**Updated 7/24/14: Av1correctedpro** 11/9/12 Patricia R. DeLucia, Daniel Oberfeld, Doug Preddy (assistance calibrating: Jeremy Donai, Dr. Pachel in speech and audiology at HSC) IRB Studies in Visual Perception: Theories and Applications

* NOTE: Must subtract 600 ms (delay to avoid clicks in sound) from TTC judgments when analyzing data (plus 1 s for stimulus presentation time).

**General Purpose:** The purpose of the AV project is to evaluate the relative contribution of visual tau and auditory tau and determine how TTC judgments are affected when the two are contradictory. Scenes consist of a single approaching object based on the displays from DeLucia and Liddell.

*NOTE:* Read Schiff and Oldak, 1990 and people who cited them before writing manuscript.

AV1 had to be rerun. **In AV1CORRECTED** we fixed some of the problems that we noticed in AV1 when we analyzed the data:

1. Results indicated many missing cells, particularly in the auditory-only condition. Response times were much shorter than the other conditions and less than 1.6 s so many trials were deleted by SAS (we delete trials when Ss press before the scene disappears). We went back and looked at the scenes and the directRT files for AV1.When we did this, we noticed a flash of black before the stimulus presentation in all conditions but the delay between flash and stimulus onset differed across conditions. In the video conditions (V only and V+A), this black flash was followed by 600 ms of white screen and then the approach stimulus was presented. But in the audio only condition, the sound started playing as soon as the flash ended (subsequent tests in which we used a buffer command in DirectRT suggested that the flash is due to the loading of windows media player by DirectRT). The 600 ms of delay that we put in the audio file (which we confirmed was still there with audacity) was not being played for the audio-only condition. The problem that we attempted to address with the 600 ms padding was not being implemented. We added 600 ms of blank to eliminate the clicks: From Oberfeld: “Normally, clicks can occur because Windows often "forgets" the first or final few hundred ms of a sound. The script already includes zero-padding (insertion of 100 ms silence at the beginning and the end - BTW, you need to consider this when synchronizing audio & video later!). Try setting the value of zeroPadMs in the attached script to 200, or even try 500 - if this does not remove the clicks, contact me again.”

Doug noticed that by switching the column in which the audio file was listed (stim1 or stim2) in the av1directRt file corrected the file. That is, in our original study, in av1directRT.csv, Stim1 listed the video filename for the video only condition and for the audio+visual condition; but it listed the sound filename in the audio only condition. When Doug switched the columns in all the audio-only conditions so that Stim1 list the blank video file and Stim2 lists the audio file, there was a white screen delay after the flash in the audio-only condition. It now looked like the video conditions. So in the original direcRT file even though stim1 and stim2 are set in directRT to start at the same time, the 600 ms delay is not played in the audio-only condition. We have not determined why the assignment of the filenames to the columns matters. To DirectRT. Doug verified the 600 ms delay by changing the background of the directRT presentation to black (though the video image still had a white background). When the screen turns from black to white, we know that this is the onset of the stimulus (rather than DirectRT’s load time). Doug used a cellphone stopwatch to measure the time between the start of the white screen and the stimulus onset. These test confirmed 600 ms padding. We think that windows media player is forgetting to play the first 600ms when the audio file is in stim1, but when it is buffered by a blank video file it has the correct 600 ms pause.

2. The number of replications was not equal across all conditions. The audio-visual condition was missing 1 replication of the a-v=0, a-v=+.5, and a-v=-.5. In av1corrected we copied one replication of each of these conditions and inserted it into the a+v condition in av1drtcorrected.csv Randomization within the condition is still working as per the protocol.

3. The order of the 3 conditions was not counterbalanced across Ss and there was an unequal number of Ss in each of the orders. We modified av1drtcorrected.csv by taking the condition randomizer out and creating 6 different order files (one for each order listed in protocol).

\*\*\*From original av1 protocol\*\*\*

**In AV1,** we asked whether the presentation of both auditory and visual tau result in better performance than either one alone. The scenes showed only an approaching object (visual tau alone), or only an auditory tone (auditory tau alone), or both the approaching object and the auditory tone (both auditory and visual tau). Ss judged TTC with a PM task. We also asked how Ss integrate auditory and visual tau when the two contradict each other. The same scenes are used from AV1. Except that the scenes with short visual tau values were presented with tones specifying long tau values and vice versa.

**In AV2,** we asked whether the size-arrival effect occurs in the auditory domain. We need to vary 2 dimensions of sound: amplitude and frequency. Closer objects make louder sounds.

In these scenes, the sound will simulate one object that is smaller but closer and one object that is larger but farther.

*NOTE:* Find out (a) How do sound parameters get correlated with distance? Do closer objects also result in higher frequencies (it is velocity-dependent: Doppler effect).

**In AV3,** we asked whether auditory tau can weaken the visual size-arrival effect. In these traditional SAE scenes, the small object will be shown with an increasingly louder tone (suggesting closer distance) and the larger object will be shown with an increasing softer tone (suggesting farther distance). *NOTE:* Consider using frequency too?

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**Specific Purpose:** The purpose of av1 is to compare auditory, visual, and auditory + visual tau information to see how they affect TTC estimations and to see how consistency among modalities affects judgments.

**Scenes**

The visual scenes were created with winobj. The auditory tones were created with matlab. The two were synchronized with DirectRT.

**Visual Scenes**

1. The parameters of the scenes are shown in av1.xls

2. Scene file names end in lst and sdf: av1tp5n, at1tp5f, av1t1n, av1t1f, av1t15n, av1t15f, av1t2n, av1t2f, av1t25n, av1t25f.

3. There are more scenes in the av1.zip files that end with ”L”. These were the scenes we started with that were based on Schiff and Detwiler (1979) and used TTCs of 2,4,6,8,10 and were longer in duration. We made the ttc values closer together and used shorter durations based on Oberfeld’s recommendations that the tones would be ore discriminable. Pilot observations in DeLucia and Oberfeld lab confirmed that people could discern differences amongst the 10 tones.

4. Other files: av1.tex, av1view.ord, fraps.ord purple.bmp, keydefs.key, runobj.cfg

5. Runobj.cfg settings for av1

0 // Collect Second Response (-1-Ask, 0-No, 1-Yes)

0 // Collect Confidence Rating (-1-Ask, 0-No, 1-Yes)

0 // Feedback On (-1-Ask, 0-No, 1-Yes)

1 // Spacekey for Advance On (-1-Ask, 0-No, 1-Yes)

1.5 // Viewport Distance (0.0-Ask, 0.1 - 40.0 feet)

1.06627 // Viewport Width (0.1 - 25.0 feet)

.80381 // Viewport Height (0.1 - 25.0 feet)

0 // Staircase Procedure On (-1-Ask, 0-No, 1-Yes; If Yes Next 7 active)

2 // Manual Control 1 Interface Type (-1-Ask, 1-Automatic, 2-Mouse, 3-

0 // Manual Control 1 On (-1-Ask, 0-No, 1-Yes; If Yes Next section active)

1 // Lighting and Depth Testing On (0-No (old RunObj compatible), 1-Yes)

0 // Single Step Control On (0-No, 1-Yes)

0 // Stereo On (0-No, 1-Yes)

0 // Inter Pupilary Distance (IPD) in feet

0 // Mipmapping On (0-No, 1-Yes)

25.00 // Display System Frame Rate (1.0-240.0 hz)

0 // Parallax On (0-No, 1-Yes; If Yes Next 3 active)

1 // Force Frame Sync (0-No, 1-Yes)

1 // Adjust Time To Sync (0-No, 1-Yes)

0 // Output .ttd File (0-No, 1-Yes)

1 // Frame Rate Factor (1-Every Frame, 2-Every 2nd, 3-Every 3rd, Etc.)

0 // RGB stereo mode (0-No, 1-Yes)

2 // Manual Control 2 Interface Type (-1-Ask, 1-Automatic, 2-Mouse, 3- 0

0 // Manual Control 2 On (-1-Ask, 0-No, 1-Yes; If Yes Next section

6. Fraps.ord was used to play the scenes while recording with Fraps.

A cross was inserted in between scenes so that the first and last frames of the blank interval before and after the approach scenes could be identified. In the auditory scenes, we used 600 ms of silence before and after the increasing tone to avoid clicking sounds created by Windows. This needed to be matched by blank screen in the visual scenes. This was done with the time-out setting in fraps.ord (6th column).

7. Fraps created a file called av1fraps.avi. This was then edited to splice up all the scenes so they could be shown separately with DirectRT. The av1fraps.avi file was edited with Windows MovieMaker in B13 (Dell). Individual scenes were then checked by playing each scene back with VLC player. The filenames end with .wmv and are called av1tp5n, at1tp5f, av1t1n, av1t1f, av1t15n, av1t15f, av1t2n, av1t2f, av1t25n, av1t25f. MAKE SURE that you save the move in customized settings and put 800 x 600 resolution and 25 fps (otherwise default is 640x 480). NOTE: Moviemaker only let us edit the movie at 30 frames per second rather than 25. Thus, each frame was 33.33ms in duration rather than 40 ms. Thus, we edited the scenes to have 18 frames of blank, 30 frames of approaching object, and 18 frames of blank at end. To count we started by beginning at time 0:00 and next frame is #1. Counted to 18. Then Frame 19 showed object for 30 frames. Then frame 31 showed blank for 18 frames. Total time was 2.20. This gives the correct 600 ms intervals so that the sound and visuals are in sync when played with DirectRT (originally we could tell they were out of sync; see test3outofsync for extreme contrived example).

8. The presentation time and order was done with DirectRT. NOTE: When we played the practice trials using visual only, we noticed that directRT would not register the first mouse click and we had to wait to press before the second mouse click was registered. This did not happen with auditory only or A+V. Thus, we created a null sound (a sound with a duration of 0 s: av1t25fnull) and had directRT play it at same time. This solved the problem (and no sound was heard).

9. Response time measures were calibrated. DirectRT’s measure in the column “RT” is the time between the start of the scene and the button/key press (from the manual). However, to calibrate we noticed there is a delay between press space bar to start scene and the start of the scene itself. Because the scene starts with white space and the delay also shows white space, we had to create special calibration scenes in which the scene starts with a cross. Then the approaching object appears. We started the stop watch when the cross appeared and ended when we pressed the mouse. The directRT RT measures were much closer to the stop watch measures (see notebook. Difference was around 100-300 ms whereas before it was a 1 s difference when we started the stop watch when we pressed the space bar. We also could see a delay and white space between time we pressed space bar and time cross appeared. This may be the “load time” listed in DirectRT’s data file but the load time is much smaller than what we estimated (about 1 s).

10. When calibrating we noticed that directRT’s RT measures were similar to our stop watch measures for only scenes that showed video but not for audio-only scenes.In these scenes the stop watch measures were longer by about .60 s (if we added 600 ms to the DirectRT value because we started watch when we heard tone and the tone has 600 ms silence first. It we don’t add this, DirectRT’s value is very close to our stop watch measure as if it is not including the silence… To fix this we now show a white screen at the same time that the audio-only tone plays. This is “nullscene.wmv” and it is the same duration as all other scenes (2.20 s). When we do this our stop watch measures were similar to the DirectRT measures of RT (when we started stop watch when tone began and ended stop watch when mouse was pressed). Now A, V, and A+V scenes appear calibrated so that stop watch and DirectRT measures of RT are comparable.

**Auditory Scenes (refer to Daniel’s emails too).**

1. The parameters of the scenes are shown in av1.xls

2. Auditory stimuli were generated with matlab files created by Daniel: av1\_ttcp5.m, av1\_ttc1.m, av1\_ttc15.m, av1\_ttc15.m, av1\_ttc2.m, av1ttc25.m (NOTE: these same files appended with a “b” at the end of the filename are the matlabe files used to create the broadband version of the stimuli. But we only used the pure tone versions). To create a new auditory tone. Open one of the existing matlab files (e.g., av1\_ttc25.m) and edit “TTClist=[n]” so that n= the desired TTC value. Then change “vList=[n1 n2]\*25” so that n1= the velocity in ft/frame for the near scene and n2=the velocity in ft/frame for the far scene. The matlab file will create 2 .wav files, one for near (with smaller value of vel\*frRate in filename), one for far.

3. Scene files end in .wav and are called av1tp5n, at1tp5f, av1t1n, av1t1f, av1t15n, av1t15f, av1t2n, av1t2f, av1t25n, av1t25f, av1t3n, av1t3f.

4. Note that there are identical tones that have a different filename (av1t0.5\_3500TTCp5n.wav). These files with longer names were kept because the matlab files that created them generated .wav files with longer names (that included the ttc and vel in the name). We appended these to include the ttc so we could match up the longer names with the final names chosen to be consistent with the scene names, etc. Also, these longer names have a version with a “b” at the end. These are the broad-band sounds but otherwise same as the pure tones.

5. At first we used matlab files (ending with .m) to create tones for the original ttc scenes based on schiff and detwiler (av1t10n, av1t10f etc). Daniel also send us matlab files to create purse and broadband tones for the final ttc values (av1\_ttcp5.m, av1\_ttc25b.m). And he sent us matlab files that created all the tones with one file (av1loop1, av1loop2, av1loop3; 2 for pure tones; 3 for broadband). Initial files before all finalized were ttcauditory\_matlab\*.m

6. The matlab files include a ramp the sound to eliminate clicking (cosinesquaredramps.m)

7. The tones were calibrated with both the sound meter datalogger and its software, and with higher-end sound meters from the HSC speech and audiology department (Jeremy Donai). Daniel sent us a matlab file that created a pure tone that we could set (using the volume on the speaker) to 90 dbA. We could then use the datalogger measures to translate into the relative intensity (see av1.xls). Because his matlab file created a tone that was too short for datalogger to measure, we changed the duration and renamed it to PRDav1TTC20120417danielcalibrationscript.m There are 3 of these, the original one, one ending with m16 and one ending with m26 which create tones that are below the original tone by 10 and 20 dB, respectively. This also allowed us to calibrate the tones (by seeing whether SPL measures with sound meter showed 10 db and 20 db difference. We were not able to directly measure change in intensity of our 1-s stimulus tones because they were too short for a sound meter to do this.

8. The calibration procedure and results are in the notebook. Generally, the speaker was set on top of the monitor in front of the viewing position. And datalogger’s mic was placed where the subject’s eye would be.

9. To calculate the final SPL, use the formula=90dB-20\*LOG10(virtual distance/500), where:

90dB was the sound level read by the meter when we played PRDav1TTC20120417danielcalibrationscript.m

(the speaker knob was set to about 10 o’clock position). Virtual distance is the scene distance between eye and object (compute separately for first, last frames). 500 is the “calibration distance” set with the variable Dcalib in the matlab file. Example of SPL on last frame for: 1 s TTC/near: 90 db – 20\*log10(3280/500)=73.66 dB.

**Hardware (run in B13 on the Dell computer)**

This experiment was run in B13 on a Dell Optiplex 390 computer with Intel Core i5 2400 Processor (3.1 Ghz) and 3 GB DDR3 SDRAM and Windows 7 Home (32-bit). The pc had a AMD Radeon HD 6350 graphics card with 512 MB RAM. Settings: Vertical refresh is on, Smoothvision HD anti-aliasing: no box checked and level = 4x, anisoptropic filtering: no box checked and per pixel samples 16x, tessilation AMD optimized box was checked, catalyst AI’s texture filtering quality was in middle and enable surface format opt was checked, mipmap detail level was highest (quality), antialiasing mode was lowest, open gl settings box not checked. refresh rate = 75 Hz, resolution 800x600, 32 bit color. Monitor is a KDS Xf7t, 17’. Monitor settings:, hor pos 34, vert pos = 38, hsize = 88 vsize = 46, pincue = 76, parallelogram = 55, trapezoid = 38, pin balance = 49, rotation = 59, Horiz moire = 0, vertmoire = 40, contrast = 100, brightness = 60, zoom = 88. Cross measures: left and right halves were 16.25 cm. Top half 12.25 cm. Bottom half 12.20 cm. The pc also had a sound Card is a PCI express sound Blaster X-fi Titanium (Model SB0880). Did not change any settings. The resolution was 24-bit and frequency was 48000 Hz. The speaker was a mono speaker but we could not find the model/brand.

In winobj, the raw scenes run at 25 fps w/o overruns (see av1viewdat.dat).

**Software and Files**

The scenes were presented with DirectRT for which the department has a site license. Ken DeMarree is the DirectRT coordinator. To use DirectRT it first has to be downloaded/installed on a computer which results in a code. Then the code is sent to Ken and he sends it to DirectRT who sends a license number to finish installation on that particular computer.

**Files needed:**

Av1correctedABC.csv (tells DirectRt the order of exptl stimuli)

Av1correctedACB.csv

Av1correctedBAC.csv

Av1correctedBCA.csv

Av1correctedCAB.csv

Av1correctedCBA.csv

av1test(displayparameters).drt (tells DirectRT which display parameters to use)

**Put the following audio and video files in the “stim” subfolder so DirectRT can access them**

**Audio:**

av1tp5n.wav

av1tp5f.wav

av1t1n.wav

av1t1f.wav

av1t15n.wav

av1t15f.wav

av1t2n.wav

av1t2f.wav

av1t25n.wav

av1t25f.wav

av1t3n.wav

av1t3f.wav

av1t25fnull.wav

**Video:**

av1tp5n.wmv

av1tp5f.wmv

av1t1n.wmv

av1t1f.wmv

av1t15n.wmv

av1t15f.wmv

av1t2n.wmv

av1t2f.wmv

av1t25n.wmv

av1t25f.wmv

nullscene.wmv

**Design for a single experiment**

TTC on final frame (5 levels): 1, 1.5, 2, 2.5 s (omitted .5 s because can’t do 0-s TTC aud stim in A+V)

Dis on final frame (2 levels): near, far

Tau information (3 levels): visual only, auditory only, visual+auditory

BUT visual+auditory is not complete crossed with the other two. It is rather crossed with the difference between auditory tau and visual tau: 0, +.5 s, -.5 s.

In the auditory only and the visual only, the TTC values will be .5 s, 1, 1.5, 2, 2.5s.

Each of these are crossed with near, far and replicated 5 times for a total of 50 trials per modality or 100 trials.

The auditory plus visual condition is shown below. The cell contains the value of the auditory TTC stimulus. There are 14 stimuli crossed with near, far and replicate 5 times for total of 140 trials.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A+VCondition | Vis TTC=.5 s | Vis TTC=1 s | Vis TTC=1.5 s | Vis TTC=2 s | Vis TTC=2.5 s |
| A-V = 0 Near | Aud TTC= .5s | Aud TTC=1s | Aud TTC= 1.5s | Aud TTC= 2s | Aud TTC= 2.5s |
| A-V= 0 Far | Aud TTC= .5s | Aud TTC= 1s | Aud TTC= 1.5s | Aud TTC= 2s | Aud TTC=2.5 s |
| A-V=+.5 Near | Aud TTC= 1s | Aud TTC= 1.5s | Aud TTC =2s | Aud TTC=2.5 s | Aud TTC= 3 s |
| A-V=+.5 Far | Aud TTC= 1s | Aud TTC= 1.5s | Aud TTC =2s | Aud TTC=2.5 s | Aud TTC= 3 s |
| A-V= -.5 Near | X | Aud TTC=.5 s | Aud TTC= 1s | Aud TTC= 1.5 s | Aud TTC=2 s |
| A-V= -.5 Far | X | Aud TTC=.5 s | Aud TTC= 1s | Aud TTC= 1.5 s | Aud TTC=2 s |

**All reps of one condition are completed in a random order before doing the next replication.**

**18 Practice Trials (in blocked order: V only, A only, A+V to make it easier to learn task)**

**Aud only: .5 s near/far, 2.5 s near/far, 1 s near/far**

**Vis only: .5 s near/far, 2.5 s near/far, 1 s near/far**

**A+V: .5 s near, 2.5 s far (A-V=0)**

**.1 s near, 2.5 s far (A-V=+.5)**

**.1 s near, 2.5 s far (A-V= -.5)**

**Pre-experiment Maneuvers**

**Sona:** Participants must be at least 18 years of age and must have normal vision (glasses or contacts okay), normal hearing, and normal motor control.

1. Have questionnaires, consent forms, surveys, and writing utensils.
2. Turn on power supply then computer.
3. Log into windows with user: Administrator, Password: winobj
4. Open directRT and open the AV1.csv file in DirectRT. Enter the participant number in the box. DO NOT click the “OK” box until the participant comes in.

**When participant arrives**

1. Greet participant and close door.
2. “Please read and sign the consent form.”
3. Fill in participant number, date, reported acuity, etc on questionnaires. Note: If wearing contacts or glasses to get to 20/20, that is fine. If subject does not have 20/20 and is not wearing corrective lenses, ask if they can see the text on the screen clearly.
4. Shut off any lamps or ceiling lights in the room.
5. Read the instructions and follow procedure. Stay in room with participant to ensure task is understood and being done correctly.

**After subject completes session**

Administer questionnaire, and debrief participant. Then make a backup of the data.

**Instructions**

**[Ask the participant to sit in front of the KDS monitor (on metal table; pc farthest from door). Tell them to turn off cell-phones, and other noise-making electronic devices. Give them the informed consent to sign and read. Make sure that directRT is opened and the participant number is entered. Ask participant the demographics questions on the questionnaire.]**

The aim of this experiment is to study the perception of moving objects. We will use computer-generated displays which simulate the motion of objects, and there will be different types of displays. In all cases, the computer will simulate an object that moves toward you. All objects in this study are the same size.

In some cases, you will see the approaching object on the screen. But you will not hear it. In other cases, you will hear the approaching object through the speaker. But you will not see it. Finally, in other cases you will both hear and see the approaching object. At some point during this approach motion the object will disappear and you will no longer see or hear it.

Your task is to press the left mouse button when you think that the object would hit, had the simulation of the object’s motion continued in the same manner as it was when you could see or hear it.

If you think that the object would not actually hit you but rather would pass to the side of you, press the button at the time it would pass you. Assume that the object continues to move in the same manner after it disappears.

There will be a variety of scenes. For example, the initial distance between you and the object may be small or large. Also, the object may approach you at different speeds.

In all cases, your task is to press the left mouse button at the **exact** time that you think that the object would hit you or pass you had the motion continued **after the object disappeared**. Remember that the object’s motion continues in the same manner after the object disappears.

**PLEASE DO NOT PRESS THE MOUSE BUTTON BEFORE THE SCENE DISAPPEARS**

Do you have any questions?

To summarize, the computer will simulate an object’s motion toward you and then the object will disappear. Press the left mouse button at the exact time that you think the object would hit you or pass you, had the object’s motion continued in the same manner after it disappeared.

After you press the mouse key, please press the space bar to proceed to the next trial. If you need a rest, do not press the space bar.

We will begin with 18 practice trials. At the end of practice a message will say "End of practice". At this point please stop.

[*CHECK HEAD, CHAIR, COMFORT]*

I am going to turn off the lights.

Are you ready? If so, press the space bar.

*After practice:* Any questions?

There will be 3 blocks of trials each separated by a rest period. If you need to rest before the rest period occurs, just don’t press the space bar. We will start with between 100 and 150 trials. Ready? **[Check head]**

In this block of trials you will (see/hear/see and hear) the approaching object

To begin, please press the space bar.

**At end of first block:** You may rest. When you are ready, we will do another set of trials. In this block of trials you will (see/hear/see and hear) the approaching object. To begin, please press the space bar. **[Check head]**

[Experimenter press C-key]

**At end of second block:** You may rest. When you are ready, we will do another set of trials. In this block of trials you will (see/hear/see and hear) the approaching object. To begin, please press the space bar.

**[Check head]**

[Experimenter press C-key]

**After participant completes session:**

1. Turn lights on. Administer questionnaire. **IMPORTANT: Before the subject leaves, look over each written questionnaire and ask further questions if needed for clarification. Record all comments and any questions you ask or elaborations you provide**

2. Debrief: “The purpose of this study is to identify how different senses help us make judgments about when objects are going to collide with us. The results of this study will help us develop further lines of research about multisensory judgments.”

3. GIVE PARTICPANT A BLANK COPY OF CONSENT FORM.

RUN TABLE AV1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Randomized Order of Running Ss | Subject Number | Gender  (0:F 1: M) | Training Condition (S: Strobe  C: Continuous  F: Filler ) | Comments and  Notes |
|  | 1 | 0 |  |  |
|  | 2 | 0 |  |  |
|  | 3 | 0 |  |  |
|  | 4 | 0 |  |  |
|  | 5 | 0 |  |  |
|  | 6 | 0 |  |  |
|  | 7 | 1 |  |  |
|  | 8 | 1 |  |  |
|  | 9 | 1 |  |  |
|  | 10 | 1 |  |  |
|  | 11 | 1 |  |  |
|  | 12 | 1 |  |  |
|  | 13 | 0 |  |  |
|  | 14 | 0 |  |  |
|  | 15 | 0 |  |  |
|  | 16 | 0 |  |  |
|  | 17 | 0 |  |  |
|  | 18 | 0 |  |  |
|  | 19 | 1 |  |  |
|  | 20 | 1 |  |  |
|  | 21 | 1 |  |  |
|  | 22 | 1 |  |  |
|  | 23 | 1 |  |  |
|  | 24 | 1 |  |  |

**Av1.** Subj #\_\_\_\_ Date\_\_\_\_\_ VisAcuity\_\_ NormalAud\_\_ M or F Age:\_\_\_ Drive Lic:\_\_\_

1. Did the visual simulation of the objects look like the objects moved in depth toward you (was the visual simulation realistic)? NO YES

2. Did the auditory simulation of the objects sound like the objects moved in depth toward you (was the auditory simulation realistic)? NO YES

3. When you both heard and saw the approaching object, did the auditory and visual information seem to be consistent with each other or to contradict each other? CONSISTENT CONTRADICT

4. When you both heard and saw the approaching object, how often you perceived a single approaching object rather than two separate approaching objects? Please use the scale below to answer. “Always” means that you always perceived the auditory and visual information as a single approaching object and never perceived two separate approaching objects. “Never” means that you never perceived the auditory and visual information as a single approaching object and always perceived two separate approaching objects.

Always Often Sometimes Occasionally Never

1 2 3 4 5

5. Are there any specific characteristics of the objects to which you most attended or on which you based your judgments? NO YES (please list)

6. Did you base your judgments on what you saw or heard as opposed to strategies, assumptions, knowledge

or other methods? NO YES

If no, on what were your judgments based?

7. Overall, how confident are you that your responses were accurate?

**Auditory Object Only**

No Extremely

Confidence\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_Confident

1 2 3 4 5

**Visual Object Only**

No Extremely

Confidence\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_Confident

1 2 3 4 5

**Auditory Plus Visual Object**

No Extremely

Confidence\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_Confident

1 2 3 4 5

8. Did the object ever seem like it was coming from any directions that were not directly in front of you

(e.g., to the side) NO YES (if so, which trials)

9. Did you experience any discomfort while viewing the scenes (e.g., headache, dizziness, nausea, etc.)? NO YES (If "YES" please describe symptoms on the back of this page)

10. Please note other comments here:

**Consent to Participate**

We are asking you to participate in a study called **Studies in Visual Perception: Theories and Applications.** Here is what you need to understand about the study:

**1)** The person in charge of this project is Dr. Patricia R. DeLucia (806-742-3711 x259). She works in the Department of Psychology at TTU. You can contact her if you have questions about the research.

**2)** You will be asked to make judgments about three-dimensional objects, scenes, or people, or about computer simulations, images from camera, video, fiberoptic or endoscopic devices, or about stimuli printed on paper. Some images may be medical and thereby graphic in nature. You also will be asked to perform perceptual-motor tasks such as manual-aiming, manual manipulation, tapping, walking, marching, talking, or humming. You will complete questionnaires about various types of performance and some may be considered sensitive in nature. You will be given rest periods when needed.

**3)** Your judgments will be recorded verbally or in writing, or by button, joystick or other peripheral devices, or by videotape. In the event that you are videotaped while you perform the task, your data will be reported anonymously.

**4)** If moving computer-generated displays or head-mounted displays are used, there is a possibility of motion sickness. You are not permitted to participate in the study if you have a seizure disorder that is activated by viewing moving displays or if you respond with any illness when viewing moving displays or motion simulations. By signing this consent form, you are indicating that you do not have such health characteristics and are willing to participate.

**5)** Your participation is appreciated. You will get experiment credits for your Psychology course (PSY 1300). You should also learn about the research.

**6)** The experiment should take about 35 minutes. You will get 1 experiment credit.

**7)** Only Dr. DeLucia and her assistants will see your responses. They will be kept in a locked research lab at TTU. Your responses will be recorded on a computer without your name. Your data will be reported anonymously.

**8)** Participating in this experiment is up to you. You won’t lose anything if you don’t do the tasks. You can quit anytime. You will still get experiment credit for the time you put in. You do not give up any legal rights by signing this form.

**9)** Dr. DeLucia will answer any questions you have about the study. For questions about your rights as a subject or about injuries caused by this research, contact the Texas Tech University Institutional Review Board for the Protection of Human Subjects. It is located in the Office of Research Services, Texas Tech University, and Lubbock, Texas 79409. Or you can call (806) 742-3884.

**I agree to participate in this research. I have read this form. I affirm that I am at least 18 years old. My questions were answered.**

Signature of Subject Printed Name Date

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This consent form is not valid after May 31, 2013