Report

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Contents


```
library(tidyverse)
library(here)
library(kableExtra)
library(ggeffects)
```

```
qtheme <- function(){
    theme_minimal(base_size = 12)
}

qtab <- function(data){
  data %>%
    kable(digits = 3) %>%
    kable_styling(bootstrap_options = c("striped", "condensed"),
                  full_width = FALSE)
}

get_threshold <- function(fit){
  -(coef(fit)[1]/coef(fit)[2])
}

get_slope <- function(fit){
  1/coef(fit)[2]
}
```

```
file <- "local-files/1_(2022-03-18_09-31-23).csv"
dat <- read_csv(here(file))
```

```
if (dat$subject[1] == "1") {
  # reverse scores
  dat$test <- ifelse(dat$test == "same", "change", "same")
}

dat <- dat %>%
  mutate(acc = ifelse(type == test, 1, 0),
```

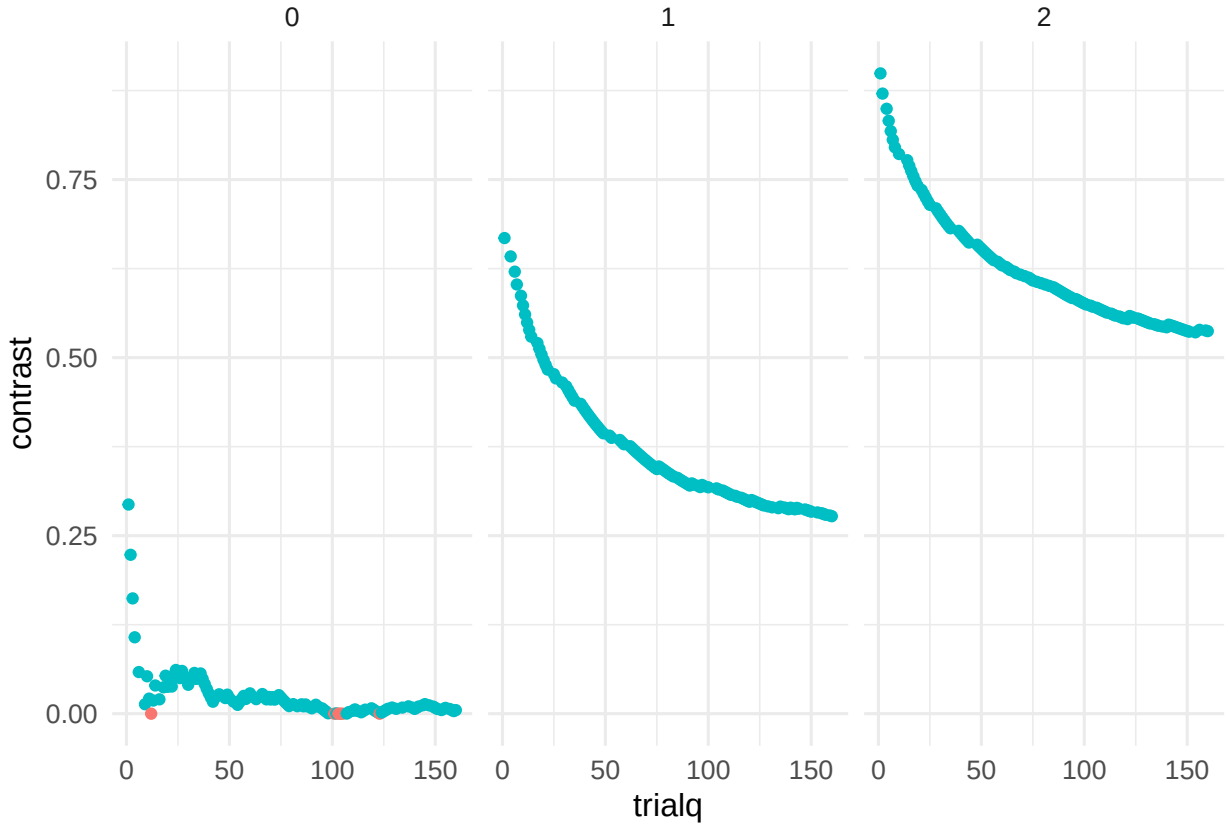
```
        pasf = factor(pas),
        questf = factor(quest),
        is_signal = factor(ifelse(trial_type == "valid", 1, 0)),
        say_signal = factor(ifelse(pas < 2, 0, 1)))
```

1 Report

1.1 QUEST overview

This plot represent the overall QUESTs across the experiment for valid trials only. The red dot are the contrast 0 (this is an index on how low is the contrast across trials).

```
dat %>%
  group_by(quest) %>%
  mutate(trialq = 1:n(),
         contr = ifelse(contrast == 0, 0, 1)) %>%
  ungroup() %>%
  filter(trial_type == "valid") %>%
  ggplot(aes(x = trialq, y = contrast, color = factor(contr))) +
  geom_point(show.legend = FALSE) +
  facet_wrap(~quest) +
  qtheme()
```



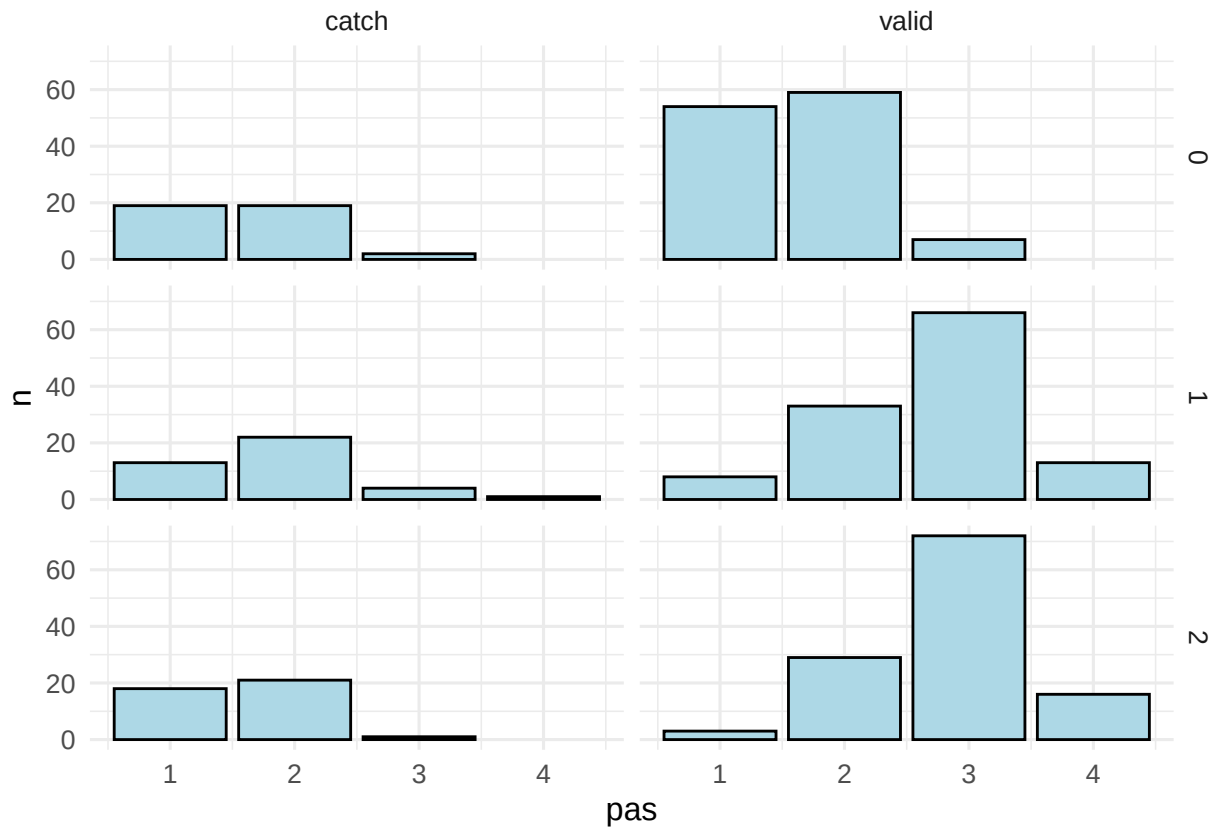
quest	mean	sd	min	first_quantile	median	third_quantile	max
0	0.025	0.038	0.000	0.007	0.013	0.026	0.294
1	0.370	0.091	0.277	0.300	0.338	0.412	0.668
2	0.624	0.084	0.536	0.556	0.598	0.669	0.899

This table is the average contrast with variability for each QUEST:

```
dat %>%
  filter(trial_type == "valid") %>%
  group_by(quest) %>%
  summarise(mean = mean(contrast),
         sd = sd(contrast),
         min = min(contrast),
         first_quantile = quantile(contrast, 0.25),
         median = median(contrast),
         third_quantile = quantile(contrast, 0.75),
         max = max(contrast)) %>%
  qtab()
```

This is the PAS distribution for QUEST and trial type (catch and valid):

```
dat %>%
  count(pas, trial_type, quest) %>%
  ggplot(aes(x = pas, y = n)) +
  geom_col(color = "black", fill = "lightblue") +
  facet_grid(quest~trial_type) +
  qtheme()
```



This is the table for PAS and QUEST contrast with variability:

```
dat %>%
  group_by(quest, pas) %>%
  summarise(mean = mean(contrast),
            sd = sd(contrast),
            ntrials = n(),
            min = min(contrast),
            first_quantile = quantile(contrast, 0.25),
            median = median(contrast),
            third_quantile = quantile(contrast, 0.75),
            max = max(contrast)) %>%
  qtab()
```

This table is the accuracy as a function of PAS and QUEST

```
dat %>%
  group_by(quest, pas) %>%
  summarise(acc = mean(acc),
            ntrials = n(),
            contrast = mean(contrast)) %>%
  qtab()
```

This is the relationship between accuracy and contrast:

quest	pas	mean	sd	ntrials	min	first_quantile	median	third_quantile	max
0	1	0.011	0.014	73	0.000	0.000	0.007	0.020	0.050
0	2	0.023	0.043	78	0.000	0.000	0.011	0.026	0.294
0	3	0.039	0.059	9	0.000	0.003	0.007	0.057	0.162
1	1	0.115	0.151	21	0.000	0.000	0.000	0.287	0.344
1	2	0.215	0.196	55	0.000	0.000	0.285	0.327	0.668
1	3	0.354	0.115	70	0.000	0.308	0.351	0.418	0.621
1	4	0.376	0.152	14	0.000	0.288	0.395	0.504	0.561
2	1	0.078	0.195	21	0.000	0.000	0.000	0.000	0.554
2	2	0.359	0.318	50	0.000	0.000	0.546	0.580	0.899
2	3	0.618	0.105	73	0.000	0.565	0.610	0.662	0.849
2	4	0.638	0.091	16	0.536	0.548	0.612	0.708	0.777

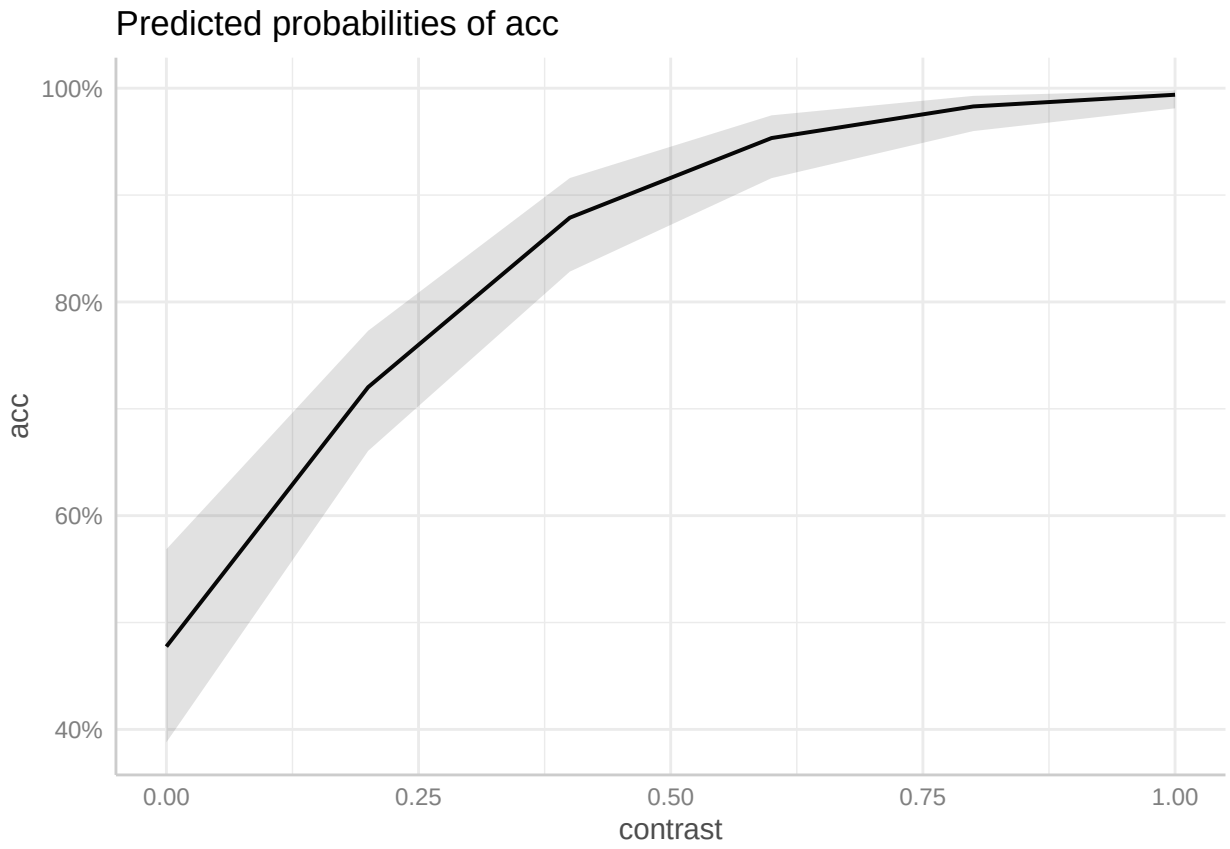
quest	pas	acc	ntrials	contrast
0	1	0.370	73	0.011
0	2	0.538	78	0.023
0	3	0.778	9	0.039
1	1	0.714	21	0.115
1	2	0.727	55	0.215
1	3	0.914	70	0.354
1	4	1.000	14	0.376
2	1	0.476	21	0.078
2	2	0.700	50	0.359
2	3	0.932	73	0.618
2	4	1.000	16	0.638

```
fit_con <- glm(acc ~ contrast,
               data = dat %>% filter(trial_type == "valid"),
               family = binomial(link = "logit"))

plot(ggeffect(fit_con))
```

```
## $contrast
```

quest	cr	fa	hit	miss	fa_rate	hit_rate	dprime	crit
0	19	21	66	54	0.525	0.550	0.063	-0.094
1	13	27	112	8	0.675	0.933	1.047	-0.977
2	18	22	117	3	0.550	0.975	1.834	-1.043



This is the signal detection analysis. Negative criterion value represent a tendency toward responding "yes" (liberal criterion)

```
dat %>%
  mutate(sdt = case_when(is_signal == 1 & say_signal == 1 ~ "hit",
                         is_signal == 1 & say_signal == 0 ~ "miss",
                         is_signal == 0 & say_signal == 1 ~ "fa",
                         is_signal == 0 & say_signal == 0 ~ "cr")) %>%
  count(sdt, quest) %>%
  pivot_wider(names_from = sdt, values_from = n) %>%
  mutate(fa_rate = fa/(fa + cr),
         hit_rate = hit/(hit + miss),
         dprime = qnorm(hit_rate) - qnorm(fa_rate),
         crit = -((qnorm(hit_rate) + qnorm(fa_rate))/2)) %>%
  qtab()
```

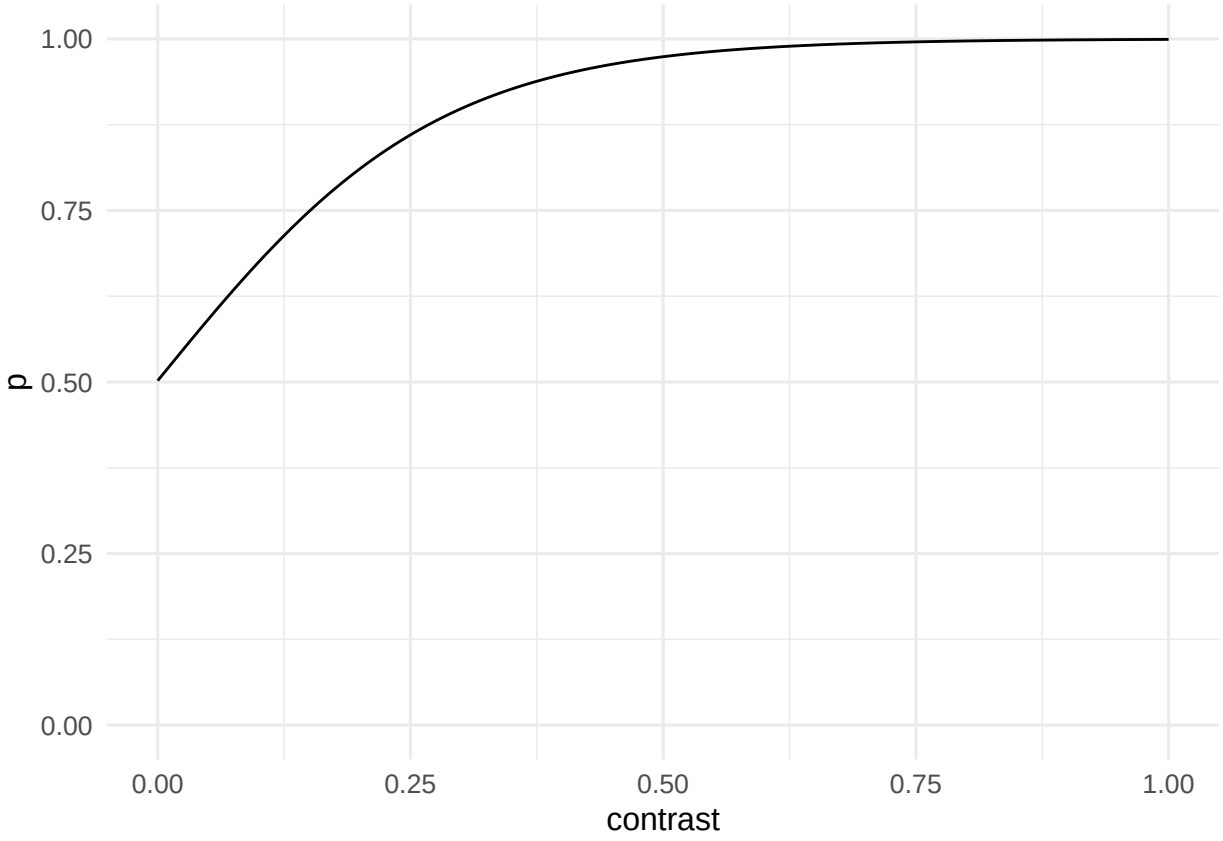
This is the psychometric function considering PAS 1 as 0 and PAS 234 as 1.

```r
fit_pas1_234 <- glm(vis ~ contrast,
           data = dat %>% filter(trial_type == "valid"),
           family = binomial(link = "logit"))

newdata <- data.frame(contrast = seq(0,1,0.001))

newdata$p <- predict(fit_pas1_234, newdata = newdata, type = "response")

ggplot(newdata) +
  geom_line(aes(x = contrast, y = p)) +
  ylim(c(0,1)) +
  qtheme()
```



The estimated 50% threshold is -0.001 and the slope is 0.138

This is the psychometric function considering PAS 12 as 0 and PAS 34 as 1. I'm not sure if this is meaningful but is a more plausible psychometric function

```r
dat$vis12 <- ifelse(dat$pas <= 2, 0, 1)

fit_pas12_34 <- glm(vis12 ~ contrast,
           data = dat %>% filter(trial_type == "valid"),
           family = binomial(link = "logit"))
```

```r
newdata <- data.frame(contrast = seq(0,1,0.001))

newdata$p <- predict(fit_pas12_34, newdata = newdata, type = "response")

ggplot(newdata) +
  geom_line(aes(x = contrast, y = p)) +
  ylim(c(0,1)) +
  qtheme()
```