

**FLANKER with fish stimuli**

**[Flanker task with the fish stimuli should be called 'Flanker' in any publications]**

<b>File Info:</b>	S1500_FlankerFishvv13.exp, S2000_FlankerFishv13.exp, S4000_FlankerFishv13.exp, K1500_FlankerFishv11.exp, K2000_FlankerFishv11.exp., K4000_FlankerFishv11.exp.
<b>Brief Description:</b>	In this game, the subject must “feed” the hungry fish by pressing where it/they are facing. When the fish are blue, the hungry fish is in the middle and when the fish are pink, the hungry fish are on the outside. There is an inside-only, outside-only, and mixed block.
<b>Stimulus presentations:</b>	<p>There are TouchScreen (S) and KeyPress (K) versions of this game. S1500/K1500 (1500 msec stimulus presentation) for adults and kids 7 years and older, and S2000/K2000 (2000 msec stimulus presentation) for kids 6 and under. There is a S4000/K4000 (4000 msec stimulus presentation) for younger children if 2000 msec is too short.</p> <p>For ADHD study: 4-6 yr olds: 3500 msec 7-8 should get 2500 msec older should get 1500 msec</p>
<b>Versions</b>	<p>Version 3 has no feedback. The S/K1500 version has no practice block3 (before mixed)</p> <p>Version 4 has enlarged touch screen activation area to match that of Hearts Flowers. Applicable only to S versions.</p> <p>Version 5 will save an output .txt file even if the program is interrupted by the ‘Esc’ key. Also, added ‘exit’ points during the practice sessions so that the tester may quit the program altogether if things are going badly.</p> <p>Version 7 corrected a bug in the time the stimulus was active for more than 2000ms.</p> <p>Version 8 corrected the ratio of incongruent to others in blocks 1 and 2</p> <p>Version 9 balanced out the left and right responses in blocks 1 and 2 from 7:10 to 8:9</p> <p>Version 10(K) and 13(S) block 3 now 64 trials (plus the extra trials 1) that follow the rules of 16 no distractor, 16 neutral, 16 congruent and 16 incongruent. Switch trials of each type. First set of 16 trials have a series of 4 non-switch trials, and the third set of 16 trials has a series of 4 switch trials.</p> <p>Version 11(K) and 13(S) have practice session before the mixed block</p>
<b>Program Info:</b>	PRESENTATION Program
<b>Task Design:</b>	<ul style="list-style-type: none"><li>• Blue Instructions (Middle Fish)</li><li>• Blue (Middle Fish) Practice Trials (4) x up to 3<ul style="list-style-type: none"><li>◦ <b>500 msec Blank → Inf. Stim. → 1000 msec feedback</b></li></ul></li><li>• Blue (Middle Fish) Trials (17)<ul style="list-style-type: none"><li>◦ <b>500 msec Blank → 1500/2000 msec Stim. → 1000 msec feedback</b></li></ul></li><li>• Pink Instructions (Outside Fish)</li><li>• Pink (Outside Fish) Practice Trials (4) x up to 3<ul style="list-style-type: none"><li>◦ <b>500 msec Blank → Inf. Stim. → 1000 msec feedback</b></li></ul></li><li>• Pink (Outside Fish) Trials (17)<ul style="list-style-type: none"><li>◦ <b>500 msec Blank → 1500/2000 msec Stim. → 1000 msec feedback</b></li></ul></li><li>• Mixed Instructions (Middle + Outside Fish)</li><li>• Mixed Practice Trials (8) x up to 3<ul style="list-style-type: none"><li>◦ <b>500 msec Blank → Inf. Stim. → 1000 msec feedback</b></li></ul></li><li>• Mixed Trials (65)<ul style="list-style-type: none"><li>◦ <b>500 msec Blank → 1500/2000 msec Stim. → 1000 msec feedback</b></li></ul></li></ul>
<b>Block Design:</b>	<p><b>Blue (Middle) Fish Practice (4) x up to 3:</b></p> <ul style="list-style-type: none"><li>◦ Press in the direction the MIDDLE fish is facing</li><li>◦ All trials are Blue (Middle Fish)</li><li>◦ <i>Passing Criteria:</i> If subject misses 2 or more, or the experimenter selects NO for “Continue?” the program runs an additional practice (up to 3)</li></ul>

**FLANKER with fish stimuli**

**[Flanker task with the fish stimuli should be called 'Flanker' in any publications]**

	<ul style="list-style-type: none"><li>○ Displayed indefinitely until the subject responds [Currently Only in TouchScreen Versions, the Keyboard version waits for a <b>correct</b> response.]</li><li>○ Positive/Negative feedback given by experimenter and by the program (audio and visual)</li></ul> <p><b>Blue (Middle) Fish Trials (17)</b></p> <ul style="list-style-type: none"><li>○ Discard 1<sup>st</sup> trial</li><li>○ No Positive/Negative feedback given by the program</li><li>○ 16 Included Trials (8 Right/8 Left)<ul style="list-style-type: none"><li>▪ 4 Congruent trials (2R/2L)</li><li>▪ 4 Incongruent trials (3R/1L)</li><li>▪ 4 No Distractor trials (2R/2L)</li><li>▪ 4 Neutral trials (2R/2L)</li></ul></li><li>○ Subject may respond until the end of the stimulus' presentation</li></ul> <p><b>Pink (Outside) Fish Practice (4) x up to 3:</b></p> <ul style="list-style-type: none"><li>○ Press in the direction the OUTSIDE fish is facing</li><li>○ All trials are Pink (Outside Fish)</li><li>○ <i>Passing Criteria:</i> If subject misses 2 or more, or the experimenter selects NO for "Continue?" the program runs an additional practice (up to 3)</li><li>○ Displayed indefinitely until the subject responds.</li><li>○ Positive/Negative feedback given by experimenter and by the program (audio and visual)</li></ul> <p><b>Pink (Outside) Fish Trials (17)</b></p> <ul style="list-style-type: none"><li>○ Discard 1<sup>st</sup> trial</li><li>○ No Positive/Negative feedback given by the program</li><li>○ 16 Included Trials (8 Right/8 Left)<ul style="list-style-type: none"><li>▪ 4 Congruent trials (2R/2L)</li><li>▪ 4 Incongruent trials (3R/1L)</li><li>▪ 4 No Distractor trials (2R/2L)</li><li>▪ 4 Neutral trials (2R/2L)</li></ul></li><li>○ Subject may respond until the end of the stimulus' presentation</li></ul> <p><b>Mixed (Inside + Outside) Fish Practice (8) x up to 3:</b></p> <ul style="list-style-type: none"><li>○ For Blue Fish, press where the MIDDLE fish is facing and for Pink Fish, press where the OUTSIDE fish are facing</li><li>○ <i>Passing Criteria:</i> If subject misses 3 or more, or the experimenter selects NO for "Continue?" the program runs an additional practice (up to 3)</li><li>○ Displayed indefinitely until the subject responds</li><li>○ Positive/Negative feedback given by experimenter and by the program (audio and visual)</li></ul> <p><b>Mixed Fish Trials (65)</b></p> <ul style="list-style-type: none"><li>○ Discard 1<sup>st</sup> trial</li><li>○ No Positive/Negative feedback given by the program</li><li>○ 64 Included Trials (32 Right/32 Left)<ul style="list-style-type: none"><li>▪ 16 Congruent trials (8R/ 8L)</li><li>▪ 16 Incongruent trials (8R/8L)</li><li>▪ 16 No Distractor trials (8R/ 8L)</li><li>▪ 16 Neutral trials (8R/ 8L)</li></ul></li><li>○ Subject may respond until the end of the stimulus' presentation</li></ul>
<b>Responses:</b>	<ul style="list-style-type: none"><li>• <b>Directions:</b> advance with the &lt;Enter&gt; key by the experimenter</li><li>• <b>Done?:</b> If this was sufficient practice select '<b>Y</b>' for yes, otherwise '<b>N</b>' for no</li><li>• <b>Do you want to leave the game?</b> If you want to quit the game altogether press '<b>Y</b>'. Otherwise, '<b>N</b>' to continue with the game.</li></ul>

### FLANKER with fish stimuli

#### [Flanker task with the fish stimuli should be called 'Flanker' in any publications]

	<ul style="list-style-type: none"><li>• <b>Practice:</b> advanced by CORRECT response from participant</li><li>• For KeyPress Responses are &lt;Ctrl&gt; (Left-hand) and the Number Pad's &lt;Enter&gt; (Right-hand) on a standard keyboard.</li><li>• For TouchScreen, Responses are Left-hand and Right-hand presses to TouchScreen buttons.</li></ul>
<b>Buttons:</b>	<b>TouchScreen:</b> <ol style="list-style-type: none"><li>1. Mouse Button 0 (Left-Click)</li><li>2. Enter</li><li>3. Y</li><li>4. N</li></ol> <b>Keyboard:</b> <ol style="list-style-type: none"><li>1. Enter</li><li>2. Y</li><li>3. N</li><li>4. Ctrl</li><li>5. Num Enter</li></ol>

<b>Data</b>	<ul style="list-style-type: none"><li>• Data saved at the end of <b>each trial</b> (not just at the end of the game.)</li><li>• <b>DATA (saved as comma delimited .txt file – “FlankerFish_subjectID.txt”)</b> <b>Combining output files</b> To collect all the output files into one excel file, use 'Combine-O-Files'. Place the executable file CombineData.exe into the My Documents Folder. Double click on the exe file to run the program. A window will open with a navigation box. Navigate to the folder that contains only the files you want to combine. Note that moving Presentation's log files may be necessary – they may be listed as .txt files on some computers. Once the folder selected with the appropriate files, press “Compile” – the default Options should work. The output will be one excel file.</li></ul> <b>DATA KEY:</b> <table><tr><td><b>SubjectID</b></td><td>Subject's unique ID code</td></tr><tr><td><b>Experiment</b></td><td>Name of Experiment (FlankerFish)</td></tr><tr><td><b>BlockNo</b></td><td>1 = Blue (Middle) Block, 2 = Pink (Outside) Block, 3 = Mixed Block</td></tr><tr><td><b>TrialNo</b></td><td>The order in which the trial was given (counting starts over for each block)</td></tr><tr><td><b>IsTrial</b></td><td>Is this an actual trial? 0 = no this is practice, 1 = yes this is a trial</td></tr><tr><td><b>TrialName</b></td><td>The name of the trial</td></tr><tr><td><b>TrialType</b></td><td>1 = Congruent, 2 = Incongruent, 3 = No Distractor, 4 = Neutral</td></tr><tr><td><b>InOut</b></td><td>1 = Inside/Blue trial, 2 = Outside/Pink trial</td></tr><tr><td><b>ExpRes</b></td><td>The side on which the subject should press: 1 = Left, 2 = Right</td></tr><tr><td><b>Response</b></td><td>The actual response given by the subject: 1 = Left, 2 = Right, 0 = None</td></tr><tr><td><b>Correct</b></td><td>1 = Correct, 0 = Incorrect</td></tr><tr><td><b>RT</b></td><td>Reaction time given in msec (0 means no response was given)</td></tr></table>	<b>SubjectID</b>	Subject's unique ID code	<b>Experiment</b>	Name of Experiment (FlankerFish)	<b>BlockNo</b>	1 = Blue (Middle) Block, 2 = Pink (Outside) Block, 3 = Mixed Block	<b>TrialNo</b>	The order in which the trial was given (counting starts over for each block)	<b>IsTrial</b>	Is this an actual trial? 0 = no this is practice, 1 = yes this is a trial	<b>TrialName</b>	The name of the trial	<b>TrialType</b>	1 = Congruent, 2 = Incongruent, 3 = No Distractor, 4 = Neutral	<b>InOut</b>	1 = Inside/Blue trial, 2 = Outside/Pink trial	<b>ExpRes</b>	The side on which the subject should press: 1 = Left, 2 = Right	<b>Response</b>	The actual response given by the subject: 1 = Left, 2 = Right, 0 = None	<b>Correct</b>	1 = Correct, 0 = Incorrect	<b>RT</b>	Reaction time given in msec (0 means no response was given)
<b>SubjectID</b>	Subject's unique ID code																								
<b>Experiment</b>	Name of Experiment (FlankerFish)																								
<b>BlockNo</b>	1 = Blue (Middle) Block, 2 = Pink (Outside) Block, 3 = Mixed Block																								
<b>TrialNo</b>	The order in which the trial was given (counting starts over for each block)																								
<b>IsTrial</b>	Is this an actual trial? 0 = no this is practice, 1 = yes this is a trial																								
<b>TrialName</b>	The name of the trial																								
<b>TrialType</b>	1 = Congruent, 2 = Incongruent, 3 = No Distractor, 4 = Neutral																								
<b>InOut</b>	1 = Inside/Blue trial, 2 = Outside/Pink trial																								
<b>ExpRes</b>	The side on which the subject should press: 1 = Left, 2 = Right																								
<b>Response</b>	The actual response given by the subject: 1 = Left, 2 = Right, 0 = None																								
<b>Correct</b>	1 = Correct, 0 = Incorrect																								
<b>RT</b>	Reaction time given in msec (0 means no response was given)																								

#### **Comment regarding the 'Esc' key, the log file and the txt data file.**

Neurobehavioral Systems have finally decided that the 'Esc' key can be disabled. That decision occurred on Nov 12, 2009 and the change will appear in the next release of Presentation. Until the change occurs, it is easy to exit any of our Presentation tasks via the 'Esc' key which causes the program to immediately shut down.

All of our Presentation tasks have been programmed to save data only if the game reaches its natural conclusion. This behavior is the recommended program design within the Presentation documentation and has always been true. The

### **FLANKER with fish stimuli**

#### **[Flanker task with the fish stimuli should be called 'Flanker' in any publications]**

reason is to prevent potential larger timing uncertainties caused by the operating system accessing the hard disk at critical timing moments (i.e. when detecting a response from the touch screen).

Combining the behavior of the 'Esc' key – which can not carry a script to save an output .txt file – and the tasks' design of only saving at the end, has meant that no output .txt file would be created if the task was stopped before completion. The Presentation log file - \*.log - does not contain response information from the touch screens. Thus, they cannot be used to recreate the \*.txt data. The log files provide quality control information (timing uncertainty). Note also that the response times differ slightly (a couple of ms) between the log file and txt file as they are captured at different points during the running of the task. Mixing the response times from the log and txt files would result in decreased accuracy of measurement.

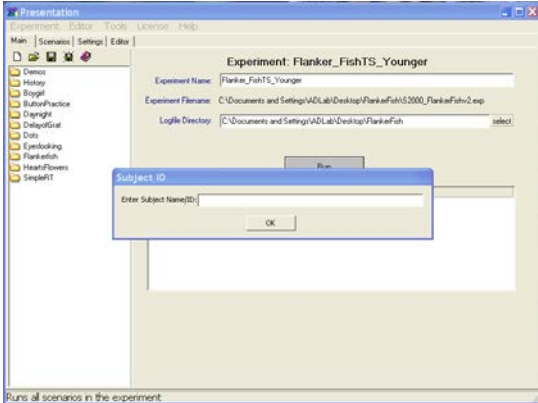
## FLANKER with fish stimuli

[Flanker task with the fish stimuli should be called 'Flanker' in any publications]

### FLANKER FISH

#### A) Starting Flanker FISH

Enter the participant's unique identifier in **SubjectID**.

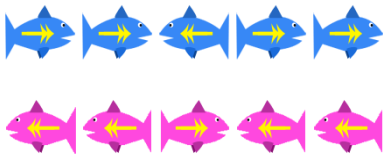


A black screen will appear with **“Ready...”**. Press the **enter** key to continue.

The next screen will be white with **“Number:”** centered. Please enter again the participant's unique identifier (the same as SubjectID).

#### B) Demonstrating the Blue Fish Game

The next screen has the caption **“In this game, you’re going to see lots of fish like these! Your job is to feed the hungry fish!”**

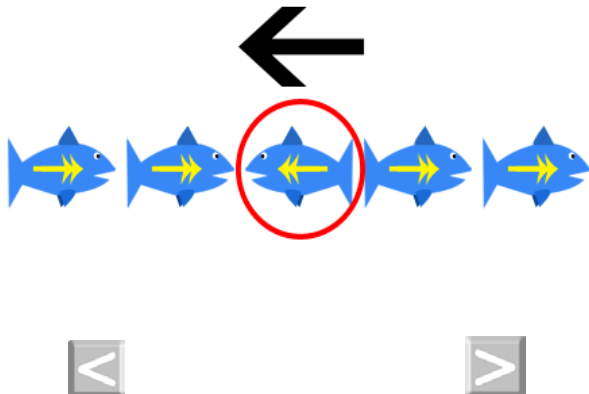


Press **enter**.

In this game the subjects are told to press the button that the middle fish is facing.

The next screen has the caption **“When the fish are BLUE the hungry fish is in the MIDDLE! Feed the MIDDLE fish by pressing where it’s facing. Here, the middle fish is facing this way!”** (The arrow is pointing left.)

Experimenter says “In this game you get to feed the hungry fish! The hungry fish is in the middle, feed the middle fish by pressing where it’s facing!” See the middle fish is facing this way so you press this button.”



### FLANKER with fish stimuli

**[Flanker task with the fish stimuli should be called 'Flanker' in any publications]**

To advance to the next screen, the tester **presses the screen** to the left of the left button



The next screen has three parts. The top caption says “**Sometimes the MIDDLE fish will be all by himself! You should still press where he’s facing!**”



The middle caption says “**Sometimes the MIDDLE fish will have company that’s going in another direction! You should still press where the middle fish is facing!**”



The bottom caption says, “**Your job is to feed the MIDDLE fish!**”





Press **enter**.

The next screen has “**Let’s Practice!**” in the upper centre. If the participant is ready, then press **enter**.

#### **C) Practicing the Blue Fish Game**

The participant now can practice the task as set out above. There is no time limit. The task will advance to the next screen

when the participant pushes the screen to the left or right of the left  button or the right  button.

#### **i) Incorrect Response Path**

If the participant gives two incorrect responses, a screen with “**Remember...**” appears.

Press **enter** to advance.

A screen with the caption, “**When the fish are BLUE, the hungry fish is in the MIDDLE! Feed the MIDDLE fish by pressing where it’s facing. Here, the middle fish is facing this way!**” (Note the arrow is point left).



To advance to the next screen, the tester **presses the screen** to the left of the left button



The participant then continues practicing. *Passing Criteria:* If subject misses 2 or more, or the experimenter selects NO for “Done?” the program runs an additional practice (up to 3).

### FLANKER with fish stimuli

[Flanker task with the fish stimuli should be called 'Flanker' in any publications]

#### ii) Correct Response Path

If the participant passes the practice session, then a screen with the words “**Done?**” appears. The answer is either **Y** for yes and **N** for no.

Then a screen with the words “**Nice Job!! Now it's time to play the game for real!**” or “**Great!! Now it's time to play the game for real!**” or “**Nice! Now it's time to play the game for real!**”

Press **enter** to advance.

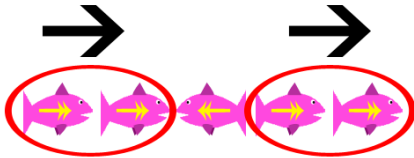
The blue fish game begins with each trial limited in time.

#### D) The Pink Fish Game.

After the participant completes the Blue fish game, then a screen with the words “**Great job!! Now a new rule!**”

Press **enter** to advance.

Then a screen with the caption “**When the fish are PINK all the OUTSIDE fish are hungry! Feed the fish on the OUTSIDE by pressing where they're facing. Here, the outside fish are facing this way.**” (Note the arrows pointing right.)



To advance to the next screen, the tester **presses the screen** to the right of the right button



The next screen has the top caption “**Sometimes there won't be a middle fish! You should still press where the OUTSIDE fish are facing!**”



The middle caption says “**And sometimes the other fish will be going somewhere else! You should still press where the OUTSIDE fish are facing!**”



The bottom caption says “**Your job is to feed the OUTSIDE fish!**”

Press **enter** to continue

The next screen says “**Let's Practice!**” in the upper centre.

The practice session and the game session follows the same pattern as for the first Blue fish block.

If the participant passes the practice session, then a screen with the words “**Done?**” appears. The answer is either **Y** for yes and **N** for no.

Then a screen with the words “**Nice Job!! Now it's time to play the game for real!**” or “**Great!! Now it's time to play the game for real!**” or “**Nice! Now it's time to play the game for real!**”

Press **enter** to advance.

### FLANKER with fish stimuli

[Flanker task with the fish stimuli should be called 'Flanker' in any publications]

The pink fish game ends with a screen saying “**That was wonderful!**”

Press **enter** to advance.

#### **E) The Mixed (Blue and Pink Fish) Game.**

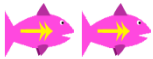
The next screen says “**Now you’re going to play the game with BOTH colors. So try really hard to remember the rules!**”

Press **enter** to advance.

A colorful screen appears with the top caption “**Blue means feed the MIDDLE! Press where the MIDDLE fish is facing!**”



The middle caption says “**Pink means feed the OUTSIDE! Press where the OUTSIDE fish are facing!**”



The bottom caption says “**Blue – MIDDLE! Pink – OUTSIDE!**”



Press **enter** to advance.

The next screen says “**Let’s Practice!**” in the upper centre.

The practice session and the game session follows the same pattern as for the Blue fish and Pink fish blocks.

If the participant passes the practice session, then a screen with the words “**Done?**” appears. The answer is either **Y** for yes and **N** for no.

Then a screen with the words “**Nice Job!! Now it’s time to play the game for real!**” or “**Great!! Now it’s time to play the game for real!**” or “**Nice! Now it’s time to play the game for real!**”

Press **enter** to advance.

The mixed Blue fish and Pink fish game begins.

The game **ends** with a cheer!

## **Data Analysis**

When we analyze the data, we filter out trials (not subjects) with response times less than 250ms.

And, we filter out trial 1 for all three blocks of a subject.

And, we analyze only the actual trials and not the practice sessions.

For response times, we also analyze only response times that had a correct response. And, including all the previous filters, we also filter out response times that exceed an upper and lower threshold of mean RT + 2\*SD. We do this per block per subject.

These are some notes Adele made on Flanker analysis:

Blue trials are standard flanker trials (i.e., ignore flankers)



**FLANKER with fish stimuli**  
**[Flanker task with the fish stimuli should be called 'Flanker' in any publications]**

Block 1 assesses selective attention (ability to inhibit visual distraction)

Pink trials are reverse flanker trials (i.e., ignore center stimulus)

Block 2 assesses selective attention (ability to inhibit visual distraction) + to do the opposite of what you had been doing (ability to inhibit old and switch to new)

Mixed block (pink and blue trials randomly intermixed)

requires more of all 3 core EFs – working memory, inhibitory control, & cognitive flexibility

like any of the many complex span tasks, it is messy in that it taxes more than one EF, but like the complex span tasks it can, for that reason, be especially good for detecting individual or group differences

Flanker effect = speed on incongruent trials minus speed on congruent trials

one could also look at speed on incongruent trials minus speed on all other trials (as all other trials are easy)

Look at %correct on each block

Look at %correct on just the incongruent trials in each block

Look at flanker effect in each Block (omitting incorrect trials, trials that were too fast to have been in response to the stimulus, and for Block 3 omitting all switch trials)

for calculating flanker effect – use incongruent vs. congruent, and also use incongruent vs. all other types

Look at switch costs in Block 3 (switching from B to P and from P to B vs. a P trial following a P trial, and a B trial following a B trial)

A simple measure of inhibition at the level of attention (executive attention) is percent correct or flanker effect on Block 1

One measure of cognitive flexibility: Look at switch costs in Block 3

Flanker effect: Incongruent minus Congruent and Irrelevant over Congruent and Irrelevant.

flanker effect should be incongruent minus (congruent and no distractor) over congruent and no distractor

Here are some comments about how we analyze data.

#### Data Filtering

The raw data before analysis is filtered listwise on several variables. The rows in the data file that are excluded are those where

- a) Trial Number is 1. (In a three block task, three trials will be discarded: one for each block.)
- b) Response Times less than 250 ms
- c) Correct is 0 (that is incorrect).

Because:

**FLANKER with fish stimuli**  
**[Flanker task with the fish stimuli should be called 'Flanker' in any publications]**

The tasks are designed to have the first trial discarded due to the probability that the response time will be an outlier. The subject may hesitate on the first trial.

Response Times less than 250 ms are discarded also due to the probability that it is an outlier. The subject may have responded without relation to the task.

We usually analyze correct responses.

In general, a case is included such that: TrialNo>1 and Correct = 1 and RT >250.

We also filter for outliers using a lower and upper threshold of 2 standard deviations from the mean response time (RT) per block per subject. The mean is calculated after the above filter.

Just to note that sometimes the terminology can be confusing. 'trial'

usually means the individual presentation of stimuli. 'trials' usually means block of trials that is neither the practice session nor a demonstration session. The output data variable IsTrial (which is "1" for the actual trials) can help to isolate the useful response times. We don't normally analyze practice or demonstration sessions.

The output data variable BlockNo is used to isolate the response times per rule (congruent, incongruent, etc.).

Other useful output data variables describe which side the subject should have selected, and what the rule for a particular trial was.

For hypothesis testing, we may calculate difference scores. That is, the difference of the response time depending on the question being asked. For example, a difference score may be created from the difference between Block 2 and Block 1 response times.

Because of the multiple measurements per subject, and the multiple measurements per condition (Block), you may want to analyze the data using a mixed linear model (hierarchical linear model). This models not just the mean of the response time, but its covariance structure. The model also has the advantage where the groups are unbalanced.

"It is a mistake and a considerable waste of time to script a task when it hasn't been defined. I always analyze our studies in SPSS in an ad hoc manner so I can quickly change tack. Which is just to say I choose the functions I'm going to use when I need to use them and modify them when I need to modify them."

and

"Analyze the results at the individual trial level (trials nested within blocks)"

I don't think performance on congruent trials and no-flanker trials is pretty comparable. Kids seem to get confused by neutral distractor trials, so their performance is worse there, and we now analyze those trials separately.

We analyze:

accuracy and RT for accurate responses (omitting RT for Trial 1 in each block) and counting as incorrect or missing any trials where RT is too fast to have been in response to the stimulus (250 ms):

Block 1 overall

Block 2 overall

Block 3 overall

The flanker effect in each block:

([RT for incongruent trials] minus (RT for easy trials [congruent & no flanker])) divided by (RT for congruent & no flanker)

repeat for Block 3, including ONLY no-switch trials (since Flanker blocks are typically all no-switch trials)

can also look without dividing the difference by anything

**FLANKER with fish stimuli**

**[Flanker task with the fish stimuli should be called 'Flanker' in any publications]**

((accuracy for easy trials [congruent & no flanker]) minus (accuracy for incongruent trials)) divided by (accuracy for incongruent trials)

repeat for Block 3, including ONLY no-switch trials (since Flanker blocks are typically all no-switch trials)

can also look without dividing the difference by anything

The local switch cost:

In Block 3 – difference in RT and accuracy on the switch versus the non-switch trials

The global switch cost:

Difference in RT and accuracy for trials in Block 3 minus trials in Blocks 1 and 2

\*\*\*

In the latest version of the Flanker / Reverse Flanker we now have 65 trials in Block 3 (the mixed block). This is an increase from earlier versions.

Flanker/Reverse Flanker trial types: The combination of the 3 easy types of trials should be greater than the number of incongruent trials. The reason is that you get a stronger flanker effect when there are relatively infrequent incongruent trials. see:

Lehle, C., & Hübner, R. (2008). On-the-fly adaptation of selectivity in the flanker task. *Psychonomic Bulletin & Review*, 15(4), 814-818.

In our latest version of Flanker, the ratio is now 75% easy, 25% incongruent (Version 11 and greater of Flanker).