ABC-CT
Data Acquisition and Analysis Core ET
Main Study Manual of Operations
Version 4.8

Running Head: DAAC ET MOP v4.8

Goal:
The DAAC ET MOP will serve as documentation of the technical development and implementation details related to the ET setup and paradigms.

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Version M4.8 Change Log:

- Revised MOP title to be consistent with the title naming protocol of EEG documents.
- Pg. 1: Updated first page formatting to be consistent with EEG MOP v2.2.
- Pg. 1: Updated citation.
- Pg. 48: Included information about Desktop vs. Arm Mount Binocular Remote Mode configurations and SR's confirmation that data quality is unaffected.

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Related Documents

What	Where	Link
DAAC : ABC-CT Files	Google Drive Folder	https://drive.google.com/folderview?id=0BwVRQ8u5irfaflk3Ni1JRWRKUWozc2Z1QjlSNjByTFg1R3ZTWDZDLVZ4SXFtTEwzdTMtTlE&usp=sharing
ET Study Materials (Acquisition Protocol, Keyboard Shortcuts, etc.)	Study Portal	http://www.abc-ct.yale.edu/studydocs/materials.aspx
ET MOP	Study Portal	http://www.abc-ct.yale.edu/studydocs/mops.aspx
ET Run Logs	Study Portal	http://www.abc-ct.yale.edu/studydocs/runlogs.aspx

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Eye Tracking Exclusionary Criteria

- From the ABC-CT Screening Form:
  - *Does your child have any sensory or motor impairments that you know about, for either hearing (e.g. deafness) or vision (e.g. blindness in either eye, strabismus, lazy eye, cataracts, congenital nystagmus, or corrected vision worse than 20/40)? If your child has vision impairments, do they wear corrective lenses?*
  - If answer is YES to the first question about vision impairments, exclude.
- Note: If it comes up on the screener that the child has/had strabismus and the parent is unsure if it has been corrected, they need a doctor to confirm it has been corrected before they can enroll. If the parent is confident that it has been corrected, then they are free to enroll without that doctor confirmation.
- 2017-06-08 Clarification from Fred: "Exclude any current vision problem affecting acuity or tracking in either eye with the exception of near- or far-sightedness corrected with single vision lenses or contacts."
- 2017-07-26: Colorblindness is not exclusionary.

Eye Tracking Battery

ET Tasks (Summary)

1. Pupillary Light Reflex Task (18 trials, 1 trial/block, 18 blocks, 9 blocks/day)
   a. Time: 2 minutes spread across experimental session
   b. Procedure: 6 seconds of black with 40-60 ms of white flash in the middle somewhere
   c. DVs:
      i. Pupillary light reflex latency
      ii. Maximum rate of constriction
      iii. Maximum rate of redilation
      iv. Relative pupil constriction
   d. Hypotheses: Previous research suggests infants at high risk for ASD will show enhanced PLR in response to the stimuli compared to low-risk subjects (expect this to transfer to children with and without ASD)
2. Visual Search/Static Social Scenes (12 trials, 6 trials/block, 2 blocks, 2 blocks/day)
   a. Time: 3 minutes
   b. Procedure: one face, five distractors presented
   c. DVs:
      i. Latency of first fixation on faces
      ii. Average number of fixations within an object
   d. Hypotheses: TD children move gaze towards faces sooner and spend more time looking at faces than children with ASD
3. Biological Motion Preference (40 trials, 10 trials/block, 4 blocks, 2 blocks/day)
   a. Time: 5 minutes
   b. Procedure: point light displays of biological motion & scrambled
   c. DVs:
      i. % time spent looking at the target (%target)
      ii. Proportion of trials where the first saccade was towards the target.
   d. Hypotheses: ASD < TD for % time looking at target & proportion of trials where first saccade was towards the target
4. Activity Monitoring (16 trials, 4 trials/block, 4 blocks, 2 blocks/day)
   a. Time: 5 minutes
   b. Procedure: two people playing together either looking at each other or looking at the toy

   c. DVs:
      i. % of time spent looking at the scene (scene%)
      ii. % of time spent looking at faces (face%)
      iii. % of time spent looking at the activity (activity%)
   d. Hypotheses: ASD < TD for scene%, face%, and activity%
5. Social Interactive Task (22 trials, 5 or 6 trials/block, 4 blocks, 2 blocks/day)
   a. Time: 5 minutes
   b. Procedure: two children playing together (no sound)
   c. DVs:
      i. % of time spent looking at the scene (scene%)
      ii. % of time spent looking at faces (face%)
      iii. % of time spent looking at the activity (activity%)
   d. Hypotheses: ASD < TD for scene%, face%, and activity%

ET Tasks (Descriptions)

Pupillary Light Reflex Task

Approximate Time: 2 minutes total spread across experimental session

Procedure (Nyström, Gredebäck, Bolte, & Falck-Ytter, 2015): Subjects' pupillary responses to white flashes of light are measured using a non-invasive eye-tracking technology. Stimuli consist of a central fixation point on a black background that flashes white for 75 milliseconds. A single stimulus lasts 6 seconds, and the onset of the flash occurs randomly between 1,600 and 2,400 milliseconds. The subjects complete 16 trials, with video clips interspersed between trials. A video clip with two dynamic moving point light displays is presented, causing a saccade from the side of the screen to the center before each trial to help prevent different retinal saturation between subjects. *Primary Dependent Variables (DVs)*:: pupillary light reflex latency, maximum rate of constriction, maximum rate of redilation, and relative pupil constriction. *Hypotheses*: Previous works suggest that infants at high risk for ASD will show enhanced PLR in response to the stimuli compared to low-risk subjects (Nyström et al., 2015).

Pupillary light reflex (PLR) has the potential to provide a reliable biomarker of ASD, measuring differences in attentional engagement and autonomic nervous system dysfunction associated with ASD. The pupil undergoes a characteristic process of constriction and recovery, the PLR, in response to a flash of light, which has been associated with attentional engagement and information processing (Hess & Polt, 1964). Hess and Polt (1964) found that pupil size increases with increasing mental activity in typically developing (TD) individuals. This PLR response is largely influenced by the parasympathetic pathway of the autonomic nervous system (Neuhuber & Schrödl, 2011), and atypical presentation of this response has been documented in a range of autonomic disorders (Bremner, 2009).

Although not specific to ASD, PLR dysfunction in individuals diagnosed with and at high risk for ASD has been documented with both non-social and social stimuli (Anderson, Colombo, & Shaddy, 2006; Daluwatte et al., 2012; Falck-Ytter, 2008). When investigating responses to white flashes of light, Nyström et al. (2015) found that infants at high risk for ASD had hypersensitive PLR, resulting in significantly stronger and quicker reflexes (relative constriction ($t(42) = 3.70$, $p = .003$); latency of onset ($t(42) = 2.32$, $p = .029$)). School-age children and adults with ASD, however, exhibit longer PLR latency ($F(4,229)= 23.24$, $p < .0001$, $\eta^2 = 0.28$), reduced constriction amplitude ($F(4,225) = 4.47$, $p = 0.002$, $\eta^2 = .06$), shorter constriction ($F(4,228) = 5.01$, $p = .0007$, $\eta^2 = 0.06$), and shorter redilation time ($F(4,225)= 3.39$, $p = 0.01$, $\eta^2 = .04$) than TD children in response to flashes of light, suggesting impaired parasympathetic modulation (Daluwatte et al., 2012; Fan, Miles, Takahashi, & Yao, 2009). Fan et al. (2009) were able to discriminate ASD versus TD classification with up to a 92.5% cross-validated success rate based upon PLR performance alone. When assessed with social stimuli, preschoolers with ASD had larger PLR to inverted faces than upright faces (pupil dilation; $t(14) = 2.168$, $p = .048$), a pattern not seen in TD children, suggesting that, rather than processing faces holistically, children with ASD focus on individual facial features, increasing the cognitive load of processing when inverted (Falck-Ytter, 2008). Anderson et al. (2006) found that, when presented with images of children's faces, children with ASD showed significantly different PLR from mental- (developmentally delayed $p = .008$) and chronological-age (TD $p = .009$) matched children, while the mental- and chronological-age matched groups showed no significant difference between each other ($p = .354$). Children with ASD exhibited pupillary constriction, while DD and TD children showed dilation.

PLR not only provides a potentially viable biomarker of ASD, but may also unveil a mechanism through which low-level arousal and attentional deficits lead to later social processing symptomology. Anderson et al. (2006) proposes that PLR performance provides clues into deficits in the neural underpinnings of preferential attention to social stimuli that is typically present in neonates, and believed to be a precursor of joint attention and ultimately

theory of mind. PLR is highly influenced by the cholinergic system, which has been linked to autonomic arousal and social reward processing (Avale et al., 2011; Bremner, 2009; Neuhuber & Schrödl, 2011). It is hypothesized that PLR dysregulation associated with ASD and ASD risk is linked to acetylcholine nicotinic receptors, which have been linked to the neurodevelopmental etiology of ASD (Nyström et al., 2015). PLR provides a non-invasive means to assess autonomic hyper- and hyposensitivity as well as abnormal social stimulus and social reward processing associated with ASD and ASD risk.

Visual Search

Approximate Time: 3 minutes

Visual search tasks have been used to measure the salience of social stimuli, particularly images of faces. ***Procedure*** (Gliga, Elsabbagh, Andravizou, & Johnson, 2009): "Color images depicting 12 different female faces with direct gaze and the same faces with averted gaze were used. Twelve different exemplars from each of five categories (alarm clocks, mobile phones, birds, cars, and shoes) were also used as distracters. Twelve different slides were created, each containing six images (one face and five distracters, one from each category) placed at an equal distance from the center of the screen (Fig. 2). Images were of comparable size. Each slide contained a different set of six images, each image being shown only once in the experiment. To the greatest extent possible, we tried to minimize the differences in color and luminosity among the six images in a slide. Each category was presented in a particular location in 2 of the 12 slides. Each slide was presented for 12 seconds." *DVs*: latency of first fixation on faces, average number of fixations within an object. ***Hypotheses***: TD children will move their gaze towards faces sooner and spend more time looking at faces than children with ASD.

Studies have demonstrated that infants as young as 6 months orient to faces in this type of array more than would be expected by chance, and they orient more often to faces than to other categories of objects. Further, 6 month olds and TD adults alike maintain their attention to faces more than toward other objects (Di Giorgio, Turati, Altoè, & Simion, 2012; Gliga et al, 2009).

These paradigms allow us to measure patterns of visual attention which may be associated with social motivation. Accordingly, they assume that social information is particularly salient for most individuals, particularly images of faces. Elsabbagh and colleagues (2012) found infants at around 7- and 14-months of age who go on to develop ASD demonstrate the face pop-out effect much like their TD peers. However, group differences begin to emerge later in life. Similar visual search studies have shown that children and adolescents with ASD demonstrate atypical scanning patterns for both social and nonsocial objects (Sasson, Turner-Brown, Holtzclaw, Lam, & Bodfish, 2008). They tend to focus less on social objects in the presence of objects of high-autism-interest, and have more circumscribed, perseverative, and detail-oriented looking patterns (Sasson et al., 2008). Compared to a group of TD children (n = 24), children with ASD (n = 29) explored significantly fewer images ($F(1, 50) = 6.74$, $p = .01$, $\eta^2 = .12$), looked at them longer ($F(1, 50) = 5.89$, $p < .05$, $\eta^2 = .11$), and averaged more fixations within each item ($F(1, 50) = 4.55$, $p < .05$, $\eta^2 = .08$).

As opposed to other eye-tracking measures of face processing, visual search tasks allow us to measure the detection of and preference for faces when other objects are present (Gliga et al., 2009). This competition for visual attention is a better reflection of real-life scenarios and is more ecologically valid compared to less complex preference stimuli (Di Giorgio et al., 2012). Therefore, these tasks may have the capacity to measure high-level social-communicative abilities in a simple, instruction-free manner. In addition to monitoring changes in social communication, these tasks have the added potential to monitor changes in restrictive and repetitive behaviors (Sasson et al., 2008).

A natural extension of the array-based visual search task is the complex naturalistic scene, typically photos of real-world situations with carefully arranged interior content such a placement of people versus objects and other non-social features (e.g. landscape). These paradigms have been used to study atypical gaze following (Freeth, Chapman, Ropar, & Mitchell, 2009) as well as atypical social orienting in general (e.g. Riby & Hancock, 2008).

Biological Motion
Approximate Time: 5 minutes

A) Background: Adults quickly and spontaneously recognize human figures in point-light displays (PLDs) consisting of a small number of illuminated dots moving like the joints of a person walking or engaging in other activities (Johansson, 1973). Preferences for biological motion (biomotion) have been found not only in human newborns (Simion, Regolin, & Bulf, 2008) but in other species as well (Vallortigara, Regolin, & Marconato, 2005). Yet, individuals with ASD have shown difficulties recognizing biological motion (D. Annaz et al., 2010; Blake, Turner, Smoski, Pozdol, & Stone, 2003; Hubert et al., 2007; Kaiser & Shiffrar, 2009) and toddlers, children, and adults with ASD also show atypical preferences for biological motion versus control motions (D. Annaz, Karmiloff-Smith, Johnson, & Thomas, 2009; A. Klin & Jones, 2008; Ami Klin, Lin, Gorrindo, Ramsay, & Jones, 2009). *B) Procedure*: Procedures will include trials from those also currently included in EU-AIMS. Following a central fixation (1.5 s), children will be presented with two animated PLDs (Fig. A), one of which will be the biomotion target and the other being a scrambled perceptual control (3-5 s). In each condition stimuli will be blocked in a pseudo-random order with *target* side counterbalanced (Total time: 5 minutes). *C) Primary Dependent Variables (DVs):* % of time spent looking at the *target* (Target%) and proportion of trials where the first saccade was towards the target (biopref_ratio). *D) Hypotheses:* Target% & biopref_ratio: ASD < TD. Effect sizes based on (Ami Klin et al., 2009): d = 1.15 (suggesting 11 participants per group) for biological motion preference differences between 2-year-old TD and ASD toddlers. In addition, results from (Dagmara Annaz, Campbell, Coleman, Milne, & Swettenham, 2012) suggested d = 1.25 for 4 to 7 year olds (suggesting 9 participants per group). *E) Objectives*: These data will elucidate low-level social attention, initial responsiveness to social reward, sustained response to social reward, and perception and understanding of others.

Activity Monitoring Task
Approximate Time: 5 minutes

A) Background: Activity monitoring is compromised in children with ASD: toddlers with ASD attend less to the activities of others than typically developing or developmentally delayed toddlers, diverting their attention to elements of the background, and attention to others' bodies rather than heads or faces (Shic et al., 2014; Shic, Bradshaw, Klin, Scassellati, & Chawarska, 2011). Recent studies show that even adults with ASD evidence atypical patterns of looking during activity monitoring probes. This task, therefore, informs the extent to which social attention is parsed in favor of non-social targets, or to social information that is not generally the focus of typically developing children. *B) Procedure*: Following a central fixation, children will be presented with multiple activity monitoring trials as developed in (Shic et al., 2014) and preliminary studies (Total time: 5 minutes). *C) Primary Dependent Variables (DVs):* % of time spent looking at scene (Scene%), faces (Face%), and the activity (Activity%). *D) Hypotheses:* Scene%, Face%, Activity%: ASD < TD. We hypothesize DVs will be positively associated with language ability and negatively associated with social deficits. Expected effect sizes for Activity Monitoring (Shic et al., 2011): d = 1.2 (suggesting 10 participants per group) for lower looking time percentages at activities in 20-month-old toddlers with ASD versus chronologically age-matched TD toddlers. Results from other preliminary data for older children over a new set of more complex activity monitoring videos suggested similar effects with d = .7 to 1.3 (suggesting

9 to 26 participants per group). *E) Objectives:* This task is especially suitable for examining joint attention and interactivity in a context that is guided by an adult's actions, and would thus afford predictability for most typical observers.

Social Interactive Task
Approximate Time: 5 minutes

A) Background: A recent study by a member of this Consortium's External Advisory Board (R.T. Schultz) used eye tracking to examine looking patterns in 12-year-old children with ASD (*n* = 59) and TD children (*n* = 22) on an "interactive social VE (Visual Exploration) task," where videos of children playing with objects were displayed (see Fig. D). The interactive social VE task showed significant differences between groups in social vs. non-social looking patterns with 95% confidence intervals not overlapping chance (see receiver operator characteristic curves of "social prioritization," i.e. %time looking at "social" ROIs minus "non-social" ROIs for each experiment, figure right). These results highlight the potential of the interactive social VE task, as well as the rationale for excluding static and dynamic VE tasks from our ET task battery. *B) Procedure*: Following a central fixation, children will be presented with interactive social trials as described in (Chevallier et al., 2015) (Total time: 5 minutes). *C) Primary Dependent Variables (DVs):* % of time spent looking at scene (Scene%), faces (Face%), and the activity (Activity%). *D) Hypotheses:* Scene%, Face%, Activity%: ASD < TD. Effect sizes from (Chevallier et al., 2015): *d* = 0.6 (suggesting 36 participants per group) for looking at social content comparing 12-year-old children with ASD and TD children. *E) Objectives:* This task taps similar constructs as the activity monitoring task, and will provide convergent measures but in a more natural, free-flowing, and complex experience, potentially augmenting between group differences and relationships with phenotypic characteristics.

This selection of EU-AIMS tasks taps into fundamental attentional and cognitive processes which may impact social information processing. Disruption in the prototypical development of the processes reflected by these tasks may be associated with later, higher-level social-communicative difficulties. Similarly, it is possible that successful interventions may result in changes in these early mechanisms sooner, or that changes at the level demonstrated by the selected EU-AIMS ET tasks could provide additional information regarding the mechanism of therapeutic change. In contrast, the core ABC-CT ET tasks have been selected to directly correlate with social-communicative ability, and as such target mechanisms that in general are more dynamic, naturalistic, and ecological. The conjunction of these two sets of paradigms thus provides wide access to a range of processes spanning from low-level arousal effects to the processing of fast-paced, highly emotionally charged and complex social situations.

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ABC-CT EU-AIMS Harmonization and Differences

1. Hardware issues:
    a. We will be using different monitors and a different eye tracker. In theory the SR has better timing due to its higher frame rate. Its optics and the underlying methodology for eye tracking also differs substantially, with Tobii typically using a dual bright pupil/dark pupil method, and SR using dark pupil only. The monitors we will be using also differ, but from an EU AIMS standpoint this is not a big deal because the EU AIMS sites also have some heterogeneity across sites in terms of monitors and display characteristics.
2. Software issues:
    a. We will be using Neurobehavioral Systems Presentation as compared to EU AIMS MATLAB Psychtoolbox code. While generally there is similarity across the types of data that are collected in both stimuli delivery systems, there may be specific types of information that are acquired on the backend from psychtoolbox that presentation does not record, and vice versa. At the moment we have no way of knowing if there are critical measures available in one system that are not available in another, but to our best knowledge there are no fatal differences here.
3. Specific paradigm differences:
    a. EU AIMS heavily relies on gaze-contingent behaviors to move experiments along. This can speed up or slow down experiments depending on multiple factors but I want to stress that this is not a minor difference. By comparison, most of the experiments previously part of our core experiments have been run in a non-gaze-contingent fashion. In general, we attend more carefully to post hoc calibration issues, and the EU AIMS groups attends more carefully to online calibration, reflecting some differences in theoretical positions on between group differences.
4. Besides gaze-contingency triggering experiments specific paradigm differences are:
    a. PLR – no significant differences.
        i. 2015-10-30: Assembled as a movie.
        ii. 2015-10-30: For greater accuracy we want to set this up as a series of frames.
        iii. 2015-10-30: Timings of the 30 Hz provided by Par Nystrom don't match up with the 25 Hz versions.
        iv. 2015-11-05: Notes from Luke Mason about EU-AIMS paradigm version
            1. When PLR video plays it flashes white just on the visible display set to exert some control over luminance level at each site (where monitor sizes could differ).
            2. They also record for ambient light illumination in the room for each session, as they will probably want to control for it statistically.
    b. Visual Search/Static Scenes – no significant differences.
    c. Biomotion – no significant differences.

Eye Tracking Task Development

Activity Monitoring

- General info
  - 2 motion conditions (static vs. movie)
  - 2 gaze conditions (mutual vs. activity)
- Counterbalancing
  - Data from toddlers were put into model (IMFAR 2016), sorted by effect size (p value), and then manually reordered in order to generate a balanced ordering
    - Chose from between the 4 different orderings from the toddler study the one that had the biggest between group differences
  - Did not use the “no distractors” condition
  - Activity Monitoring Counterbalancing

Trial	Block	Side	ShowType	Class	Actors	Script	Bg	Gaze	Distractors	Flip
1	1	L	movie	am	a3	s5	b3	gm	d1	f1
2	1	L	show1	ams	a4	s6	b4	ga	d1	f0
3	1	L	movie	am	a6	s3	b5	ga	d1	f0
4	1	L	show1	ams	a7	s0	b7	gm	d1	f0
5	1	L	movie	am	a1	s2	b0	gm	d1	f0
6	1	L	movie	am	a2	s7	b2	ga	d1	f1
7	1	L	show1	ams	a0	s3	b3	gm	d1	f0
8	1	L	show1	ams	a1	s2	b0	ga	d1	f1
9	2	L	movie	am	a7	s4	b6	gm	d1	f1
10	2	L	show1	ams	a6	s2	b2	ga	d1	f1
11	2	L	movie	am	a0	s6	b1	ga	d1	f1
12	2	L	show1	ams	a3	s7	b4	gm	d1	f1
13	2	L	movie	am	a5	s0	b6	ga	d1	f0
14	2	L	show1	ams	a2	s0	b4	ga	d1	f0
15	2	L	show1	ams	a5	s2	b5	gm	d1	f1
16	2	L	movie	am	a4	s1	b3	gm	d1	f0
1	1	R	movie	am	a3	s5	b3	gm	d1	f0
2	1	R	show1	ams	a4	s6	b4	ga	d1	f1
3	1	R	movie	am	a6	s3	b5	ga	d1	f1
4	1	R	show1	ams	a7	s0	b7	gm	d1	f1
5	1	R	movie	am	a1	s2	b0	gm	d1	f1
6	1	R	movie	am	a2	s7	b2	ga	d1	f0
7	1	R	show1	ams	a0	s3	b3	gm	d1	f1
8	1	R	show1	ams	a1	s2	b0	ga	d1	f0
9	2	R	movie	am	a7	s4	b6	gm	d1	f0
10	2	R	show1	ams	a6	s2	b2	ga	d1	f0
11	2	R	movie	am	a0	s6	b1	ga	d1	f0
12	2	R	show1	ams	a3	s7	b4	gm	d1	f0
13	2	R	movie	am	a5	s0	b6	ga	d1	f1
14	2	R	show1	ams	a2	s0	b4	ga	d1	f1
15	2	R	show1	ams	a5	s2	b5	gm	d1	f0
16	2	R	movie	am	a4	s1	b3	gm	d1	f1

Biological Motion Preference

- General info
  - 10 versions (Object ID's) of biomotion used: 5, 28, 24, 20, 13, 1, 30, 23, 16,12
  - 2 experimental orderings (each repeated 3 times to reach 6 experimental orderings total)
  - 40 trials of Biological Motion Preference
  - Original backgrounds were black, need gray backgrounds
- Counterbalancing
  - Trials 1-20 are exactly the same as EU-AIMS
  - Trials 21-40 are like EU-AIMS
    - Same Object IDs but we use all Side/Control options (EU-AIMS only had time to use the rotating Control option)
    - Side and Control are the opposite of trials 1-20 (Right → Left, Rotating → Scrambled and vice versa)
    - Condition order = same as 1-20 (but with different Object IDs)
  - Object IDs to use were selected by Fred
  - Biological Motion Preference Counterbalancing (Order for A, C, E)
    - Order for A, C, E below -- Order for B, D, F has all of the Sides and Controls swapped

Trial	Block	Condition	Side	Control	Object ID
1	1	1	L	R	5
2	1	2	R	S	28
3	1	3	L	S	24
4	1	4	R	R	20
5	1	5	L	R	13
6	2	4	L	R	20
7	2	3	R	S	24
8	2	5	R	R	13
9	2	2	L	S	28
10	2	1	R	R	5
11	3	5	L	S	13
12	3	1	L	S	5
13	3	4	R	S	20
14	3	3	L	R	24
15	3	2	R	R	28
16	4	3	R	R	24
17	4	5	R	S	13
18	4	2	L	R	28
19	4	1	R	S	5
20	4	4	L	S	20
21	5	1	R	S	1
22	5	2	L	R	30
23	5	3	R	R	23
24	5	4	L	S	16
25	5	5	R	S	12
26	6	4	R	S	16
27	6	3	L	R	23
28	6	5	L	S	12
29	6	2	R	R	30
30	6	1	L	S	1
31	7	5	R	R	12
32	7	1	R	R	1

33	7	4	L	R	16
34	7	3	R	S	23
35	7	2	L	S	30
36	8	3	L	S	23
37	8	5	L	R	12
38	8	2	R	S	30
39	8	1	L	R	1
40	8	4	R	R	16

Pupillary Light Reflex

- General info
  - 3 versions of PLR varying when the flash begins
    - Flash begins at: frame 65 (plr65), frame 71 (plr71), or frame 78 (plr78)
    - Flash lasts 4 frames at 30 frames per second
    - Markup file analyzes 100 ms before flash, the 4 frames of the flash, and 100 ms after the end of the flash
    - [(x / 30.0 * 1000) - 100 and ((x+4) / 30.0 * 1000) + 100] when x= 65
  - 6 experimental orderings
  - 18 trials of PLR
- For each trial, each version appears in two of the orders (“counts in column”)
- For each block of 3 trials, each version appeared a total of 4 times across the 4 Feasibility orders
  - Within 1 trial, only 1 version was ever repeated (with each version repeated during a different trial within the block)
- Digrams were counted and no digrams of repeats were allowed (ex: 11, 22, 33)
  - Throughout all 6 experimental orders and all 18 trials, each digram was repeated 17 times (excluding the 11, 22, and 33 digrams)
  - In each order, the digrams were repeated 3 times for 5 of the digrams and 2 times for 1 of the digrams (different for every order)
- PLR Counterbalancing

Order #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	3	1	2	1	3	2	3	2	1	2	1	3	1	2	3	2	3	1
2	2	1	3	2	3	1	2	3	1	3	2	1	2	1	3	1	2	3
3	1	2	3	2	1	3	1	2	3	1	3	2	3	2	1	3	1	2
4	2	3	1	3	2	1	3	1	2	1	2	3	1	3	2	3	2	1

- Counts in Column

Trial -->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1	2	1	1	1	2	1	1	2	2	1	1	2	1	1	1	1	2
2	2	1	1	2	1	1	1	2	1	1	2	1	1	1	2	1	2	1
3	1	1	2	1	2	1	2	1	1	1	1	2	1	2	1	2	1	1

- Counts in 3-Trial Block for Feasibility Testing

Option	Trial 1-3	Trial 4-6	Trial 7-9	Trial 10-12	Trial 13-15	Trial 16-18
1	4	4	4	4	4	4
2	4	4	4	4	4	4
3	4	4	4	4	4	4

- Digram Equivalents for Each Trial and Order

6	1	3	2	7	5	7	3	1	3	2	6	1	5	7	5	6	
3	2	7	5	6	1	5	6	2	7	3	1	3	2	6	1	5	
1	5	7	3	2	6	1	5	6	2	7	5	7	3	2	6	1	
5	6	2	7	3	2	6	1	3	1	5	6	2	7	5	7	3	

- Digram Count per Order

Order #	Digram # 0	1	2	3	4	5	6	7	8
1	0	3	2	3	0	3	3	3	0
2	0	3	3	3	0	3	3	2	0
3	0	3	3	2	0	3	3	3	0
4	0	2	3	3	0	3	3	3	0

- Digram Count for All Trials and Orders (Overall)

0	0	1, 1
1	11	1, 2
2	11	1, 3
3	11	2, 1
4	0	2, 2
5	12	2, 3
6	12	3, 1
7	11	3, 2
8	0	3, 3

- 2016-08-30: PLR Lux
    - Measured with a light meter, the baseline black screen of the PLR stimulus is 3.5 lux. The maximum readout during the PLR flash was an average of 94.6 lux, but this ranged from roughly 80 to 109 during different readings.

Social Interactive

- General info
    - 22 trials (15 seconds each)
        - 11 social
        - 11 nonsocial
- Counterbalancing
    - Came from CHOP directly

block	trial	file	id	condition
1	1	sibs1_non_15s	1	non
1	2	sibs5_non_15s	5	non
1	3	sibs4_non_15s	4	non
1	4	sibs8_soc_15s	8	soc
1	5	sibs10_soc_15s	10	soc
1	6	sibs3_non_15s	3	non
2	1	sibs2_soc_15s	2	soc
2	2	sibs6_non_15s	6	non
2	3	sibs9_soc_15s	9	soc
2	4	sibs11_non_15s	11	non
2	5	sibs12_soc_15s	12	soc
3	1	sibs1_soc_15s	1	soc
3	2	sibs8_non_15s	8	non
3	3	sibs5_soc_15s	5	soc
3	4	sibs4_soc_15s	4	soc
3	5	sibs3_soc_15s	3	soc
3	6	sibs10_non_15s	10	non
4	1	sibs2_non_15s	2	non
4	2	sibs6_soc_15s	6	soc
4	3	sibs12_non_15s	12	non
4	4	sibs9_non_15s	9	non
4	5	sibs11_soc_15s	11	soc

Visual Search/Static Scenes

- General info
  - 6 visual search trials
  - 6 static scene trials
  - 8 possible background sounds
- Counterbalancing
  - Came from EU AIMS directly
  - Images are not repeated but songs are repeated

Block	image	sound
1	STATIC1.JPG	SI_SONG2.wav
1	POPOUT1.JPG	SI_SONG3.wav
1	STATIC2.JPG	SI_SONG4.wav
1	POPOUT2.JPG	SI_SONG5.wav
1	STATIC3.JPG	SI_SONG6.wav
1	POPOUT3.JPG	SI_SONG7.wav
2	STATIC4.JPG	SI_SONG8.wav
2	POPOUT4.JPG	SI_SONG9.wav
2	STATIC5.JPG	SI_SONG3.wav
2	POPOUT5.JPG	SI_SONG5.wav
2	STATIC6.JPG	SI_SONG2.wav
2	POPOUT6.JPG	SI_SONG6.wav

  - Show VSS on both days (same stimuli, just flipped on day 2)

		Day	
		1	2
Order	1	L	R
	2	R	L
	3	L	R
	4	R	L

General ET Task Development Notes

- Notes on recording of key presses
  - P, M, G, and L are only recorded outside of SR calibration/validation and if it is after the first internal calibration point
- SR calibration with animations instead of crosshairs
  - 2015-10-29
    - Beibin is working to replace the SR calibration (with crosshairs) with animations
    - Can skip by taking out the drift correction
    - Calibration line doesn't matter
    - Waiting for SR's response about this
  - 2015-11-10
    - Beibin modified the "exp.sce" in "DEPLOY" folder for experiment 5000. We can run calibration animation on SR now. We should decide what stimuli to use for calibration.
    - Notes on changes:
      - PresLink.dll should be changed for the new calibration
      - Added a SR_task() function s.t. we can have SR calibration
      - Changed eye_tracker_init() function so that Broadcast can perform with the new calibration
      - Moved the broadcast programs into C:/bin/ folder to keep it simpler
    - Use **F4** to run calibration instead of **C**
    - No more validation (**V**)
  - 2015-11-20
    - **F4** to calibrate, then **F4** again to validate
    - Problem with Presentation displaying Dynamic Naturalistic Scenes videos (bar across screen)
  - 2015-10-29
    - Display problem (a horizontal bar) on dollhouse video, as shown in the attached video "display bar.mov". This problem occurs when there are large movements in video or two consecutive frames have different color (e.g. PLR). The problem is only noticeable in dollhouse video for the whole experiment.
    - Turning on Vertical Sync (in NVIDIA 3D settings) seems to fix the problem
- Added user input of participant ID and session to beginning of Presentation code
  - 2015-12-01
    - Session = 1-6 (time 1, day 1 = 1; time 1, day 2 = 2; time 2, day 1 = 3; etc.)
- Presentation Video Timings
  - 2015-11-18
    - Good video uncertainties on a frame-by-frame basis (see table below)
      - Units = tenths of a millisecond or frames

Filename	Frames Total	Frames with Uncertainty > 5 tenths of a ms	Uncertainty > 5 Avg.	Uncertainty > 5 Stdev.	Maximum Uncertainty
baby_animals_640x480_short.avi	754	1	179.00	#DIV/0!	179
plr71.avi	186	0	#DIV/0!	#DIV/0!	3
U19DollhouseV05.avi	7718	359	18.28	26.27	185
plr65.avi	1	0	#DIV/0!	#DIV/0!	2
sibs1_soc_15s.avi	465	11	11.45	3.42	17
sibs8_non_15s.avi	465	8	9.50	3.82	16

sibs3_soc_15s.avi	465	3	6.33	0.58	7
sibs10_non_15s.avi	465	7	10.14	3.24	16
plr78.avi	186	0	#DIV/0!	#DIV/0!	2
sibs11_soc_15s.avi	495	11	10.91	2.88	15
electricsheep_v2a.avi	477	16	9.63	2.75	15
plr65.avi	186	1	11.00	#DIV/0!	11
spPandaCL.avi	300	8	8.38	1.19	11
am_a7_s4_b6_gm_d1_f1.avi	658	11	9.45	2.46	12
am_a0_s6_b1_ga_d1_f1.avi	546	0	#DIV/0!	#DIV/0!	3
plr71.avi	186	0	#DIV/0!	#DIV/0!	2
am_a5_s0_b6_ga_d1_f0.avi	598	2	16	0	16
am_a4_s1_b3_gm_d1_f0.avi	544	11	9.545454545	3.297381882	16
plr78.avi	186	1	15	#DIV/0!	15
plr71.avi	186	0	#DIV/0!	#DIV/0!	2
electricsheep_v1a.avi	477	2	12.5	6.363961031	17
spPugCC.avi	300	0	#DIV/0!	#DIV/0!	3
bm2_01_111_22.avi	109	0	#DIV/0!	#DIV/0!	2
bm2_30_354_11.avi	161	0	#DIV/0!	#DIV/0!	2
bm2_23_343_21.avi	145	0	#DIV/0!	#DIV/0!	2
bm2_16_232_12.avi	136	0	#DIV/0!	#DIV/0!	2
plr78.avi	186	0	#DIV/0!	#DIV/0!	2
plr65.avi	186	0	#DIV/0!	#DIV/0!	2
electricsheep_v3a.avi	477	9	9.44	1.94	12
spTrainCL.avi	300	0	#DIV/0!	#DIV/0!	3

- Paradigm changes for Main Study
    - 2016-08-05
        - Visual Search kept in to maintain structure of it interleaved with Static Scenes (SS)
        - Final task set
            - Activity Monitoring (AM)
            - Biological Motion (BM)
            - Social Interactive (SI)
            - Social Scenes (SS) / Visual Search (VS)
    - 2016-07-29 (email from Fred)
        - Tasks removed
            - Dynamic Naturalistic Scenes (DS)
            - Gap Overlap (GO)
            - Spontaneous Social Orienting (SSO)
            - Visual Search
    - 2016-06-30 (email from Fred to Sara & Jamie)
        - Adam and I (and the rest of the ET DAAC) conferred regarding the paradigms and have decided that there is no compelling reason to swap out or remove any experiments at the current time. We are getting adequate data collection at the moment from all paradigms, and the most questionable paradigm was Sandwich Lady, which some sites did not like because of the language. We went back and looked at the underlying data and data loss in Sandwich Lady and found that the data loss was due primarily to calibration quality issues rather than lack of looking. In addition, we looked through the alternative Helen-Tager Flusberg videos. Our general lack of previous experience with this alternative Sandwich Lady paradigm as well as the lack of comparability between Feasibility

and the Main Study in the event of a switch makes us less confident that a switch at this time is useful or warranted. If there had been a formal switch planned, we would have mentioned it earlier because it would constitute a large change, but we also realize we hadn't definitively reported that paradigms were NOT changing, hence this message. Please let us know if you have any questions.

        - That said, there are many changes we are making to the delivery system, and we certainly have our hands full even as the paradigms themselves remain fixed

- File size expectations for Main Study
    - treeBased on the following proportion:
        - Feasibility session length = 20.6 minutes
        - Main Study session length = 14.4 minutes
    - Expected study uploads (provided to DCC)

	Feasibility	Full	Full+20%
LOG	0.23	0.16	0.19
DVD	1.50	1.05	1.26
TOTAL	1.73	1.21	**1.45**

    - Maximum study uploads

	Feasibility	Full	Full+20%
LOG	0.23	0.16	0.19
DVD	4.00	2.80	3.36
TOTAL	4.23	2.96	3.55

    - Empirical calculations about file size

	Feasibility	Feasibility	Feasibility	Main Study	Main Study	Main Study
	Expected	Average	Max	Avg	Max	Avg * 1.2
DVD	1.5	1.052	3.312	0.735	2.315	0.882
EDFLOG	0.23	0.026	0.035	0.018	0.024	0.022
Total	1.73	1.078	3.347	0.754	2.340	0.904

    - NDAR study uploads (provided to DCC)

	Feasibility	Full	Full+20%
TXT	0.24	0.17	**0.20**

- Smooth pursuit calibration adjustments
    - Changed to simple shapes to reduce jitter in the animation

Main Study Counterbalancing Proposal (Final)

Order	A	A	B	B	C	C	D	D
Day	Task	Time (s)	Task	Time (s)	Task	Time (s)	Task	Time (s)
1	PLR-B01-O1	6	PLR-B01-O2	6	PLR-B01-O3	6	PLR-B01-O4	6
1	AM-B1-L	80	BM-B1-L	60	SI-B1	90	VSS-B3	120
1	PLR-B02-O1	6	PLR-B02-O2	6	PLR-B02-O3	6	PLR-B02-O4	6
1	AM-B2-L	80	BM-B2-L	60	SI-B2	75	VSS-B4	120
1	BREAK-B1	15	BREAK-B1	15	BREAK-B1	15	BREAK-B1	15
1	PLR-B03-O1	6	PLR-B03-O2	6	PLR-B03-O3	6	PLR-B03-O4	6
1	CAL-B01	10	CAL-B01	10	CAL-B01	10	CAL-B01	10
1	BM-B1-R	60	VSS-B3	120	AM-B1-L	80	SI-B1	90
1	PLR-B04-O1	6	PLR-B04-O2	6	PLR-B04-O3	6	PLR-B04-O4	6
1	BM-B2-R	60	VSS-B4	120	AM-B2-L	80	SI-B2	75
1	PLR-B05-O1	6	PLR-B05-O2	6	PLR-B05-O3	6	PLR-B05-O4	6
1	CAL-B02	10	CAL-B02	10	CAL-B02	10	CAL-B02	10
1	SI-B1	90	AM-B1-R	80	VSS-B1	120	BM-B1-L	60
1	PLR-B06-O1	6	PLR-B06-O2	6	PLR-B06-O3	6	PLR-B06-O4	6
1	SI-B2	75	AM-B2-R	80	VSS-B2	120	BM-B2-L	60
1	BREAK-B2	15	BREAK-B2	15	BREAK-B2	15	BREAK-B2	15
1	PLR-B07-O1	6	PLR-B07-O2	6	PLR-B07-O3	6	PLR-B07-O4	6
1	CAL-B03	10	CAL-B03	10	CAL-B03	10	CAL-B03	10
1	VSS-B1	120	SI-B1	90	BM-B1-R	60	AM-B1-R	80
1	PLR-B08-O1	6	PLR-B08-O2	6	PLR-B08-O3	6	PLR-B08-O4	6
1	VSS-B2	120	SI-B2	75	BM-B2-R	60	AM-B2-R	80
1	PLR-B09-O1	6	PLR-B09-O2	6	PLR-B09-O3	6	PLR-B09-O4	6
1	CAL-B04	10	CAL-B04	10	CAL-B04	10	CAL-B04	10
Day 1 Total (s)		779		779		779		779
Day 1 Total (min)		12.98		12.98		12.98		12.98

Order	A	A	B	B	C	C	D	D
Day	Task	Time (s)	Task	Time (s)	Task	Time (s)	Task	Time (s)
2	PLR-B10-O1	6	PLR-B10-O2	6	PLR-B10-O3	6	PLR-B10-O4	6
2	SI-B3	90	AM-B3-R	80	VSS-B3	120	BM-B3-L	60
2	PLR-B11-O1	6	PLR-B11-O2	6	PLR-B11-O3	6	PLR-B11-O4	6
2	SI-B4	75	AM-B4-R	80	VSS-B4	120	BM-B4-L	60
2	BREAK-B3	15	BREAK-B3	15	BREAK-B3	15	BREAK-B3	15
2	PLR-B12-O1	6	PLR-B12-O2	6	PLR-B12-O3	6	PLR-B12-O4	6
2	CAL-B05	10	CAL-B05	10	CAL-B05	10	CAL-B05	10
2	VSS-B3	120	SI-B3	90	BM-B3-R	60	AM-B3-R	80
2	PLR-B13-O1	6	PLR-B13-O2	6	PLR-B13-O3	6	PLR-B13-O4	6
2	VSS-B4	120	SI-B4	75	BM-B4-R	60	AM-B4-R	80
2	PLR-B14-O1	6	PLR-B14-O2	6	PLR-B14-O3	6	PLR-B14-O4	6
2	CAL-B06	10	CAL-B06	10	CAL-B06	10	CAL-B06	10
2	AM-B3-L	80	BM-B3-L	60	SI-B3	90	VSS-B1	120
2	PLR-B15-O1	6	PLR-B15-O2	6	PLR-B15-O3	6	PLR-B15-O4	6
2	AM-B4-L	80	BM-B4-L	60	SI-B4	75	VSS-B2	120
2	BREAK-B4	15	BREAK-B4	15	BREAK-B4	15	BREAK-B4	15
2	PLR-B16-O1	6	PLR-B16-O2	6	PLR-B16-O3	6	PLR-B16-O4	6
2	CAL-B07	10	CAL-B07	10	CAL-B07	10	CAL-B07	10
2	BM-B3-R	60	VSS-B1	120	AM-B3-L	80	SI-B3	90
2	PLR-B17-O1	6	PLR-B17-O2	6	PLR-B17-O3	6	PLR-B17-O4	6
2	BM-B4-R	60	VSS-B2	120	AM-B4-L	80	SI-B4	75
2	PLR-B18-O1	6	PLR-B18-O2	6	PLR-B18-O3	6	PLR-B18-O4	6
2	CAL-B08	10	CAL-B08	10	CAL-B08	10	CAL-B08	10
Day 2 Total (s)		779		779		779		779
Day 2 Total (min)		12.98		12.98		12.98		12.98

ABCD/CDAB
BDAC/ACBD
CADB/DBCA
DCBA/BADC

Note from stats team: “This has the advantage that it takes 2 pairs from each of two of the three cycles so that there is no pair of tests that fails to appear and in fact each pair in each order appears exactly twice which is very nice. The down side is that lots of the pairings occur twice within one order rather than spread across multiple orders or put another way, each person sees mostly the same tests next to each other on both days. So this is great on a group level but slightly less good on a within person level.”

- Feasibility Counterbalancing Proposal (Final)

Order	A / 1	B / 2	C / 3	D / 4	E / 5	F / 6
Day 1	PLR-B01-O1	PLR-B01-O2	PLR-B01-O3	PLR-B01-O4	PLR-B01-O5	PLR-B01-O6
	SSO	GO-B1-R	GO-B1-R	BM-B1-L	VSS-B1	SI-B1
	BREAK-B1	PLR-B02-O2	PLR-B02-O3	PLR-B02-O4	PLR-B02-O5	PLR-B02-O6
	PLR-B02-O1	GO-B2-R	GO-B2-R	BM-B2-L	VSS-B2	SI-B2
	CAL-B1	BREAK-B1	BREAK-B1	BREAK-B1	BREAK-B1	BREAK-B1
	GO-B1-L	CAL-B1	CAL-B1	CAL-B1	CAL-B1	PLR-B03-O6
	PLR-B03-O1	DS-B1	SI-B1	AM-B1-R	BM-B1-R	CAL-B1
	GO-B2-L	PLR-B03-O2	PLR-B03-O3	PLR-B03-O4	PLR-B03-O5	SSO
	BREAK-B2	CAL-B2	SI-B2	AM-B2-R	BM-B2-R	BREAK-B2
	CAL-B2	SI-B1	BREAK-B2	PLR-B04-O4	BREAK-B2	PLR-B04-O6
	BM-B1-R	PLR-B04-O2	PLR-B04-O3	CAL-B2	CAL-B2	CAL-B2
	PLR-B04-O1	SI-B2	CAL-B2	VSS-B1	SI-B1	DS-B1
	BM-B2-R	BREAK-B2	DS-B1	PLR-B05-O4	PLR-B04-O5	PLR-B05-O6
	BREAK-B3	PLR-B05-O2	PLR-B05-O3	VSS-B2	SI-B2	CAL-B3
	CAL-B3	CAL-B3	CAL-B3	BREAK-B2	BREAK-B3	GO-B1-R
	DS-B1	BM-B1-L	AM-B1-L	CAL-B3	PLR-B05-O5	PLR-B06-O6
	PLR-B05-O1	PLR-B06-O2	PLR-B06-O3	SI-B1	CAL-B3	GO-B2-R
	CAL-B4	BM-B2-L	AM-B2-L	PLR-B06-O4	AM-B1-R	BREAK-B3
	SI-B1	BREAK-B3	PLR-B07-O3	SI-B2	PLR-B06-O5	CAL-B4
	PLR-B06-O1	CAL-B4	CAL-B4	BREAK-B3	AM-B2-R	AM-B1-R
	SI-B2	AM-B1-R	SSO	PLR-B07-O4	PLR-B07-O5	PLR-B07-O6
	BREAK-B4	PLR-B07-O2	BREAK-B3	CAL-B4	CAL-B4	AM-B2-R
	PLR-B07-O1	AM-B2-R	PLR-B08-O3	GO-B1-L	DS-B1	PLR-B08-O6
	CAL-B5	PLR-B08-O2	CAL-B5	PLR-B08-O4	PLR-B08-O5	CAL-B5
	AM-B1-L	CAL-B5	BM-B1-R	GO-B2-L	CAL-B5	BM-B1-L
	PLR-B08-O1	VSS-B1	PLR-B09-O3	BREAK-B4	GO-B1-L	PLR-B09-O6
	AM-B2-L	PLR-B09-O2	BM-B2-R	CAL-B5	PLR-B09-O5	BM-B2-L
	PLR-B09-O1	VSS-B2	BREAK-B4	DS-B1	GO-B2-L	BREAK-B4
	CAL-B6	BREAK-B4	CAL-B6	PLR-B09-O4	BREAK-B4	CAL-B6
		CAL-B6		CAL-B6	CAL-B6	

Order	A / 1	B / 2	C / 3	D / 4	E / 5	F / 6
Day 2	PLR-B10-O1	PLR-B10-O2	PLR-B10-O3	PLR-B10-O4	PLR-B10-O5	PLR-B10-O6
	DS-B2	SI-B3	AM-B3-L	DS-B2	AM-B3-R	BM-B3-L
	PLR-B11-O1	PLR-B11-O2	PLR-B11-O3	PLR-B11-O4	PLR-B11-O5	PLR-B11-O6
	CAL-B7	SI-B4	AM-B4-L	CAL-B7	AM-B4-R	BM-B4-L
	SI-B3	BREAK-B5	PLR-B12-O3	BM-B3-L	PLR-B12-O5	BREAK-B5
	PLR-B12-O1	PLR-B12-O2	CAL-B7	PLR-B12-O4	CAL-B7	CAL-B7
	SI-B4	CAL-B7	VSS-B1	BM-B4-L	GO-B3-L	DS-B2
	BREAK-B5	AM-B3-R	PLR-B13-O3	BREAK-B5	PLR-B13-O5	PLR-B12-O6
	PLR-B13-O1	PLR-B13-O2	VSS-B2	CAL-B8	GO-B4-L	CAL-B8
	CAL-B8	AM-B4-R	BREAK-B5	GO-B3-L	BREAK-B5	GO-B3-R
	AM-B3-L	PLR-B14-O2	CAL-B8	PLR-B13-O4	CAL-B8	PLR-B13-O6
	PLR-B14-O1	CAL-B8	BM-B3-R	GO-B4-L	SI-B3	GO-B4-R
	AM-B4-L	SSO	PLR-B14-O3	BREAK-B6	PLR-B14-O5	BREAK-B6
	PLR-B15-O1	BREAK-B6	BM-B4-R	CAL-B9	SI-B4	CAL-B9
	CAL-B9	PLR-B15-O2	BREAK-B6	SSO	BREAK-B6	AM-B3-R
	VSS-B1	CAL-B9	CAL-B9	BREAK-B7	PLR-B15-O5	PLR-B14-O6
	PLR-B16-O1	BM-B3-L	GO-B3-R	PLR-B14-O4	CAL-B9	AM-B4-R
	VSS-B2	PLR-B16-O2	PLR-B15-O3	CAL-B10	DS-B2	PLR-B15-O6
	BREAK-B6	BM-B4-L	GO-B4-R	SI-B3	PLR-B16-O5	CAL-B10
	CAL-B10	BREAK-B7	BREAK-B7	PLR-B15-O4	CAL-B10	VSS-B1
	BM-B3-R	CAL-B10	CAL-B10	SI-B4	BM-B3-R	PLR-B16-O6
	PLR-B17-O1	GO-B3-R	DS-B2	BREAK-B8	PLR-B17-O5	VSS-B2
	BM-B4-R	PLR-B17-O2	PLR-B16-O3	PLR-B16-O4	BM-B4-R	BREAK-B7
	BREAK-B7	GO-B4-R	CAL-B11	CAL-B11	BREAK-B7	CAL-B11
	CAL-B11	BREAK-B8	SI-B3	AM-B3-R	CAL-B11	SI-B3
	GO-B3-L	CAL-B11	PLR-B17-O3	PLR-B17-O4	SSO	PLR-B17-O6
	PLR-B18-O1	DS-B2	SI-B4	AM-B4-R	BREAK-B8	SI-B4
	GO-B4-L	PLR-B18-O2	BREAK-B8	PLR-B18-O4	PLR-B18-O5	BREAK-B8
	BREAK-B8	CAL-B12	PLR-B18-O3	CAL-B12	CAL-B12	PLR-B18-O6
	CAL-B12		CAL-B12			CAL-B12

- Changes made to experimental orderings by Fred
    - There are different trials on different days, so it doesn't make sense for there to be left and right versions for different days, only for different orderings
    - VSS removed from the L-R orderable list to maintain comparability with EU-AIMS
- 2015-10-12 Counterbalancing Proposal

Experimental Order	A	B	C	D
Day 1				
1	SSO	GO-R	GO-R	BM-L
	PLR	PLR	PLR	PLR
2	GO-L	DS	SI	AM-R
	PLR	PLR	PLR	PLR
3	BM-R	SI	DS	VSS-R
	PLR	PLR	PLR	PLR
4	DS	BM-L	AM-L	SI
	PLR	PLR	PLR	PLR
5	SI	AM-R	SSO	GO-L
	PLR	PLR	PLR	PLR
6	AM-L	VSS-L	BM-R	DS
Day 2				
1	DS	SI	AM-R	DS
	PLR	PLR	PLR	PLR
2	SI	AM-L	VSS-R	BM-R
	PLR	PLR	PLR	PLR
3	AM-R	SSO	BM-L	GO-R
	PLR	PLR	PLR	PLR
4	VSS-L	BM-R	GO-L	SSO
	PLR	PLR	PLR	PLR
5	BM-L	GO-L	DS	SI
	PLR	PLR	PLR	PLR
6	GO-R	DS	SI	AM-L

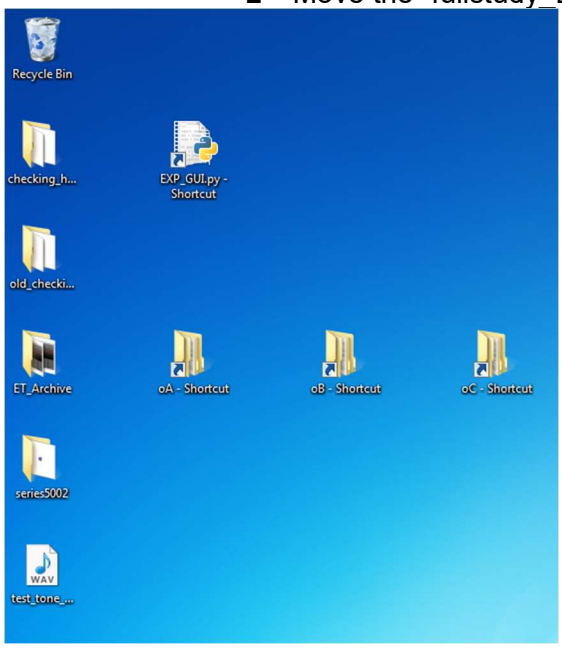
- 2015-08-21 Counterbalancing Proposal

	A	**B**	**C**	**D**
Day 1 **1**	SSO	Gap Overlap	Gap Overlap	Biomotion Preference
	PLR	PLR	PLR	PLR
2	Gap Overlap	Dynamic Naturalistic	Social Interactive	Activity Monitoring
3	Biomotion Preference	Social Interactive	Dynamic Naturalistic	Visual Search/Static Scenes
	PLR	PLR	PLR	PLR
4	Dynamic Naturalistic	Biomotion Preference	Activity Monitoring	Social Interactive
	PLR	PLR	PLR	PLR
5	Social Interactive	Activity Monitoring	SSO	Gap Overlap
	PLR	PLR	PLR	PLR
6	Activity Monitoring	Visual Search/Static Scenes	Biomotion Preference	Dynamic Naturalistic
Day 2 **1**	Dynamic Naturalistic	Social Interactive	Activity Monitoring	Dynamic Naturalistic
	PLR	PLR	PLR	PLR
2	Social Interactive	Activity Monitoring	Visual Search/Static Scenes	Biomotion Preference
	PLR	PLR	PLR	PLR
3	Activity Monitoring	SSO	Biomotion Preference	Gap Overlap
	PLR	PLR	PLR	PLR
4	Visual Search/Static Scenes	Biomotion Preference	Gap Overlap	SSO
	PLR	PLR	PLR	PLR
5	Biomotion Preference	Gap Overlap	Dynamic Naturalistic	Social Interactive
	PLR	PLR	PLR	PLR
6	Gap Overlap	Dynamic Naturalistic	Social Interactive	Activity Monitoring

Deployment

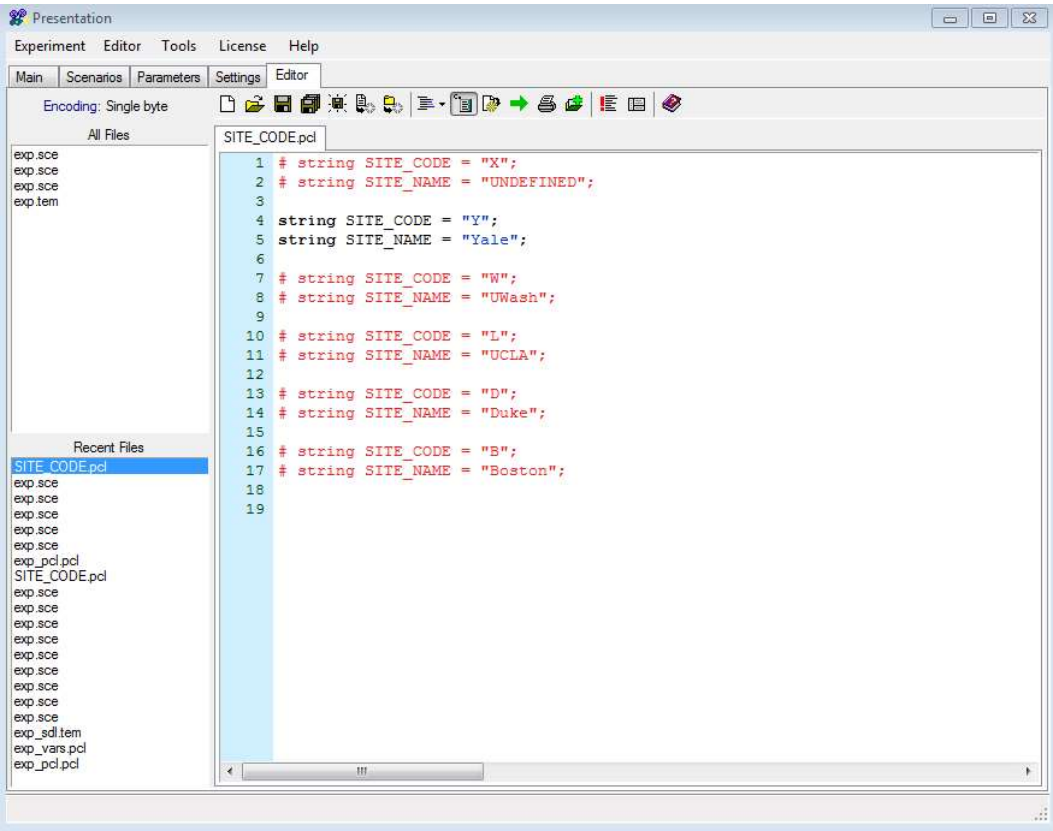
Eye Tracking Paradigms

- 2017-03-06: Updated vhecking_helper to version 2.4
- 2017-01-04: Updated checking_helper to version 2.2
- 2016-08-30: ET Paradigms for Main Study
    - Move the following folders into “ET Archive” (on the Stimulus Presentation Desktop)
        - “series5001”
        - “series5001_without_light_meter”
        - “checking_helper”
    - Download “fullstudy_ET_stimuli.7z”, “fullstudy_ET_experiment.7z” and “checking_helper.7z” from this Box Share
        - https://yale.box.com/s/s9rhkqv9vdxeisuyg5yhethto9fu1e2w
        - Email askdaac@seattlechildrens.org if you have difficulties.
    - Unzip “fullstudy_ET_stimuli.7z” onto the Desktop in a folder of the same name
        - Open the unzipped folder “fullstudy_ET_stimuli” and inside it should be a folder called “abcct_20160817”
        - Cut and paste the “abcct_20160817” folder into this new location: “C:/DATA/”
        - Move the “fullstudy_ET_stimuli” folder and zip file into “ET_Archive”
    - Unzip “fullstudy_ET_experiment.7z” onto the Desktop in a folder of the same name
        - Open the unzipped folder “fullstudy_ET_experiment” and inside it should be a folder called “series5002”
        - Cut and paste the “series5002” folder onto the Desktop
        - **These will be the experiments you use from now on when running eye tracking sessions. Feel free to create shortcuts on the Desktop for each day/order folder if you wish.**
        - Move the “fullstudy_ET_experiment” folder and zip file into “ET_Archive”



- Open the series5002 folder and then open the SITE_CODE.pcl file. Comment out the “X” variable which is undefined and uncomment your site’s specific variable. (See image below for Yale example.)

- UCLA = L
- Boston = B
- Yale = Y
- UW = W
- Duke = D



- Unzip “checking_helper.7z” DIRECTLY onto the Desktop
  - Open the unzipped folder “checking_helper”
  - Within “checking_helper”, create a shortcut to “EXP.GUI.py”
    - Cut and paste this shortcut to the Desktop
    - Move the “checking_helper.7z” file into “ET_Archive”
- If you are unsure of what to do with a file on the desktop of your Stimulus Presentation computer, please e-mail askdaac@seattlechildrens.org.

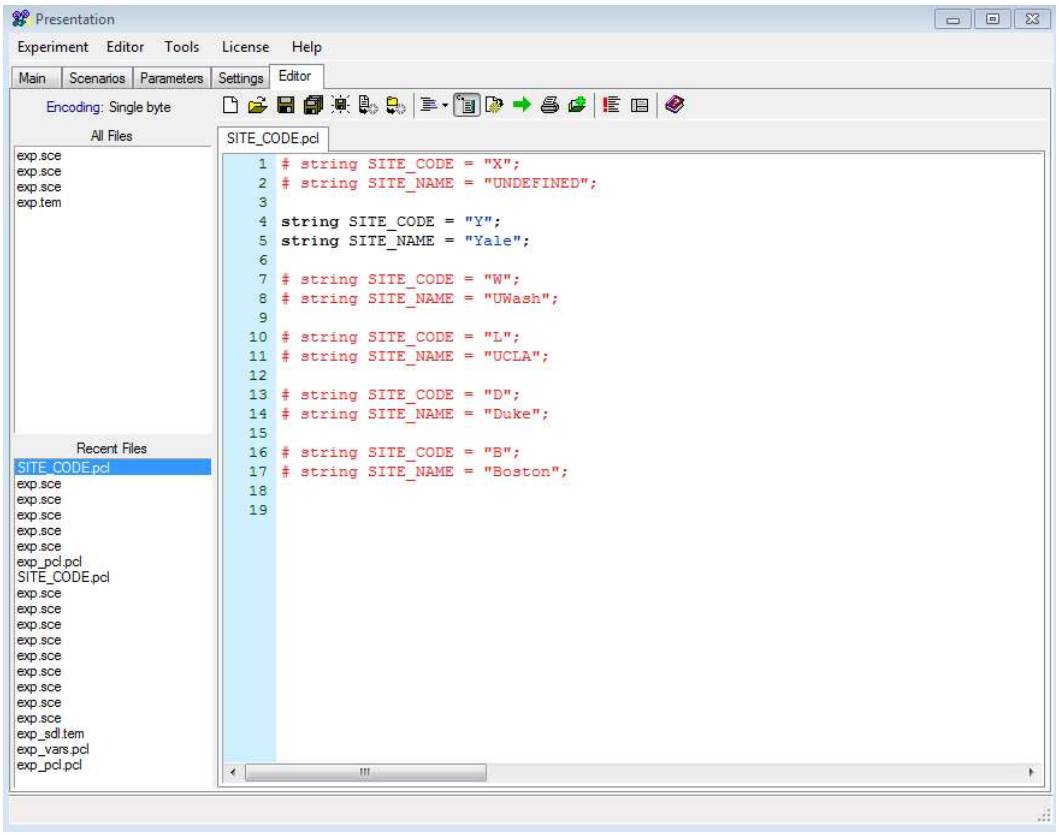
- 2015-12-04: ET Paradigms for Feasibility
    - Create a folder on the desktop of your Stimulus Presentation computer named "ET Archive"
        - Move the "series5001" and "series5001_without_light_meter" folders into "ET Archive"
    - Download "experiment_1202.7z" and "checking_helper.7z" from the following Box share: https://yale.box.com/s/s9rhkqv9vdxeisuyg5yhethto9fu1e2w
    - Unzip "experiment_1202.7z" and "checking_helper.7z" into folders with the same name on the desktop
    - Open the unzipped folder "experiment_1202" and the enclosed folder "1202" – within that should be two more folders: "series5001" and "series5001_without_light_meter"
    - Copy and paste "series5001" and "series5001_without_light_meter" directly onto the desktop. These will be the experiments you use from now on when running eye tracking sessions.
    - Within "series5001" and "series5001_without_light_meter", be sure to fix the SITE_CODE.pcl file as noted in the ET MOP (comment out the "X" variable which is undefined and uncomment your site's specific variable).
    - PLEASE DO NOT DELETE ANYTHING OFF THE STIMULUS PRESENTATION COMPUTER. If you are unsure of what to do with a file, please e-mail Adam Naples (adam.naples@yale.edu), Fred Shic (frederick.shic@yale.edu), Erin Barney (erin.barney@yale.edu), or Ariel Chang (ariel.chang@yale.edu).
    - Note: The only folder that needs to be on the desktop is the "series5001" folder, though we recommend keeping the "checking_helper" folder on the desktop as well to make it easily accessible.
- 2015-11: ET Paradigms for Feasibility [out of date]
    - Download the experiments to the Stimulus Presentation computer
    - Download all files in this folder: https://yale.box.com/s/s9rhkqv9vdxeisuyg5yhethto9fu1e2w
        - E-mail Adam Naples (adam.naples@yale.edu) if you do not have access to this folder
    - Copy "DATA" folder to "C:\". If asked to override, allow all
    - Copy "bin" folder to "C:\"
    - Copy experiment 5001 to Desktop
    - Open Presentation software, goto extension manager, unregister the old "PresLink" extension, and register the new one at "C:\bin\PresLink.dll". You can follow the steps in "C:\Program Files (x86)\SR Research\EyeLink\Docs\PresLink.chm", which has detailed information and screenshots
- Custom 8-character filename (EDF) generated by Presentation

```
string site_code = SITE_CODE; # unique code for each site
string year_string = ExtendedHex(int(date_time("yyyy"))-2005); # begins with
"A" in 2015
string month_string = ExtendedHex(int(date_time("m"))); # begins with "1" =
January, "A" = October
string day_string = ExtendedHex(int(date_time("dd"))); # begins with "1" = day
1, "A" = day 10
string hour_string = ExtendedHex(int(date_time("h"))); # begins with "0" = hour
0, "A" = hour 10
string minute_string = date_time("nn"); # minutes are just minutes
string second_string  = ExtendedHex(int(date_time("s"))/2); # begins with "0" =
first 2 seconds 0, "A" = seconds 20-21

string filename =
```

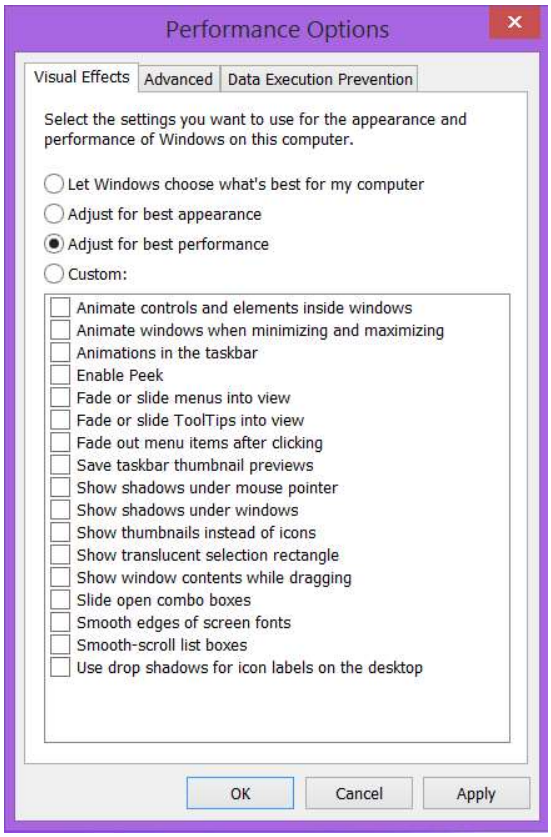
```
site_code+year_string+month_string+day_string+hour_string+minute_string+second_
string;
return filename;
```

- Site Codes (defined in "series5002\SITE_CODE.pcl")
    - Edit “SITE_CODE.pcl” to comment out the “Undefined” option and uncomment your site (see image below)
        - UCLA = L
        - Boston = B
        - Yale = Y
        - UW = W
        - Duke = D

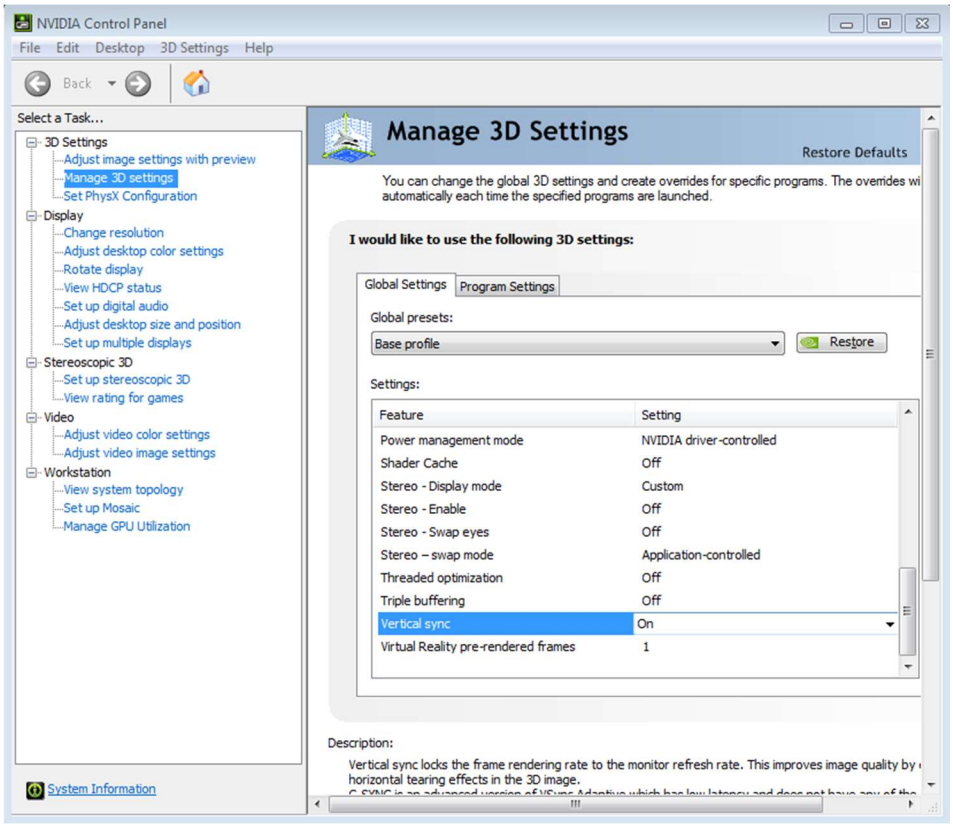


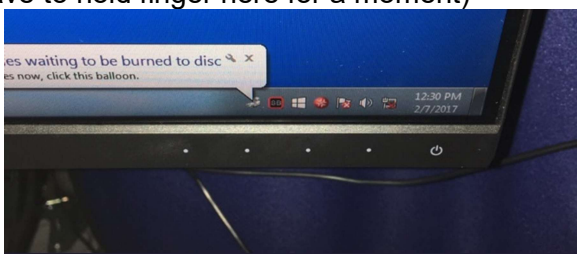
Stimulus Presentation Computer Settings

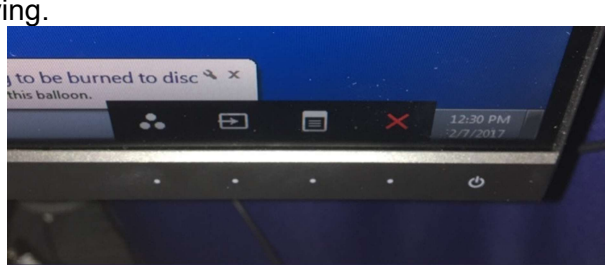
- Install the EyeLinkDevKit
    - \\wcrsh00-18.its.yale.internal\abcctet-730025-ysm\Paradigms\Main Study\Other
- Install the PresLink.dll file into Presentation following the directions at the link below. However, we should select the **C:/bin/PresLink.dll** instead of the one listed in the tutorial.
    - \\wcrsh00-18.its.yale.internal\abcctet-730025-ysm\Paradigms\Main Study\Other
    - https://www.neurobs.com/pres_docs/html/03_presentation/11_extensions/01_extension_manager.htm
    - This allows us to use the Pikachu and Pokeball as the SR calibrations.
- Services to disable on Stimulus Presentation computer
    - Acrobat updater
    - Windows firewall
    - Security center
    - Windows search
    - Windows update
    - Windows defender
    - Startup programs:
        - Adobe reader
        - Creative updreg
        - easeUSB
    - Windows indexer updaters, msconfig autoloads, disable all the windows automatic stuff.
- Turn off aero themes on stimulus presentation computer
    - Use windows key and search for: “Adjust the appearance and performance of Windows”
        - Select “Adjust for Best Performance” (all of the boxes should be unchecked)
        - Select “OK”

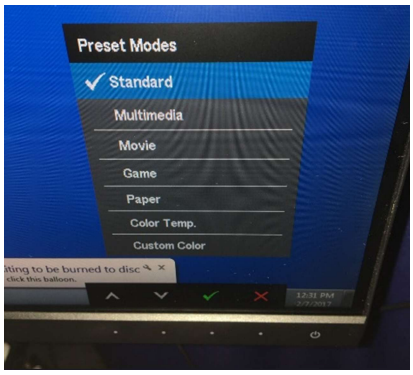


- Turn off NVIDIA 3D on the stimulus presentation computer
    - Right click on the desktop and select “NVIDIA Control Panel”
    - Select “Manage 3D Settings” on the left panel
    - Scroll to the bottom and find “Vertical Sync” and turn it **ON**



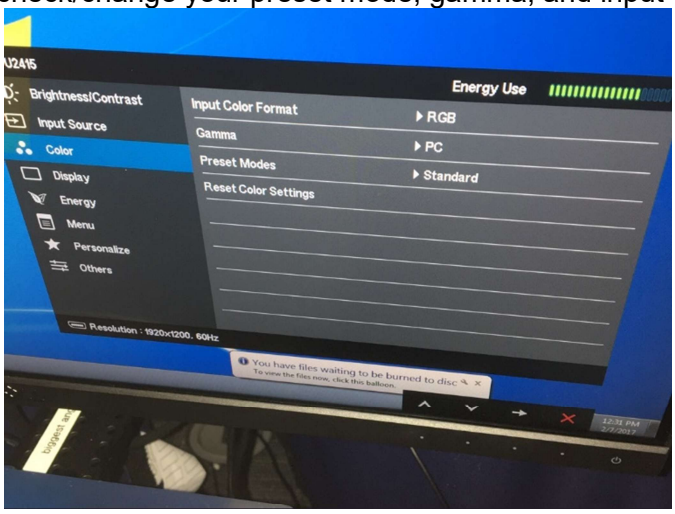
- Stimulus Presentation Monitor Settings
  - Open monitor menu by pressing one of the dots next to the power button (you may have to hold finger here for a moment)
    - 

  - Menu will appear onscreen right above the monitor buttons/dots. Press the leftmost dot to bring up the menu of monitor presets to check which one you are displaying.
    - 



- Press the dots beneath the up and down arrows to move through preset options if necessary (all sites should be on “Standard” mode). Press the dot beneath the green checkmark to exit the menu if you’ve made any changes.
- You can check your monitor settings in greater detail by pressing one of the dots to bring up the base menu, and then the dot that is the third from the left (underneath the rectangular icon with lines in it). Check the brightness/contrast, and set the levels of both to be 75 if they are not there.

- Use the dots under the arrows to navigate down to the color menu, which allows you to check/change your preset mode, gamma, and input color format.



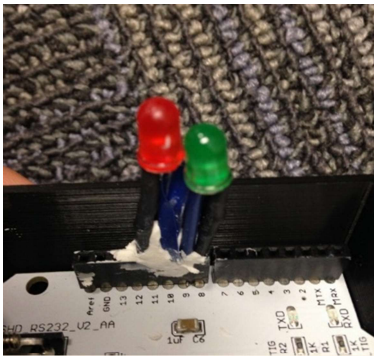
Light Meter Settings

Dr. Meter Light Meter (Commercial Light Meter)

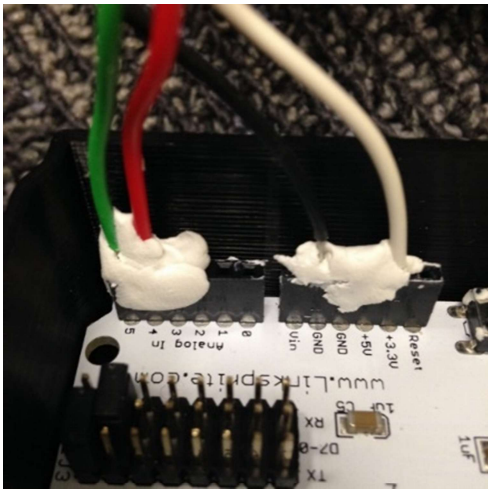
- Commercially-produced light meter (Dr.Meter Digital Illuminance/Light Meter LX1330B , 0 - 200,000 Lux Luxmeter) from Amazon for $38.
  - https://www.amazon.com/Dr-Meter-Digital-Illuminance-Light-LX1330B/dp/B005A0ETXY/ref=sr_1_3?ie=UTF8&qid=1486067375&sr=8-3&keywords=light+meter
- Light meter request sent to site PIs on 2/6/17 via Sara Webb.

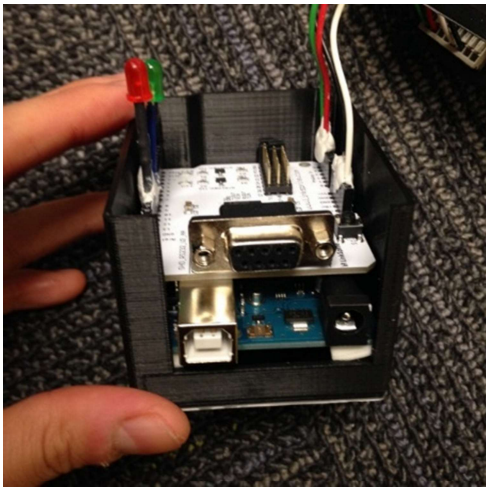
Arduino Light Meter

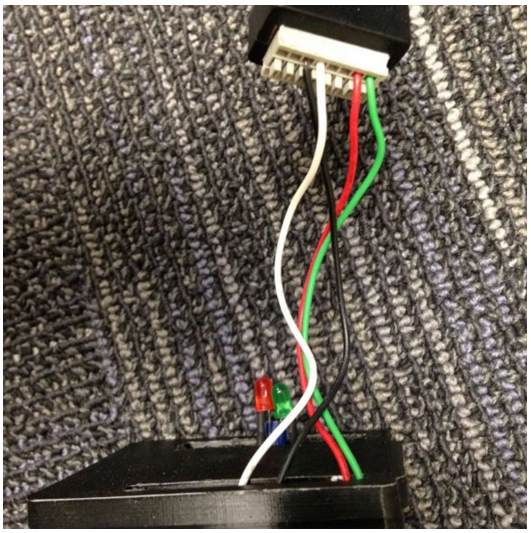
- Connections
  - Red LED → Analog 10 and Analog 11
  - Green LED → Analog 8 and Analog 9

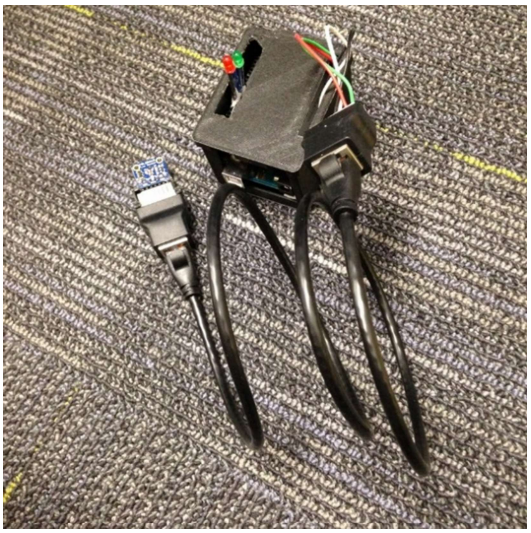


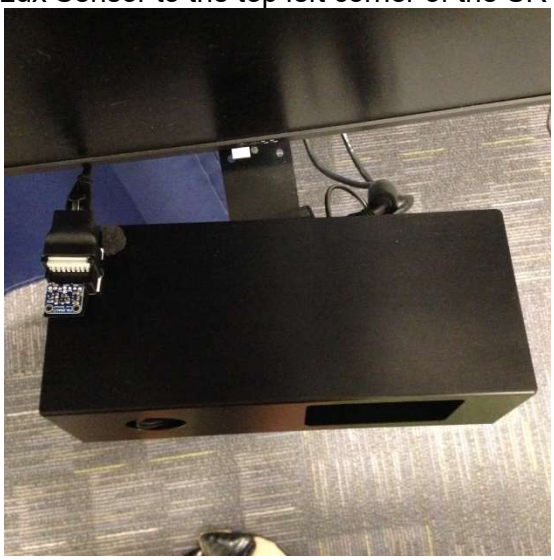
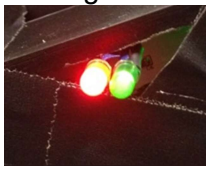
  - Green → Analog 5
  - Red → Analog 4
  - Black → Ground
  - White → +3.3V

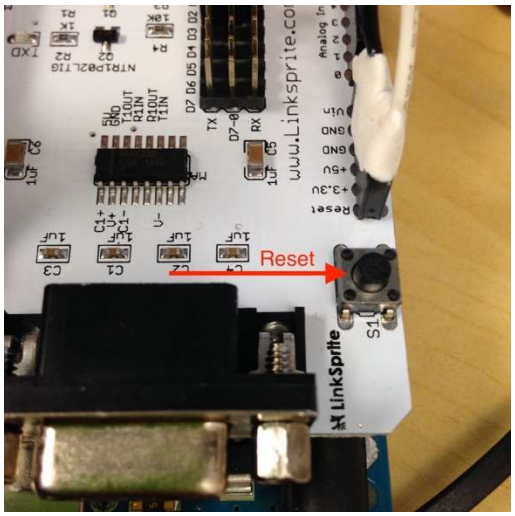




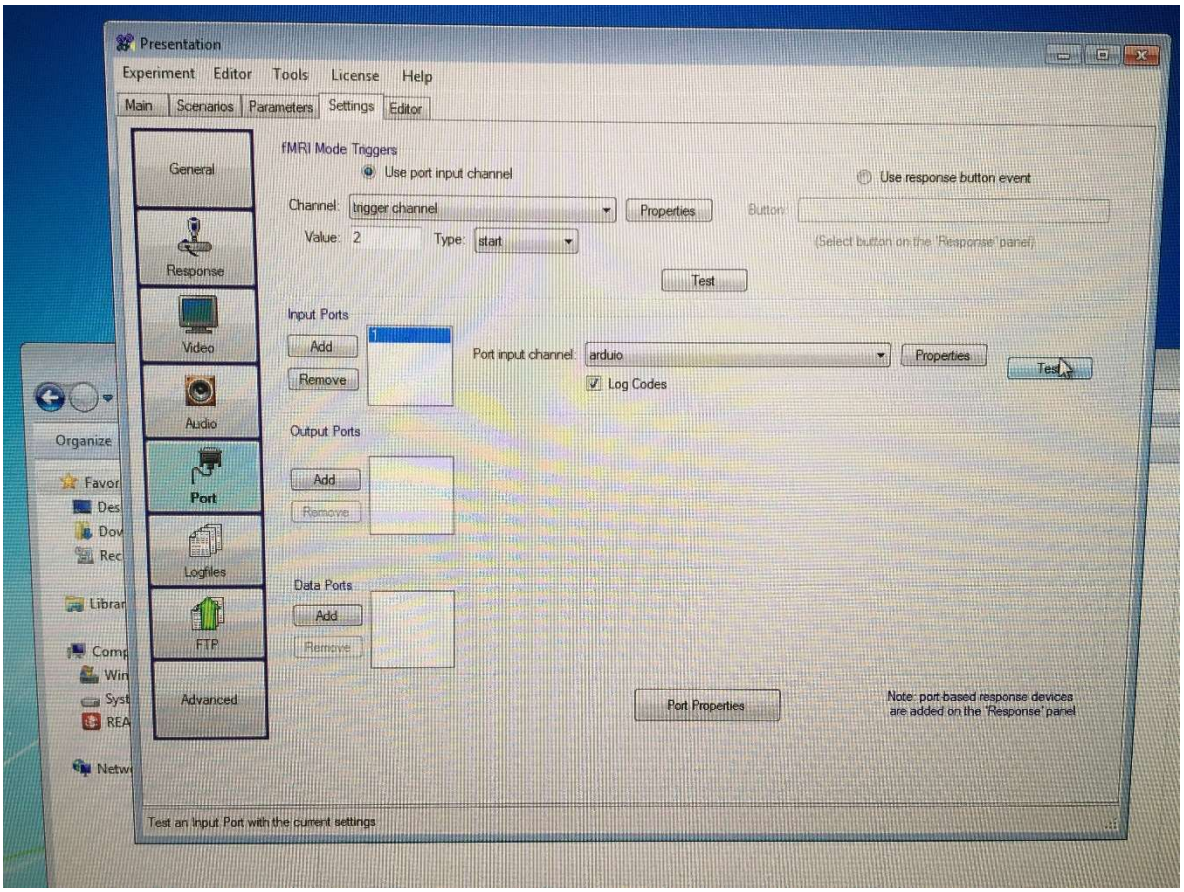




- Wires → Ethernet Jack → Ethernet → Ethernet Jack → Lux Sensor
- Light meter deployment
    - Connect light meter to serial port (gray cable) and plug into power adapter
    - Attach Arduino board onto arm of display mount
    - Attach Lux Sensor to the top left corner of the SR Camera cover
        - 
    - Attach Ethernet cable to Ethernet jacks (one on lux meter and one on the Arduino board)
- Light meter LED meanings
    - Both red and green LED on = reading is 0 or reading is greater than 300
        - 
        - Try pressing RESET button on Arduino if you think the lighting is okay



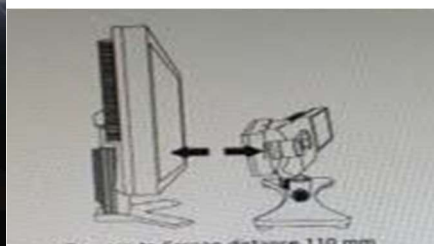
    - While the light meter is connected, use thin object to reach in through Light Meter Case and hit the reset button
  - Red LED on = arduino is receiving power but the lux meter is not reading anything (contact DAAC)
    - 
  - Green LED on = Arduino and lux sensor are both on and connected
    - 
  - No LED on = no power (or another error, contact DAAC)
- Note: Gain was set to 1 for Main Study (as compared to Feasibility)
- Interpreting Light Meter Readings
  - *.lux file (extracted using logfile_parse.py from the *.log file)
    - Data format: a, b, c
      - a = time/counter
      - b = lux reading
      - c = uncertainty in lux reading
  - Presentation raw light meter readings
    - Open one experiment in Presentation but do not start it
    - Press Settings > Port > Highlight the input port number and press “Test”



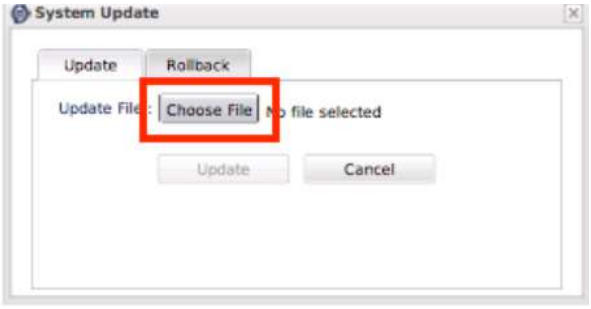
- Data format: d, e, f
  - D = 255
  - Lux reading = 128*e + f

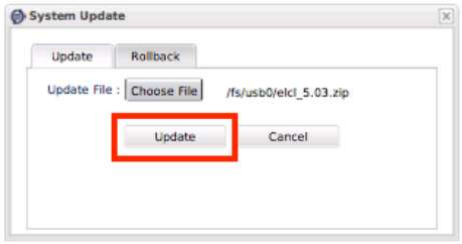
SR Eyelink 1000 Plus (ET Host) Settings

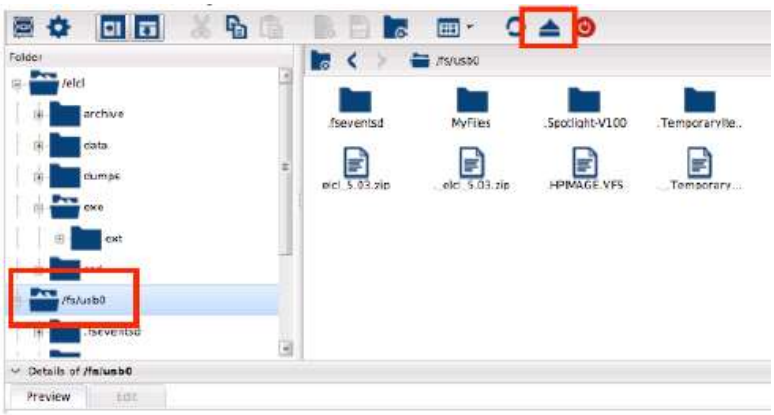
- Lens: 25 mm
  - 

- Distance between screen and Eyelink: 110 mm
  - Measure the distance between the lens (at the point where the lens connects to the camera) and display monitor
    - 
      
- Updating the ET Host Software to Version 5.09
  - Download the two files here: \\storage.yale.edu\home\abcctet-730025-ysm\Transfer\SR_updates
  - Put the “elcl-5.09.zip” file onto a flash drive (must be **FAT32** format).
  - Turn on the ET Host computer.
  - Plug the flash drive into the ET Host computer.
  - Press CTRL+ALT+Q on the ET Host computer’s keyboard to enter the File Manager.
  - Click the settings gear wheel button.
    - 

  - Click the system update button.

- 
- Click the “Choose File” button.
- 

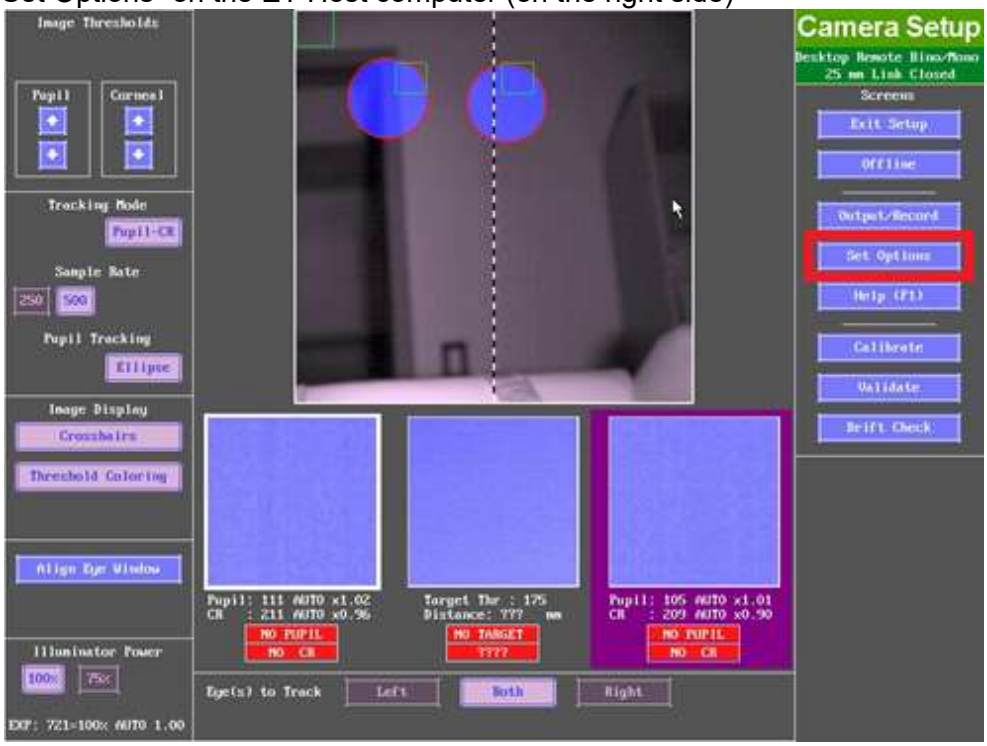
- Find your USB and select the elcl-5.09.zip file. Press Open.
- Choose “Update”.
- 

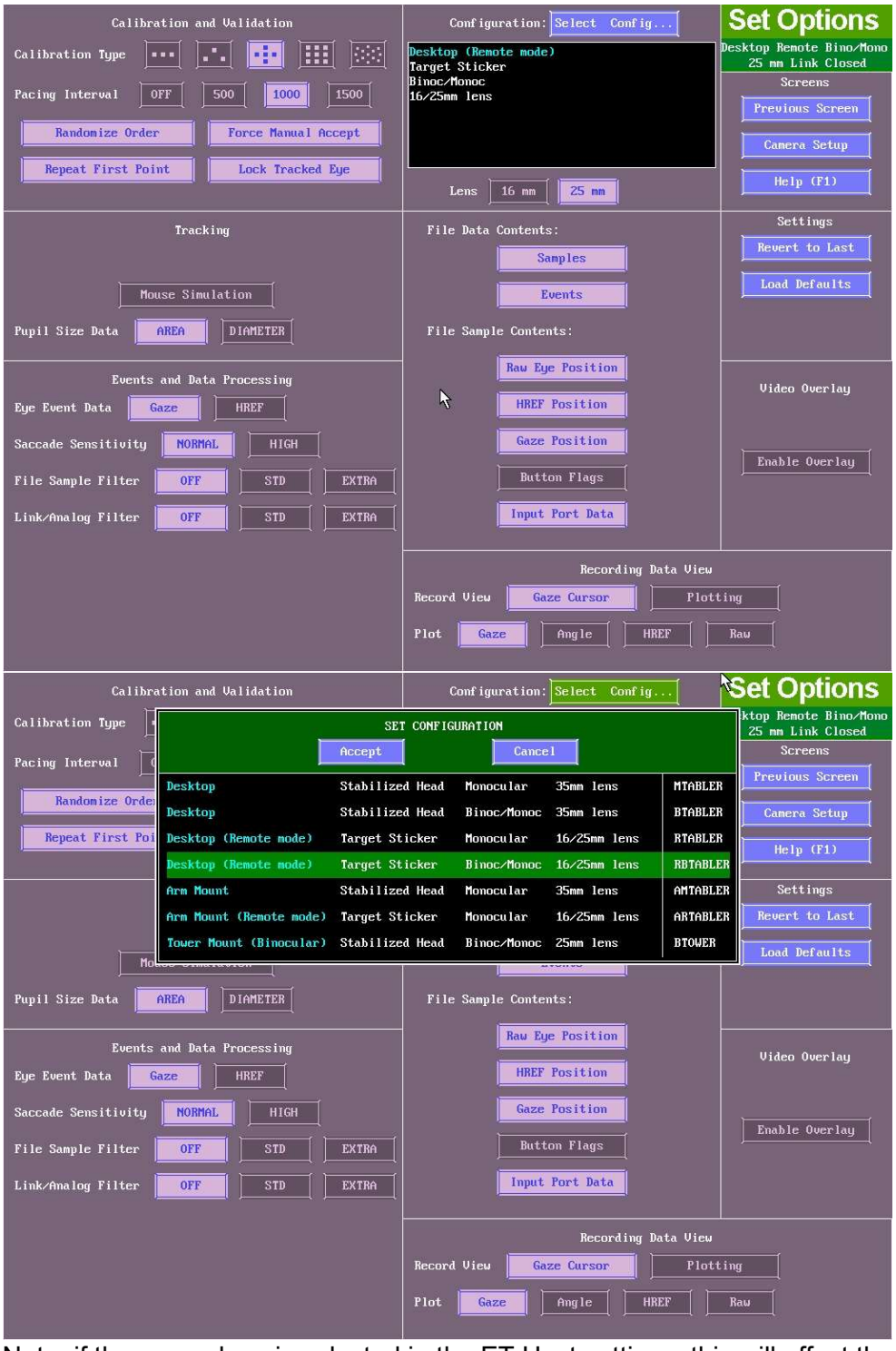
- The update should take 1-2 minutes.
- Navigate to your flash drive in the File Manager and eject it by pressing the eject icon.
- 

- After the update is installed, check that it has been installed by clicking the icon to start the eye tracker in the top left corner of the ET Host screen
- 
- The version number is shown at the bottom right of the ET Host screen

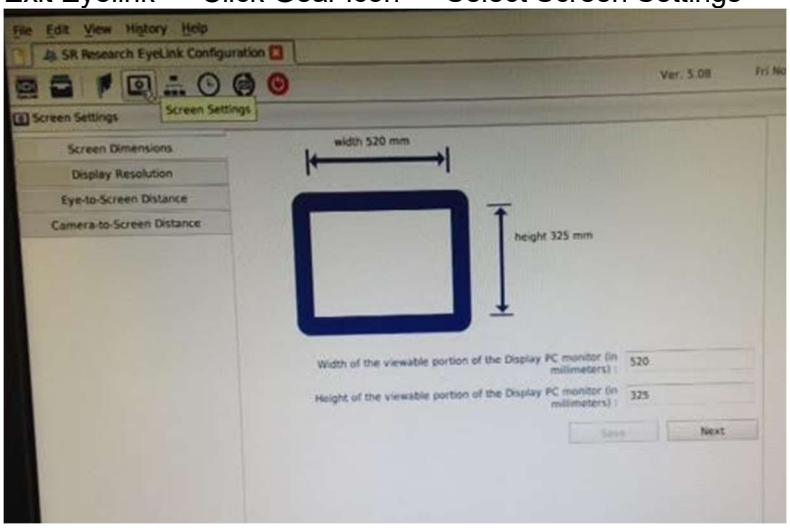
- Adjust the ET Host settings based on the screenshots below

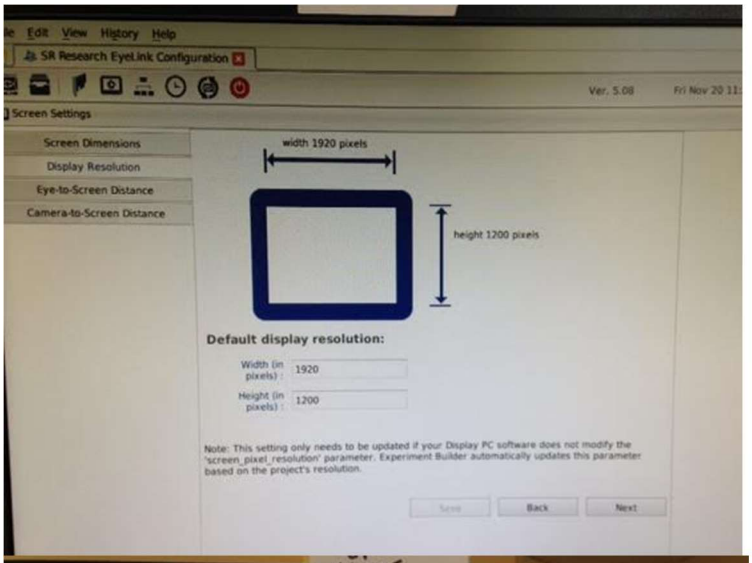
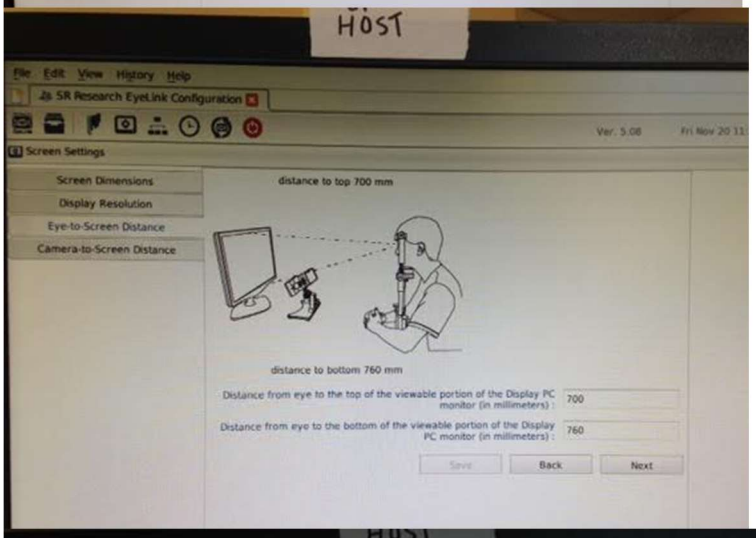
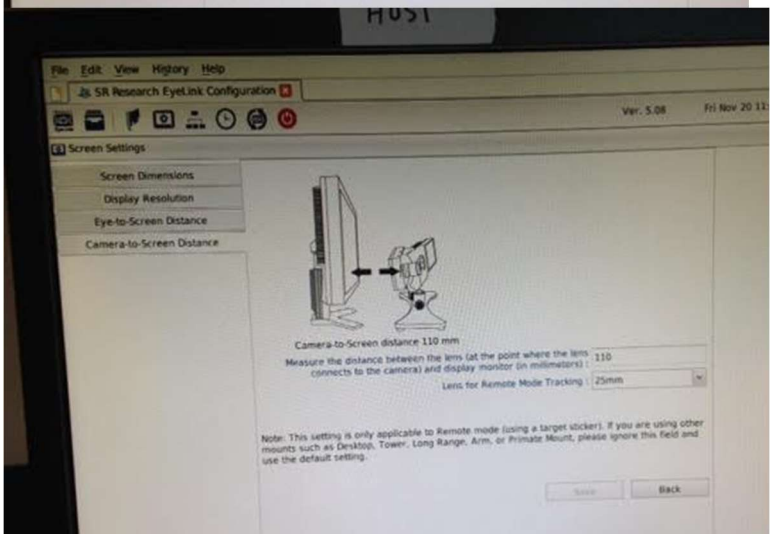
- ET Host Settings
  - Press “Set Options” on the ET Host computer (on the right side)





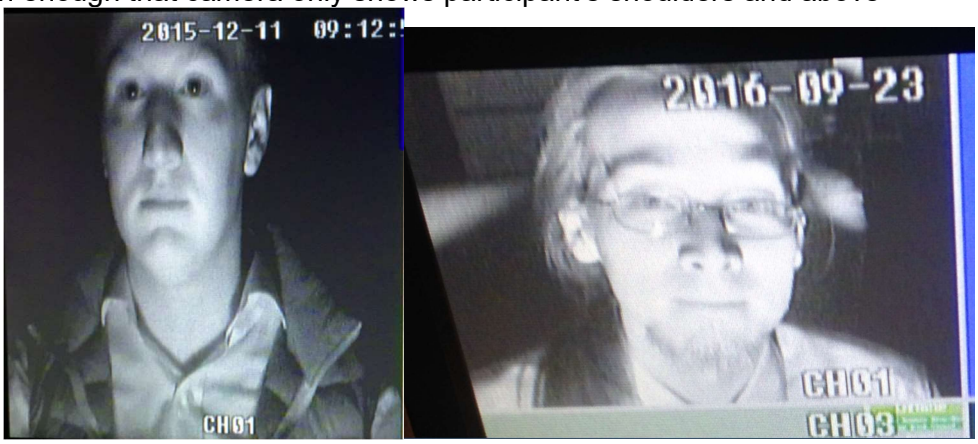
- Note: if the wrong lens is selected in the ET Host settings, this will affect the data in the following ways (via SR Research):
  - "You should be able to use the edf2asc.exe or Visual EDF2ASC (Windows), or EDF Converter (Mac OS X) to generate a message report from the .edf files in question. Look for the line CAMERA_LENS_FOCAL_LENGTH XX where XX will tell you what lens was selected at the time of recording. That said, if there is any concern

that a different lens was used than what was selected. This would not, however, bring forth any discrepancies between the lens that was selected if it did not match the actual lens that was used.
        - "The consequences of using a different lens than is selected is that the head distance is reported incorrectly. Gaze data (in terms of position) should still be representative of actual screen coordinates, although the time derivatives of gaze data (velocity, acceleration) are wrong because of the improper scaling by an incorrect head distance. Therefore, event parsing is based off of incorrect velocity and acceleration data."
    - Note: Although we are using an Arm Mount camera we are using the 'Desktop Binocular Remote Mode' configuration as opposed to the 'Arm Mount Binocular Remote Mode' configuration that exists with newer versions of the Host software. We did not update the Host software for the Main Study phase to preserve consistency with the Feasibility phase configurations. SR confirmed that data quality was not impacted. Response below:
        - "There are some small differences in the settings of these two configurations but any differences in data quality will be negligible....the only difference between these modes is that the Arm Mount Binocular Remote Mode, which loads "ABRTABLE.INI", is locking in some parameters relating to the remote camera position and the physical screen size that are specific to the Viewsonic 17" LCD screen with 20 degree mounting bracket. In the most recent version of the host software those lines are actually commented out as we provide a range of different screens to fit the arm. Other than this, the "ABRTABLE.INI" file simply points to the "RTABLEC.INI" file, which is loaded in Desktop Binocular Remote Mode. So the settings are essentially the same and you can continue as you are without any cause for concern. "
-
- SR Eyelink Configuration
    - Exit Eyelink → Click Gear icon → Select Screen Settings
    - 

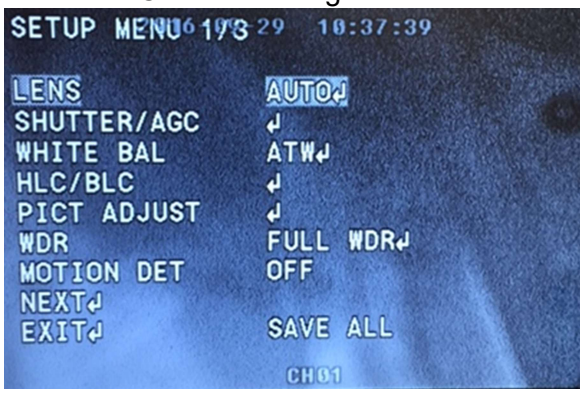
- 
Edit View History Help
SR Research EyeLink Configuration
Ver. 5.08
Screen Settings
Screen Dimensions
Display Resolution
Eye-to-Screen Distance
Camera-to-Screen Distance
width 1920 pixels
height 1200 pixels
Default display resolution:
Width (in pixels) : 1920
Height (in pixels) : 1200
Note: This setting only needs to be updated if your Display PC software does not modify the 'screen_pixel_resolution' parameter. Experiment Builder automatically updates this parameter based on the project's resolution.
Save
Back
Next
- 
HOST
File Edit View History Help
SR Research EyeLink Configuration
Ver. 5.08
Screen Settings
Screen Dimensions
Display Resolution
Eye-to-Screen Distance
Camera-to-Screen Distance
distance to top 700 mm
distance to bottom 760 mm
Distance from eye to the top of the viewable portion of the Display PC monitor (in millimeters) : 700
Distance from eye to the bottom of the viewable portion of the Display PC monitor (in millimeters) : 760
Save
Back
Next
- 
HOST
File Edit View History Help
SR Research EyeLink Configuration
Ver. 5.08
Screen Settings
Screen Dimensions
Display Resolution
Eye-to-Screen Distance
Camera-to-Screen Distance
Camera-to-Screen distance 110 mm
Measure the distance between the lens (at the point where the lens connects to the camera) and display monitor (in millimeters) : 110
Lens for Remote Mode Tracking : 25mm
Note: This setting is only applicable to Remote mode (using a target sticker). If you are using other mounts such as Desktop, Tower, Long Range, Arm, or Primate Mount, please ignore this field and use the default setting.
Save
Back

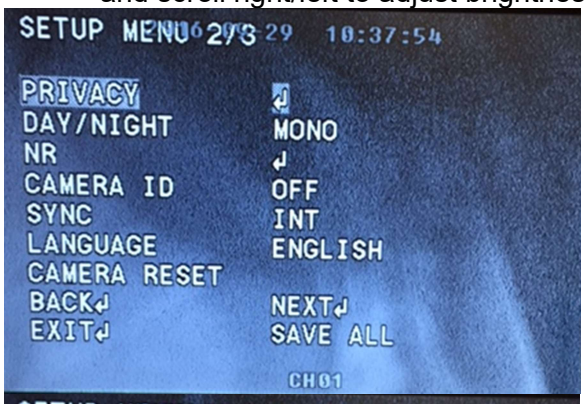
Behavior Monitoring Camera Settings

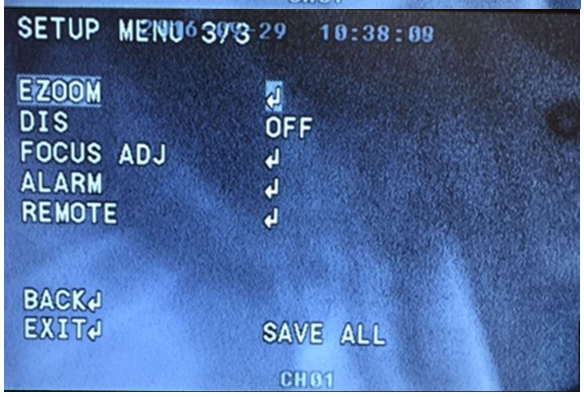
- Please refer to the Video posted on the ABC-CT portal under Training → All Training Videos → ET Videos → ET Camera Brightness
- http://www.abc-ct.yale.edu/training/ettrain.aspx
- 

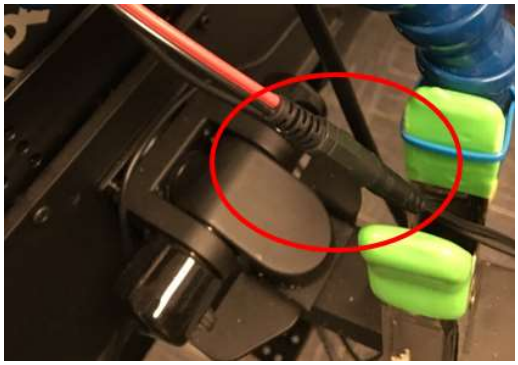
- Zoom in enough that camera only shows participant's shoulders and above
  - 

- Adjust focus until image is clear

- Behavior Monitor Camera Settings Screenshots
  - 

    - To adjust brightness: go to Shutter/AGC, then scroll down to Brightness and scroll right/left to adjust brightness
  - 

  - 

- Behavior Monitor Camera Wire Setup
  - Disconnect current camera from power by removing power supply from the jack at the end of the black and red wires attached to the back of the camera.
    - 

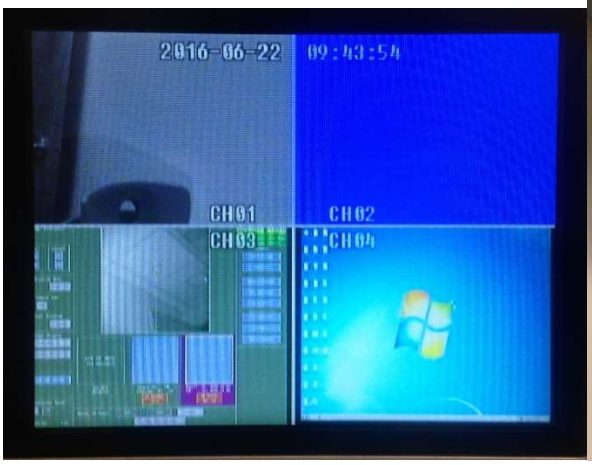
- Unscrew and remove video input/output cable from back of camera; remove microphone from top of camera.
  - 

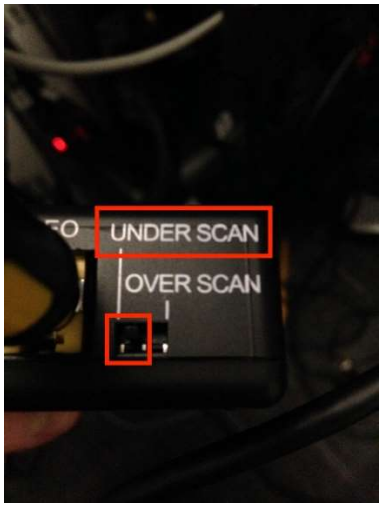
- Remove red and red/black power cables from back of camera by pressing down on the white buttons and taking the wires out of their respective ports. Put wires somewhere safe.
- Remove camera from tripod.
- Screw new camera onto tripod.
- Connect red and red/black power cables to back of camera by inserting exposed end of wires into appropriate ports while pressing down on the white button over the port. Red wire should be placed into port on the left (the one marked '+') and the black/red wire should be placed into the one marked '-'.
  - 

- Reconnect power source to the jack at the end of red/black wires, and check that the red light on the back of the camera above POWER is on. (nb: make sure power source is actually connected to power before testing this)
- Insert and secure video cable, and affix microphone to top of camera.
- Contact DAAC with any questions or problems!

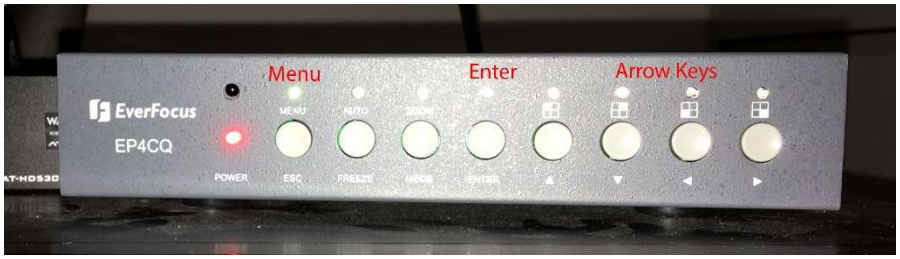
Multiplexer Settings

- Change your multiplexor setup to reflect the behavioral monitoring camera in CH01, the stimulus presentation in CH04, and the ET Host computer in CH03. (Photos attached for reference)



- 2016-11-17: Startech VGA Scan Converter: make sure that the switch on the side of the converter connected to the back of the multiplexor is switched to the left to be set to under scan
  - 

Changing to Local Time

- *Please do this at the beginning of each month and email AskDAAC@seattlechildrens.org to let us know it has been completed*
- Reference clock (open on phone or laptop): www.time.gov
- Stimulus Presentation Computer
    - Click on the time in the bottom right hand corner of the screen.
    - Select “Change Date and Time Settings”
    - Click the button that reads “Change date and time”
    - While referencing a reliable clock that provides hours:minutes:seconds, enter the accurate time where the stimulus presentation computer’s time is shown. For complete accuracy on the level of seconds, it works best to enter a seconds value later than the time shown on your reference clock, and to then wait to accept the changes to the stimulus presentation computer’s time when the reference clock’s time matches the one you’ve entered.
- Multiplexer little display
    - Using remote control
        - Press Menu on multiplexer remote control
        - Select System Setup and press Enter
        - Highlight Date → Press Enter and change date using the arrow keys
        - Highlight Time → Press Enter and change time using the arrow keys
        - Press Menu on the multiplexer remote control. The timestamp shown on the top right screen section on the DVD viewer should now match that of your stimulus presentation computer/reference clock.
    - Using buttons on the main unit
        - 

        - Press Menu button on multiplexer
        - Select System Setup and press Enter
        - Highlight Date → Press Enter and change date using the arrow keys
        - Highlight Time → Press Enter and change time using the arrow keys
        - Press Menu on the multiplexer. The timestamp shown on the top right screen section on the DVD viewer should now match that of your stimulus presentation computer/reference clock.
- DVD Player (not necessary to check monthly)
    - Press Function Menu (on DVD remote)
    - Select Others → Setup → Others
    - Select Clock
    - Enter local time and date (HH:MM:SS; DD/MM/YY)
    - Press OK on DVD remote to store

Additional Monitors

Cloning the Stimulus Presentation Screen

A third monitor was added to the ET system to replicate the Stimulus Presentation screen for the Experimenter. This was accomplished using the same model screen as the Stimulus Presentation screen, and it was attached using an HDMI-to-DVI cable plugged into the back of the Stimulus Presentation computer (see Figures 1-3).

Any site may add a third monitor to their ET system if they wish. Please purchase the following monitor and an HDMI-to-DVI cable from the links below. If you have trouble purchasing these exact models, please contact the ET DAAC before making a purchase.

- Dell U2415 24-Inch 1920 x 1200 LED Monitor: https://amzn.com/B00NZTKOQI
  - Note: you must buy *this specific monitor* model if you choose to add a third monitor to your ABC-CT ET system
- HDMI-to-DVI cable: https://amzn.com/B014I8UL8U (example cable, can choose any HDMI-to-DVI cable brand and length)

To replicate the Stimulus Presentation screen's display on the new monitor, right click on the Desktop of the Stimulus Presentation computer and select NVIDIA Control Panel. Go to "Display" >> "Set up multiple displays." Right click on the image of the monitor with two numbers in it (see Figure 4) and click "Clone with [#]." This should clone the display and the settings should look like Figure 5. Click "Apply".

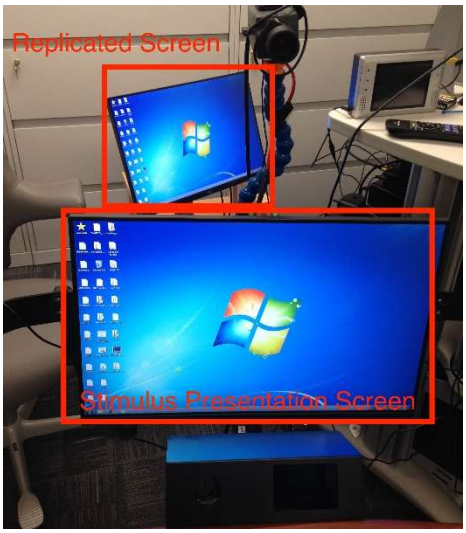


Figure 1. Replicated Stimulus Presentation screen

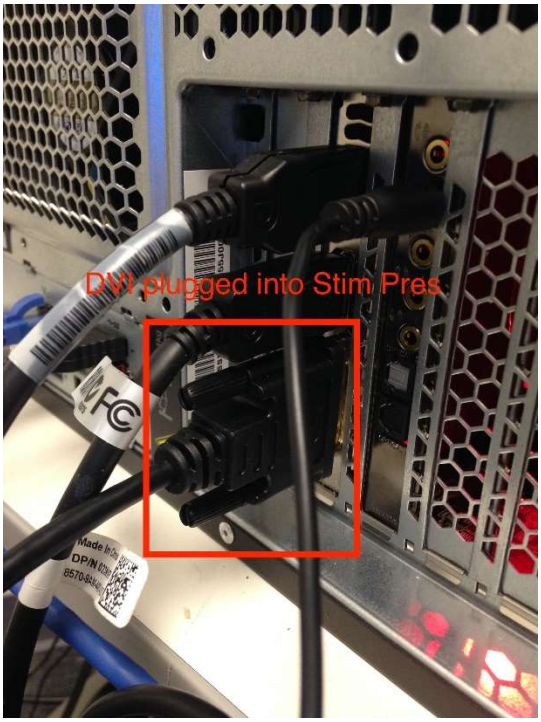


Figure 2. DVI cable plugged into the back of the Stimulus Presentation computer

Figure 3. HDMI cable plugged into the back of the new monitor

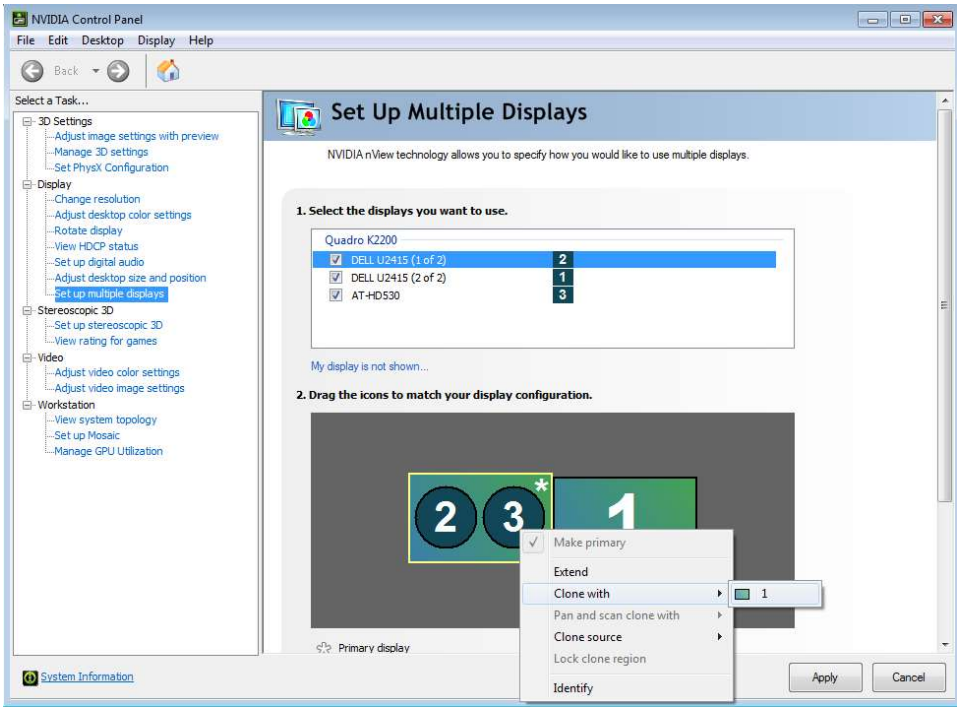


Figure 4. Display cloning settings (before cloning)

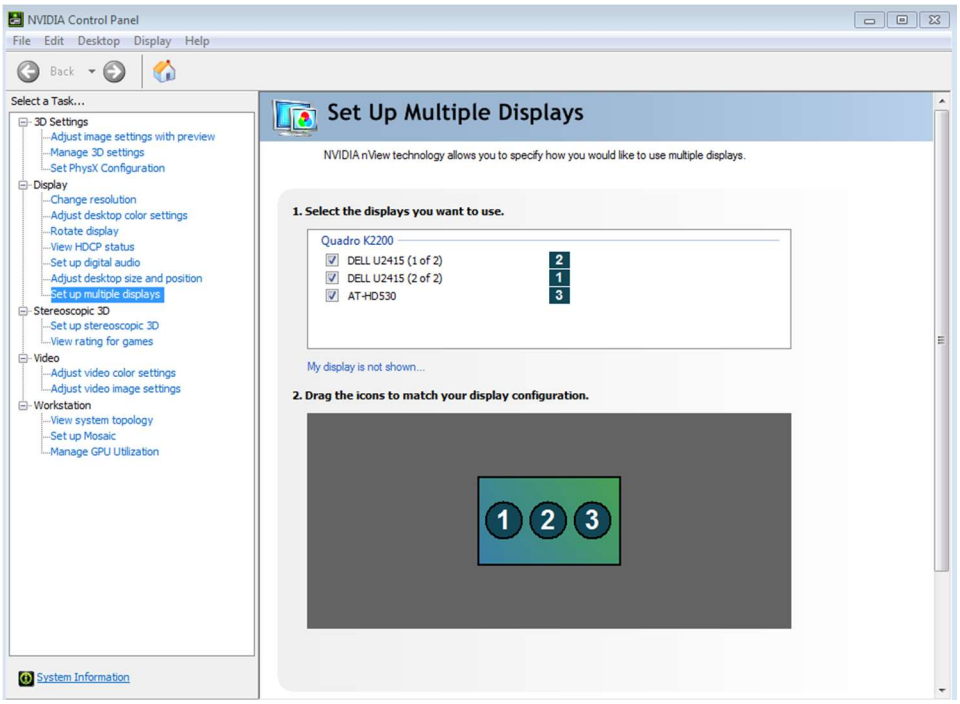


Figure 5. Display cloning settings (after cloning the screens)

Cloning the Multiplexor's 4-Screen Display

- Use HDMI output on the DVD player to create a participant monitor that does not impact performance

Listening to the Eye Tracking Session from Afar

If your Stimulus Presentation monitor, child, and BA are separated from the Experimenter and the rest of the equipment, you will want to be able to hear what is going on in the Stimulus Presentation room. This can be accomplished by purchasing an RCA male to 3.5mm female adapter (ex: https://amzn.com/B000I23TTE) that you plug into the back of the DVD player. The RCA cables should be plugged into the color-corresponding “OUT” ports on the DVD player. Then you can plug in headphones of your choice into the 3.5 mm jack.

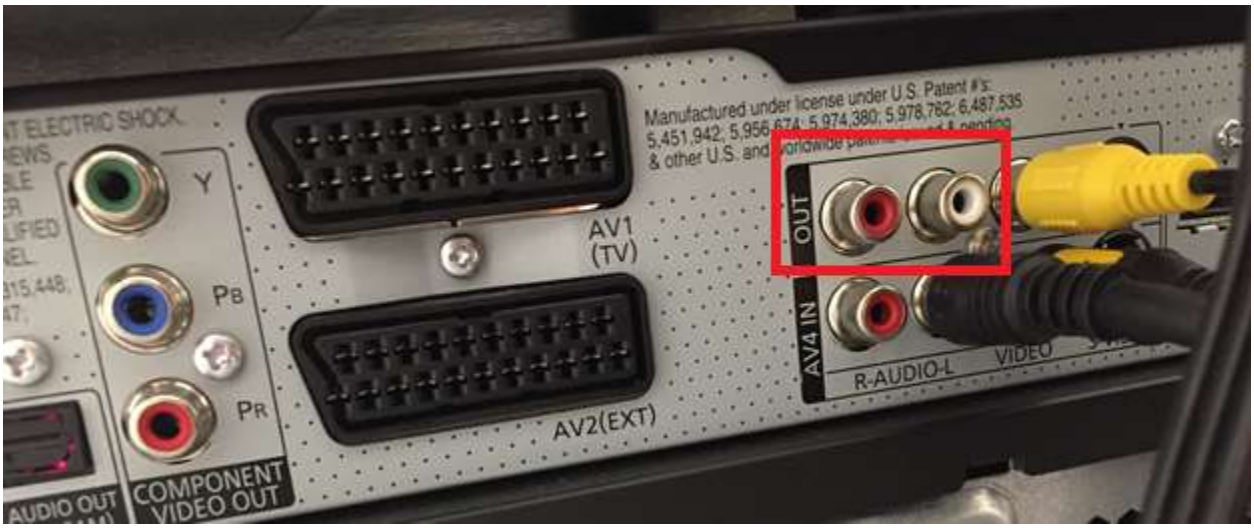


Figure 1. Photo of the back of the DVD player with the RCA output ports boxed in red

Keyboard Shortcut Contingencies

During a trial if you press P/M/G multiple times:

No matter how many times you press the P/M/G keys during a trial, you are led to only one P/M/G break after the trial ends.

Note: During a P break, if you change the movies by pressing M, then after accepting SR calibration, you're led to another movie. Once you hit SPACE then the internal calibration starts.

During a G break if you press G:

During a G break, if you press G then SPACE, you're led to the next trial but then there's another G break immediately after that trial. However, no matter how many times you press the G key during a G break, the extra G break occurs only once.

During a G break if you press P:

During a G break, if you press P then SPACE, you're either led to the next trial followed by a P (movie+calibration) or you go straight to a P break (I'm not sure why sometimes it goes straight to P and sometimes to the next trial then P). Regardless of how many times you press P, there is only one P break that occurs after the trial.

Interestingly, for VS/SS and PLR only, if you do a regular P break, the movie break has a background color that matches the paradigm background color. But if you press P while on a G break, then the movie break has either a bright red, blue or white background...for other paradigms, the movie break backgrounds always match the paradigm background (black (SI), white (BM), grey (AM)).

During a G break if you press M:

During a G break, if you press M then SPACE, you're led to the next trial, followed by a movie break. Only one movie break occurs, regardless of how many times you press M during G break.

Interestingly, for VS/SS and PLR only, if you do a regular M break, the movie break has a background color that matches the paradigm background color. But if you press M while on a G break, then the movie break has either a bright red, blue or white background...for other paradigms, the movie break backgrounds always match the paradigm background (black (SI), white (BM), grey (AM)).

During an M break if you press M:

The movie changes.

During an M break if you press G:

After you press SPACE to exit out of the M break, you're led to the G break. G break only occurs once regardless of how many times you press G during M break.

During an M break if you press P:

After you press SPACE to exit out of the M break, you're led to a P break (movie, SR, internal). Only one P break occurs regardless of how many times you press P during M break.

During a P break if you press M during the calibration:

If you press M any time during the SR calibration, then after the SR calibration, you're led to a movie break followed by an internal calibration.

If you press M any time during the internal calibration, then the moment you hit M you're led to a movie break. When you press SPACE to exit out of the movie break, you re-start the internal calibration from the beginning.

During a P break if you press G during the movie portion:

You get a G break in between the SR calibration and internal calibration. G break only occurs once regardless of how many times you press G during the movie portion of a P break.

During a P break if you press P:

If you press P at least once during the movie portion or during the SR calibration of a P break, then after the first SR calibration you're led to another movie break, followed by a second SR calibration. Then two internal calibrations occur back to back. Note that regardless of how many times you press P during the movie/SR calibration portions, there is only one extra SR and internal calibration to do. However, you can accumulate more calibrations if you accidentally press P during each movie break, during the grey screen after the movie break (before you hit F4) or during the SR calibration.

Try out some combinations and write down the results (ex: M and G within a trial, what happens when the trial ends?)

Within a trial if you press...

- MGMG -> G break
- MG -> G break
- GM -> G break
- GMM -> G break
- GP -> G break
- PG -> G break
- PPGPP -> G break
- MP -> P break
- PM -> P break
- Summary
    - **P trumps M**
    - **G trumps all**

Keyboard Shortcut Mappings to Responses in LOG Files

Response in LOG	*Key Press*
1	Spacebar
2	Spacebar (release)
3	Left
4	E
5	M
6	C
7	7
8	P
9	Left mouse click
10	Left mouse click (release)
11	O
12	L
13	G
14	F4

Administration Procedures

General Session Protocol

- ~15 minutes per ET session
- 2 sessions per visit (each on a separate day)
- 3 visits total
    - Time 1: 0 weeks
    - Time 2: 6 weeks
    - Time 3: 24 weeks

ET Acquisition Protocol

ET Acquisition Protocol	ABC-CTETAcquisitionProtocol	Google Drive (DAAC : ABC-CT > CIS Protocol and Support Documents)

Training Procedures (also located in ET Acquisition Protocol)

7.1 ET Experimenter Training

- Please email askdaac@seattlechildrens.org to alert us whenever a new member joins your team.
- Trained by on-site trainer.
- Watch study portal videos.
- Read through Acquisition Protocol and MOP (can skim some parts that are not relevant)
- 2 program evaluation sessions run and files sent to askdaac@seattlechildrens.org for evaluation. Files can be uploaded to Box, DropBox, or Google Drive as long as they only contain lab members who give permission to have their videos shared. The subject should aim to be noncompliant and not accommodate the experimenter.
    - PE File Requirements (initiated 6/16/17)
        - 2+ P key presses per file.
        - 2+ movie (M) or gray screen (G) breaks per file.
        - 1 situation where participant stands up and leaves and then returns (only needs to be done once overall, NOT once per file).
        - BA not required but allowed if you want one.
    - PE Noncompliance Suggestions
        - Subject covers sticker
        - Subject looks off-screen for long periods
        - Subject makes large changes in position or fidgets constantly
        - Subject wears glasses
        - Subject purposefully does not look at calibration points
        - Subject eats
        - Subject verbally expresses disgust about experiments
        - Subject continually tries to talk to experimenter
    - Please allow 5 business days for PE feedback to be sent from the DAAC.
    - It is possible the DAAC will ask for additional PE files depending on the quality of the initial 2 PE sessions.
- After ET DAAC clears the experimenter, the CIS can add them to the "EEG ET ABCCT Team Contact" spreadsheet as "Exp" for ET column (this means they can be experimenter or BA for a session).
    - https://docs.google.com/spreadsheets/d/1zYhq4cUKNZoemT-oMzSCi5oJC4B_XKs5DxAVB2o8_gw/edit?usp=sharing
- It is the sites' responsibility to store and maintain accurate regulatory materials. Please contact the Administrative team if you have questions.

ET Behavioral Assistant Training

- Please email askdaac@seattlechildrens.org to alert us whenever a new member joins your team
- Trained by on-site trainer
- Watch study portal videos
- Read through Acquisition Protocol and MOP (can skim some parts that are not relevant)
- At least one practice session (do not need to send files to ET DAAC) to get a feel for the role without a real participant
- Add them to the "EEG ET ABCCT Team Contact" spreadsheet as "BA" for ET column
    - https://docs.google.com/spreadsheets/d/1zYhq4cUKNZoemT-oMzSCi5oJC4B_XKs5DxAVB2o8_gw/edit?usp=sharing
- It is the sites' responsibility to store and maintain accurate regulatory materials. Please contact the Administrative team if you have questions.

ET Run Logs

ET Run Logs	CIS ET LOGs (Google Drive Folder)	Google Drive (DAAC : ABC-CT > CIS ET LOGs)

Notes about ET Run Logs

- See ET Acquisition Protocol
- General
    - There will be different log forms for each experimental order
    - The session log should be filled out by the experimenter

ET Equipment

Diagram of Cart Setup

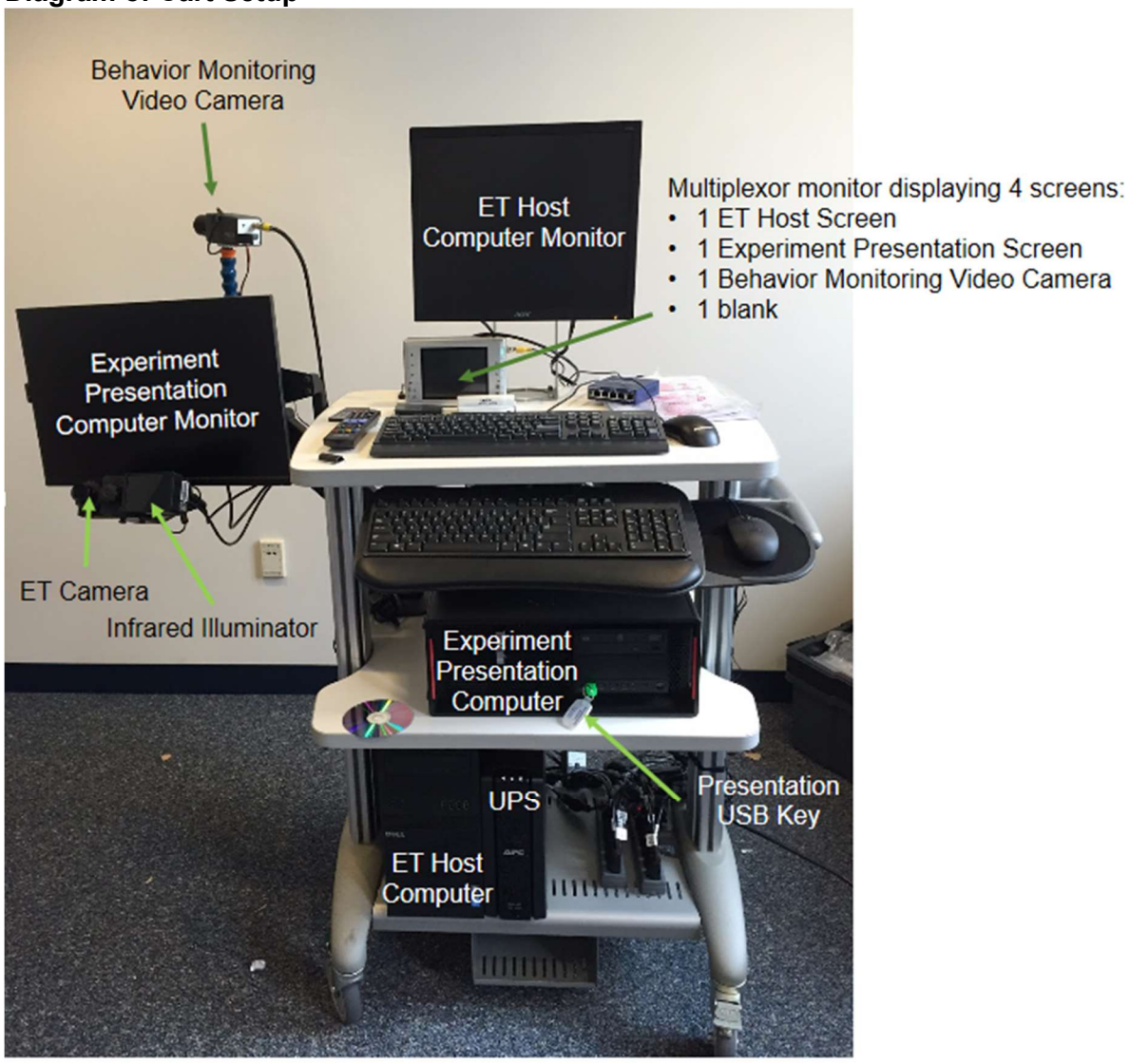
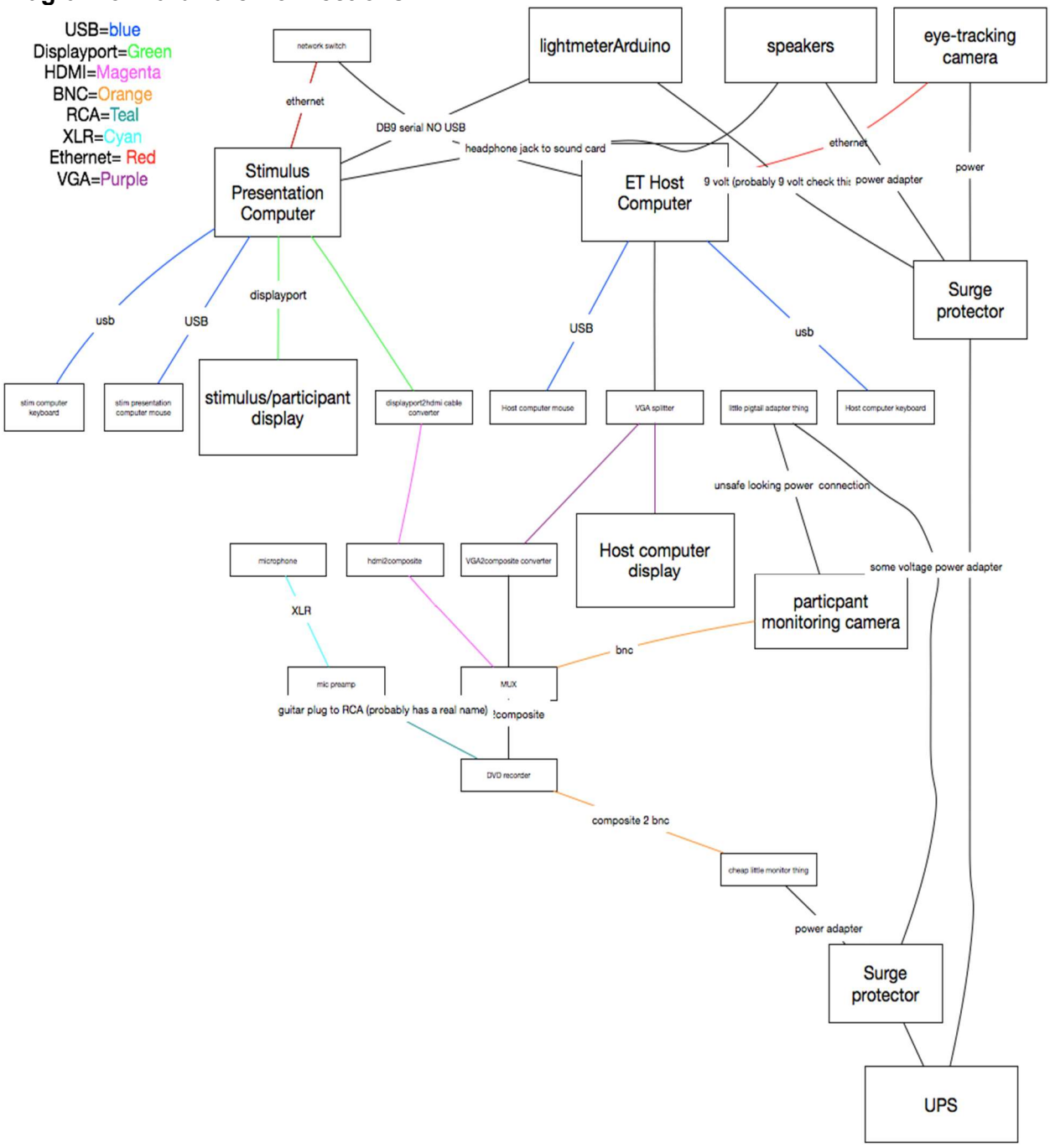


Diagram of Hardware Connections



General Equipment List

ET Equipment List	[ABC-CT] ET Equipment	Google Drive (DAAC : ABC-CT > CIS Protocol and Support Documents > ET Support Documents)

https://drive.google.com/open?id=1r1gRuNd7_gdVjM_r5S6ne4FwVmr5Od0egIXJEMJhGB0

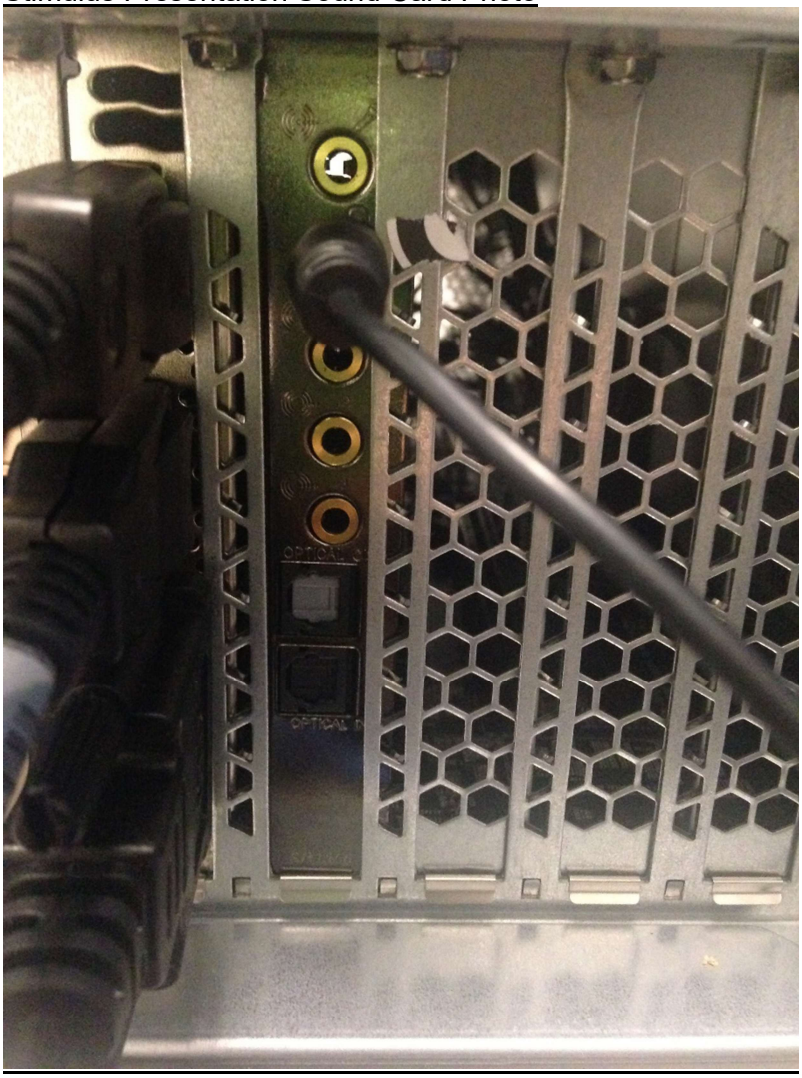
Item	Quantity	From	Cost (each)
Presentation License	1	Neurobehavioral Systems Presentation	$869.05
60533-BLK	1	Modularhose.com	$6.39
61514-BLK	1	Modularhose.com	$6.54
61501-BLK	2	Modularhose.com	$8.52
90725-BLK	1	Modularhose.com	$5.33
51824-BLK	1	Modularhose.com	$6.71
Stimulus presentation computer: TopSeller ThinkStation P500 Tower Xeon QC E5-1620 v3 3.5GHz / 4GB / 1x1TB SATA / K2200 / DVD-RW / W7P64- W8.1P Lenovo Commercial Systems	1	GovConnection/ Lenovo	$1,432.85
NETGEAR ProSAFE GS105NA 5-Port Gigabit Switch (GS105NA)	1	Amazon	$34.99
Rosewill PCI-Express Dual Port Gigabit Ethernet Network Adapter 2 x RJ45 (RNG-407-Dualv2)	1	Amazon	$34.99
SanDisk 960GB Ultra II Solid State Drive	1	Amazon	$313.99
1/4" Angled Male to RCA Male Audio Cable 3'	1	B&H	$3.15
VBBC-306 Premium BNC 75 Ohm Video Cable, 6'	1	B&H	$10.46
RCA male to BNC, 3'	4	Amazon	$5.98
DisplayPort to HDMI cable, 3'	1	Amazon	$10.99
VGA split adapter StarTech	1	Amazon	$8.66
Ethernet cables, 3'	3	Amazon	$4.99
PRO42- Unidirectional Boundary Microphone	1	B&H	$66.95
1/3" CS Mount 2.8-11 mm f/1.4 DC Iris Lens	1	B&H	$51.30
MGT121AR Class II 12 VDC 1000mA Regulated Power Supply	1	B&H	$6.71
650 TVL Day/Night Wide Dynamic Range Box Camera	1	B&H	$246.00
StarTech.com High Resolution VGA to Composite (RCA) or S-Video Converter - PC to TV Video Adapter - 1600x1200 RGB to TV Converter	1	Amazon	$83.97
MP13 Mini Microphone Preamp	1	B&H	$48.60
EP4CQVGA 4-Channel Color Multiplexor	1	B&H	$108.00
DMR-EH59GA-K Multi-Zone 250GB HDD/DVD Recorder	1	B&H	$351.00
2H100 Dual Handle Bracket Mounts to LCD Monitor Stands and LCD Monitor Arms	1	Ergomart.com	$91.34
Heavy Duty Monitor Arm	1	Ergomart.com	$256.61
Mount Kit C for monitor arm	1	Ergomart.com	$58.08
Heavy Duty Spring Tilter Assembly in Black	1	Ergomart.com	$68.53
75/100mm Star VESA Plate with Hardware	1	Ergomart.com	$0.00
VESA 0.5in Spacer Kit	1	Ergomart.com	$3.00
Sound Blaster Z PCIe Gaming Sound Card with High Performance Headphone Amp and Beam Forming Microphone	1	Amazon	$99.00
Dell U2415 24-Inch 1920 x 1200 LED Monitor	1	Amazon	$273.00
Bose Computer MusicMonitor -- Black	1	Amazon	$299.00
Eversun Technologies 5.6" LCD Test Monitor	1	B&H	$145.80
APC Backups Pro 1500	1	Amazon	$173.95
Power strips	2	Amazon	$17.99
Etekcity 10-Pack Upgraded Power Extension Cord Cable Strip Outlet Saver, Lifetime Warranty, UL Listed, 16AWG/13A, 3-Prong, 1-Foot (Black)	1	Amazon	$16.99

Serial port cable DB9	1	Amazon	$5.75
9 VDC 1000mA regulated switching power adapter	1	Adafruit	$6.95
Power supply pigtail cable	1	?	?

Stimulus Presentation Monitor Specifications

- Size (mm): 520 x 325
- Size (pixels): 1920 x 1200
- Refresh Rate: 60 Hz

Stimulus Presentation Sound Card Photo

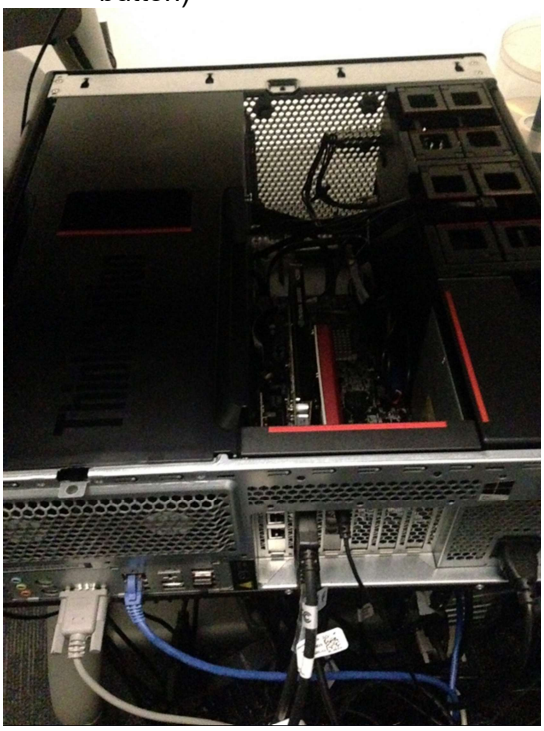


Cloning the ABC-CT ET Stimulus Presentation Hard Drive (from Ariel Chang, 2017-04-19)
Materials:

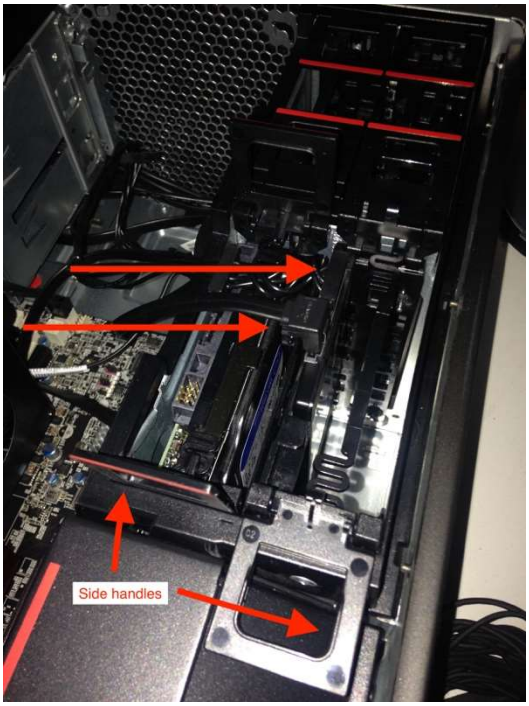
- Stimulus Presentation Computer
- New (internal) hard drive (use the same as the original one we bought for the computer)

Steps:

1. Shut down entire eye-tracking system (both stimulus presentation computer and eye tracking host computer)
2. Remove cover of stimulus presentation computer case (lift up handle next to power button)



3. Lift up side handles, disconnect hard drive from mounting bracket, and label it (ie. original hard drive)



4. Turn on docking station

5. Insert original hard drive (to be copied) into slot A and blank hard drive (target to be copied onto) into slot B –docking station lights should turn on to indicate hard drives have been inserted properly

6. Press “clone” button on the product for about 3 seconds, release and the LED indicator of 100% will light up, and quickly click “Clone”
7. Indicator lights (25%, 50%, 75%, 100%) will flash on as cloning progresses until entire line of lights is on, indicating cloning is done – *docking station will go to sleep if no operation is performed within 30 min of clone completion*
8. Reinsert and connect original hard drive, store backup hard drive (not connected) in different mounting bracket

ET Data Access (Large File Download)

If the large file download at Yale stops working, please try the following:

- Make sure the mac mini is connected to the Yale Secure wifi network, not Yale Guest.
- Run the script LargeFileDownload.sh in ~/Documents manually to see if that fixes the problem
- If not, try restarting the computer. Beyond that, hopefully you get helpful errors when you run the script manually.
- The Readme on the desktop also provides some information on how the computer is set up to work with the scripts (all scripts are in ~/Documents)
- It also covers changing the netID and password for the computer to connect to the Yale share server, which will require updating at least every year as the NetID passwords are required to change.

ET Analyses

ET Pipeline

See the DAAC ET QC and Derived Results Manuals for detailed instructions on accessing and running the ET Pipeline.

Feasibility: Analyses

Activity Monitoring

- Feasibility data file: summary_select_am_20160510.csv
- Construct Validity
    - Definition: %Looking at Heads + %Looking at Activities + %Looking at Distractors > chance (i.e. more than the area those regions take up in the scene; i.e. these are the primary areas of looking by all participants)
    - Variable: heads_activity_distractor_mean
    - Notes: mean of (%heads + %activities + %distractors)
- Stratification
    - Definition: %Looking at Heads
    - Variable: heads_mean
    - Notes: %heads

Biological Motion

- Feasibility data file: summary_select_bm_20160510.csv
- Construct Validity
    - Definition: %Time looking at Biological Motion (one-sample t-test against chance (50% preliminary)) (TD only)
    - Variable: human_mean
    - Notes: na
- Stratification
    - Definition: %Time looking at Biological Motion
    - Variable: human_mean
    - Notes: na

Pupillary Light Reflex

- Feasibility data file: summary_plr_20160516.csv
- Construct Validity
    - Definition: relative pupil constriction after flash (all participants)
    - Variable: pupil_constrict_mean
    - Notes: na
- Stratification
    - Definition: pupillary light reflex latency
    - Variable: latency_mean
    - Notes: na
- Separate program that runs on ASC files

Social Interactive

- Feasibility data file: summary_select_si_20160510.csv
- Construct Validity
    - Definition: %Looking at Social > chance (50%)
    - Variable: social_mean
    - Notes: %social = activity + %body + %mouth + %eyes + %head
- Stratification
    - Definition: % Looking at Social
    - Variable: social_mean
    - Notes: %social = activity + %body + %mouth + %eyes + %head
- 2016-05-18: Fixed “sibs6_non3_AOI.bmp” so background is gray instead of original image’s background

- AOIs
    - Drawn by Erin, Carla, and Ariel in Paint.NET
        - Erin: sibs1-4
        - Carla: sibs5-9
        - Ariel: sibs10-12
    - Open Paint.NET
    - Open a previous AOI image BMP file
        - Ex: “sibs1_non1_AOI.bmp”
        - This will just be used to pull the colors from using the dropper
    - Open your background file
        - Ex: “sibs1_non1_AOI.jpg”
    - Create 6 new layers
        - Name (top to bottom): eyes, mouth, head, activity, body, bkg
    - Tools
        - Paint dropper (shortcut = K)
        - Paint bucket (shortcut = F)
            - Tolerance = 50
            - Anti-aliasing disabled
            - Pixelated selection quality
        - Paintbrush (shortcut = B)
            - Hardness = 100
            - Anti-aliasing disabled
            - Pixelated selection quality
            - Brush Width = 42 (= approximately one degree of visual angle on U19 machine)
    - Layers
        - eyes
            - Hairline to mid-nose (where nose points out farthest usually)
        - mouth
            - Bottom of jaw to mid-nose (eyes take precedence)
        - head
            - Outside hairline down to bottom of chin
        - activity
            - Forearms (below elbow), all toys in use
        - body
            - Whole body except head
        - bkg
            - Paint bucket fill with grey100 (use dropper to pull color from previous AOI image)
    - Save as…Paint.NET
    - Save as… BMP
        - 8-bit
        - Dithering level: 7
        - Flatten

<u>Static Scenes</u>

- Feasibility data file: summary_select_ss_20160510.csv
- Construct Validity
    - Definition: %Looking at Face > chance (50%)
    - Variable: face_mean

    - Notes: %face = %eyes + %mouth
- Stratification
    - Definition: %Looking at Face
    - Variable: face_mean
    - Notes: %face = %eyes + %mouth
- AOIs
    - Drawn by Erin in Photoshop
    - Error: 1 degree = 42 pixels

Visual Search

- Feasibility data file: summary_select_vs_20160510.csv
- Construct Validity
    - Definition: # Objects looked at >= 3 (Preliminary number, i.e. participants are looking at more than half the objects – need to generate new analytic file)
    - Variable: num_objects_looked_at_mean
    - Notes: average number of objects a child looked at for >500 ms
- Stratification
    - Definition: %Time looking at Faces
    - Variable: face_mean
    - Notes: na
- AOIs
    - Drawn by Erin in Photoshop
    - Error: 1 degree = 42 pixels

Main Study: Analyses

Instruction for Taking Screenshots of Each Paradigm (for AOI Development)

1. Download the paradigms (special version for screenshots), unzip the files, and put the folder on desktop.
    a. "\\wcrsh00-18.its.yale.internal\abcctet-730025-ysm\Paradigms\Main Study\series5002_screenshots.7z"
2. Make sure you have the folder C:/screenshots.
3. Run a session, then archive C:/screenshots/series5002 folder, then delete the folder.
4. Repeat step 2-3 until you have screenshots for all orders.

Main Study: Valid Trials per Paradigm

- General: 25% of trials, rounded up
- AM (4/16 trials)
    - >50% valid looking time
    - Minimum calibration error < 2.5 degrees (105 pixels)
        - Minimum calibration error = (static_nn_mean or static_raw_mean or nn_raw_mean)
- BM (10/40 trials)
    - >50% valid looking time
    - Minimum calibration error < 2.5 degrees (105 pixels)
        - Minimum calibration error = (static_nn_mean or static_raw_mean or
- PLR (5/18 trials – 25% rounded up)
    - A_0 (baseline pupil area) must be unbroken and relatively stable
    - Latency can be identified reliably by human coders
    - A_m can be identified reliably by human coders
    - Note: these criteria only need to be met for a single eye for the trial to be considered valid
    - Note: PLR is the only task that involves semi-manual coding
- SI (6/22 trials – 25% rounded up)
    - >50% valid looking time
    - Minimum calibration error < 2.5 degrees (105 pixels)
        - Minimum calibration error = (static_nn_mean or static_raw_mean or nn_raw_mean)
- SS (3/12 trials – 25% rounded up)
    - >50% valid looking time
    - Minimum calibration error < 2.5 degrees (105 pixels)
        - Minimum calibration error = (static_nn_mean or static_raw_mean or nn_raw_mean)
- VS (3/12 trials – 25% rounded up)
    - >50% valid looking time
    - Minimum calibration error < 2.5 degrees (105 pixels)
        - Minimum calibration error = (static_nn_mean or static_raw_mean or nn_raw_mean)

Main Study: Quality Control

Criteria to Continue to T2

- As noted in the Clinical MOP, you must provide valid EEG or ET data to be invited back for T2
- If three blocks (must be a combination of blocks from Activity Monitoring, Biological Motion, Social Interactive, and Static Scenes/Visual Search) are marked as “data” or “questionable” for item 7 (Overall Quality) in the ET run log (combining across T1 Day 1 and T1 Day 2), a child may continue to T2, regardless of EEG performance.

Note that 3 blocks (out of 16 total per time point) will take 3.25 to 5.5 minutes depending on the blocks that the child sits through. Sites can determine this themselves after the Day 2 ET session (see bottom of the last page of the ET Run Logs), and the ET DAAC will be confirming this in our feedback emails.