funnel familiarizations for funnel tasks, task-specific familiarization trials for all other tasks; this does not include cylinder task or rotations, in which case you keep repeating the trials). If a dog does not choose on two consecutive trials and thus returns to familiarization trials, no-choices on those trials *will* count toward the no-choice abort criterion for the task. The experimenter should also offer the dog food by hand or on floor to be sure that the dog is motivated to eat.

Abort procedures

For Reward Preference:

For working dogs, if a dog aborts their first attempt of Reward Preference, abort the testing session for the day and try again at the next session. The abort on Reward Preference will count as one of the two allowable task aborts.

For non-choice tasks (Inhibitory Control, Unsolvable Task, First Step, or Tube Laterality):

If a dog (working or pet) aborts the task, administer the next task in the battery. The aborted task(s) can be retried at the conclusion of the battery. These aborts do not count towards the battery-wise abort criteria. An abort of this type does not count toward battery-wise abort criteria.

*For choice tasks (i.e. any tasks except: Inhibitory Control, Unsolvable Task, First Step, or Tube Laterality), **except** Reward Preference:*

For working dogs, if a dog aborts the task, the session is terminated for that day, and the dog attempts the task again (from the beginning) during its next testing session (after Warm-Ups). If the dog aborts the same task for a second day, this task is skipped, and the next task in the battery is administered.

If the visit begins with the continuation of a previous day's tasks due to an abort in the preceding session, whether or not to attempt more than one day's worth of task in the session is at the discretion of the experimenter and dog owner. As a general rule if the dog has more than ½ of the tasks from the aborted session remaining it is better to simply finish this day's worth of tasks and conclude the session. If the dog has less than ½ of the tasks from the aborted session remaining you should consider continuing on to the next day's tasks in the same session to make the most of the visit.

If a dog aborts on any two different tasks, the dog is excluded from the remainder of the battery. Remember that Warm-Ups count as a task and thus Warm-Up aborts count toward this criterion. If a dog aborts Warm-Ups twice, they will automatically be excluded from the remainder of the battery.

Warm-Ups

Treats: Jerky Treats

Leash: Long Line

Occluder: Small when needed

Timer: H 15s countdown

No cup: With the dog centered at the H start line, Admin says 'look' and shows the dog the reward, then places the reward on location C. Admin returns to the Admin start line, looks down, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice. H then drops the dog's leash and the dog is allowed to approach. If the dog does not touch the reward within 15s, the trial is repeated. This continues until the dog has successfully retrieved the reward on 2 total trials.

If the dog does not meet this criterion within 6 trials, the task is aborted. If Warm-Ups are aborted twice, the dog is excluded from the remainder of the battery.

One cup: With the dog centered at the H start line, Admin says 'look' and shows the dog the reward. She then visibly places the reward under a container located at M. Admin then returns to the Admin start line, looks down, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice. If the dog chooses the container, Admin lifts the container and allows the dog to retrieve the reward. If the dog does not make a choice within 15s the trial is repeated. This continues until the dog has successfully retrieved the reward on 2 total trials.

If the dog does not meet this criterion within 6 trials the task is aborted. If Warm-Ups are aborted twice, the dog is excluded from the remainder of the battery.

Two-cup visible: Two containers are positioned at the choice line on locations L and R'. With the dog centered at the H start line, Admin says 'look' and shows the dog the reward. Admin then visits both containers, visibly placing the reward underneath one container while simply pausing at the other. The hand that presents the reward should always remain at the center of Admin's body throughout this process, regardless of whether Admin is holding the reward or not. Admin then returns to the Admin start line, looks down, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice. Follow normal choice contingencies. If the dog makes an incorrect choice, the trial is repeated continually until a correct choice is made.

The dog must make 4 correct first choices in a sliding window of 5 trials to advance to two-cup occluded trials. 'No choice' responses are not counted against the dog for this purpose. If this criterion is not met within 20 trials (40 trials for pet dogs), the task is aborted.

Note that the purpose of Warm-Ups is to help the dog understand the concept of finding rewards under cups. If the dog does not choose for two consecutive trials of two-cup visible, return to one-cup visible trials until the dog chooses correctly twice. Then, return to two-cup visible trials, starting just after the previous stopping point. One-cup trials count towards the abort criteria (trials and/or time) and towards the number of trials to reach passing criteria. For working dogs, proceed until they meet abort criteria.

Two-cup occluded: Two containers are positioned at L and R'. With the dog centered at the H start line, E says 'look' and shows the dog the reward. She then hides the reward behind an occluder and baits one of the cups. She does not visit the other cup. Admin then returns to the Admin start line, places the occluder behind her, looks down, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice. Follow normal choice contingencies. If the dog makes an incorrect choice, the trial is

repeated continually until a correct choice is made.

The dog must make 4 correct first choices in a sliding window of 5 trials to advance to the remainder of the battery. 'No choice' responses are not counted against the dog for this purpose. If this criterion is not met within 20 trials (40 trials for pet dogs), the task is aborted.

If at any point a working dog has participated in **50** warm-up trials (75 for pet dogs) (summed across trial types, and inclusive of no choice trials) or the dog has not met the warm-up criteria within **30** minutes (1 hr for pet dogs), the session is aborted.

Note that the purpose of Warm-Ups is to help the dog understand the concept of finding rewards under cups. If the dog does not choose for two consecutive trials of two-cup occluded, return to one-cup visible trials until the dog chooses correctly twice. Then, return to two-cup occluded trials, starting just after the previous stopping point. One-cup trials count towards the abort criteria (trials and/or time) and towards the number of trials to reach passing criteria. For working dogs, proceed until they meet abort criteria.

Abort Criteria: Stated above for each type.

Cameras: Normal camera positions.

Distracting Pointing Cue

Treats: Jerky Treats or toy

Leash: Long Line

Occluder: Small

Timer: H 15s countdown

Two containers are positioned at L and R' on the choice line. With the dog centered at the H start line, Admin says 'look' and shows the dog the reward. Admin approaches the choice line with the reward behind the occluder and baits/sham baits the containers, and returns to the Admin start line to give the pointing cue. Admin first says 'look' and then points with the arm closest to the NON baited container by extending a straightened arm towards the container with index finger extended, and head turned toward indicated container. Admin says 'okay!' while still fixated on the container and maintains this position until a choice is made. Upon release command, starts a 15s timer and releases the dog to make a choice. Follow normal choice contingencies. If the dog does not choose within 15s the trial is repeated. Six trials are conducted.

Abort Criteria: No choice on 6 trials.

Cameras: Normal camera positions.

Marker Cue

Treats: Jerky Treats or toy

Leash: Long Line

Occluder: Small

Timer: H 15s countdown

Two containers are positioned at A and A' on the choice line. With the dog centered at the H start line, Admin says 'look' and shows the dog the reward. Admin walks back to the choice line with the reward behind the occluder and baits/sham baits the containers, returns to the admin start line, and gives the marker cue. Admin walks toward the dog holding the marker out in front of her, shakes the marker, and says 'look!' Admin then holds the marker at her belly button as she approaches the cups from right to left and places the marker on the designated cup without making a loud noise. The hand that presents the marker should always remain at the center of Admin body throughout this process, regardless of whether Admin is holding the marker or not. Admin then returns to the admin start line, looks down, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice. Follow normal choice contingencies. If a dog does not choose within 15s the trial is repeated. Six trials are conducted.

Abort Criteria: No choice on 6 trials.

Cameras: Normal camera positions.

Causality

Treats: Visual – Jerky Treats or toy

Leash: Long Line

Occluder: Standing

Timer: H 15s countdown

Familiarization - Visual Container: With the dog centered at the H start line, Admin shows the dog the reward inside of the bucket and says 'look.' Looking down, Admin places the bucket right side up with the reward inside on either L or R', returns to the E start line, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice (defined as touching the bucket). Two trials are conducted. If the dog does not make a choice within 15s, the trial is repeated. The dog must successfully locate the bucket at both locations before proceeding to the visual test trials.

Visual Test Trials: Admin centers two pieces of cloth on L and R'. With the dog centered at the H start line, Admin says 'look' and shows the dog the reward inside of a bucket. Behind a free-standing occluder, E places the bucket under one cloth and sham baits the location where the bucket is not hidden by picking up the cloth such that it is visible over the occluder and placing it back in its designated space. The cloth circle is lifted above the occluder in both locations to ensure ambiguity in the baiting/sham baiting process. Admin returns to the Admin start line, looks down, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice. A choice is defined as the dog touching the cloth with nose or paws OR its body passing over the area directly above the cloth. If the dog chooses correctly, admin lifts the cloth and allows the dog to obtain the reward. If the dog chooses incorrectly, admin says "wrong" and simply retrieves the baited container from under the cloth without lifting the unbaited cloth. The next trial is then conducted. If a dog does not choose within 15s, admin visits both locations with the occluder, removes the baited container from under the cloth, and repeats the trial. If a dog has two consecutive no choices, admin should perform two one-bucket familiarization trials (no occlusion), one trial on each side. Four trials are conducted.

Abort criteria: No choice on 8 trials.

Cameras: Normal camera positions.

Working Memory

Treats: Jerky Treats or toy

Leash: Long Line

Occluder: Long Standing

Timer: H 15s countdown

Three containers are positioned in an array on L, M and R equidistant from the dog with a long standing occluder directly behind the containers. With the dog centered at the H start line, Admin stands behind the occluder, says 'look' and shows the dog the reward, then visibly places it under one of the cups. Admin should not put both feet in front of the occluder to present the reward but, if needed, can put one foot over in order to bait the container. Admin then places the occluder in front of the cups (so the dog cannot see them), returns to the Admin start line, stands upright with her hands at her sides, and looks straight down. H starts a stopwatch as soon as the cups are hidden behind the occluder (without waiting for Admin to return to the Admin start line) and waits for the designated amount of time to pass without interacting with the dog (20s: 3 trials, 40s: 3 trials, 60s: 3 trials, reward being placed at each location once per time interval). On the 20s trials, H should give Admin a verbal 3s warning prior to the end of the waiting period. Once this time has elapsed, admin removes the occluder, returns to the E start line, looks down, and says 'ok!' H then starts a 15s timer and releases the dog to make a choice. Follow normal choice contingencies. If the dog does not make a choice, the trial is scored as no choice and the next trial is administered, but prior to the next trial, admin offers the dog a small piece of food to assure that the dog is still motivated to obtain the reward. If the dog will not accept food, follow the general food-related abort criteria.

Abort criteria: None

Cameras: Normal camera positions.

Working Memory with Distractions

Treats: Jerky Treats or toy

Leash: Long Line

Occluder: Long Standing

Timer: H 20s & 40s countdown, followed by 15s countup

The distraction task is identical to the working memory task except that only the 20 (first 3 trials) and 40 (last 3 trials) second delays are used. During the delay, H assumes a position between the dog and the cups and pets the dog on the face and body while constantly vocalizing in a medium- to high-pitched voice. H should not use any command words or be overly arousing to the dog. On the 20s trials, H should give admin a 3s warning prior to the end of the waiting period. When the timer begins to beep H centers the dog at the H start line. Once time has elapsed, admin removes the occluder, returns to the admin start line, looks down, and says 'ok!'. H then starts a 15s timer and releases the dog to make a choice. Follow normal choice contingencies. Like in working memory, if the dog does not make a choice, the trial is scored as no choice and the next trial is administered, but prior to the next trial, admin offers the dog a small piece of food to assure that the dog is still motivated to obtain the reward. The next trial is then conducted. Six trials are conducted.

Abort criteria: None.

Cameras: Normal camera positions.

Unsolvable Task

Treats: Jerky Treats; tennis ball; note: the dog should not get the tennis ball until after the first familiarization

Leash: Tab

Timer: H 30s Familiarization, 1min Test

Familiarization – The dog is at the near line, and the lid of the clear container is located at C. In familiarization trials, E stands, shows the subject a reward, places the reward on top of the lid, and then places the container loosely over the lid such that it is easily knocked off. E then steps back to the experimenter start line, looks at the dog, and says 'ok!' H releases the dog and starts a 30s timer. The dog is then allowed to approach the container, displace the lid, and obtain the reward. The trial ends when the dog retrieves either the ball or the treat. . If at any point, the dog makes the problem impossible to solve on her own (i.e. latches lid onto container or knocks container flat onto the floor and thus traps the reward under it), E should subtly intervene and make the problem solvable again. The trial is repeated if the dog does not retrieve the reward (either toy or treat). The dog is required to successfully complete 4 familiarization trials before advancing to the test.

Test - Test trials are identical to familiarization trials except that E snaps the lid onto the container so that it cannot be removed and then flips the container over such that the dog can see the reward through the bottom. Subjects are given 1min to attempt to access the reward. E stands at the E start line and visually follows the dog (rotating if necessary) during this period. E holds a silent stopwatch behind her back and starts and stops it in count-up mode to measure the total time that the dog looks to her face. H times the 1-minute trial and stands directly facing the wall behind the H start line, ignoring the dog. After each test trial, E praises the dog, opens the container and allows the dog to retrieve the contents. Four trials are conducted.

Abort Criteria: If the dog does not obtain the reward on 12 familiarization trials, the task is aborted.

Cameras: Normal camera positions.

Coding: From video we will code the amount of time that subjects manipulate the apparatus attempting to obtain food as a measure of motivation.

Laterality- Tube Task

Treats: Peanut Butter/Kong Stuff'n

Leash: none

Timer: H 15min stopwatch

Approximately two inches at each end of a one-foot section of one-inch diameter PVC pipe are filled with peanut butter or Kong Stuff'n. H places the pipe on the ground, opening facing the dog, and starts a 15min timer. E films from the front while H codes and records paw incidents. H notes each time the dog manipulates the tube with her left or right front paw; if a paw event (with one or both paws) lasts for more than 3s, H removes and repositions the tube approximately .5m away with the opening facing the dog. If both paws come into contact with the tube simultaneously, disregard and do not include it in the 26 pawing incidents. However, anytime that the dog makes new contact with the tube using either individual paw, E should call out the paw being used, and H records it. H can also help to call out touches to be sure that none are missed. For example, if the dog paws the tube with her left paw and then subsequently paws the tube with her right paw, both events should be coded (one left, one right). Often dogs will allow the tube to rest on top of one paw while they manipulate it with the other. In these cases it is the paw used for active manipulation that is scored. The session is continued for 15min or until 26 pawing occasions have been recorded. If the dog consumes all contents of the tube, H can pause the timer to refill it. Once the dog has touched the tube, if she becomes disinterested, E and H can try to reengage her with the tube. However, the tube should not become overly social in nature. These needs will vary by dog.

Scoring: A pawing incident is defined as the dog touching the tube with the underside of her paw or nails. If the dog kicks the tube with the top of her paw or nails, this is not a pawing incident.

Abort Criteria: The dog does not touch the tube with its paw within the first 5 minutes of testing.

Cameras: Wide-angle camera remains in normal position. Coding camera operated by E is held close to the floor maintaining a vantage point of the tube and both paws throughout the task.