pilot

Pilot

```
library(tidyverse)
library(estimatr)
library(ggplot2)
library(readr)


th <- theme_classic()
theme_set(th)
```

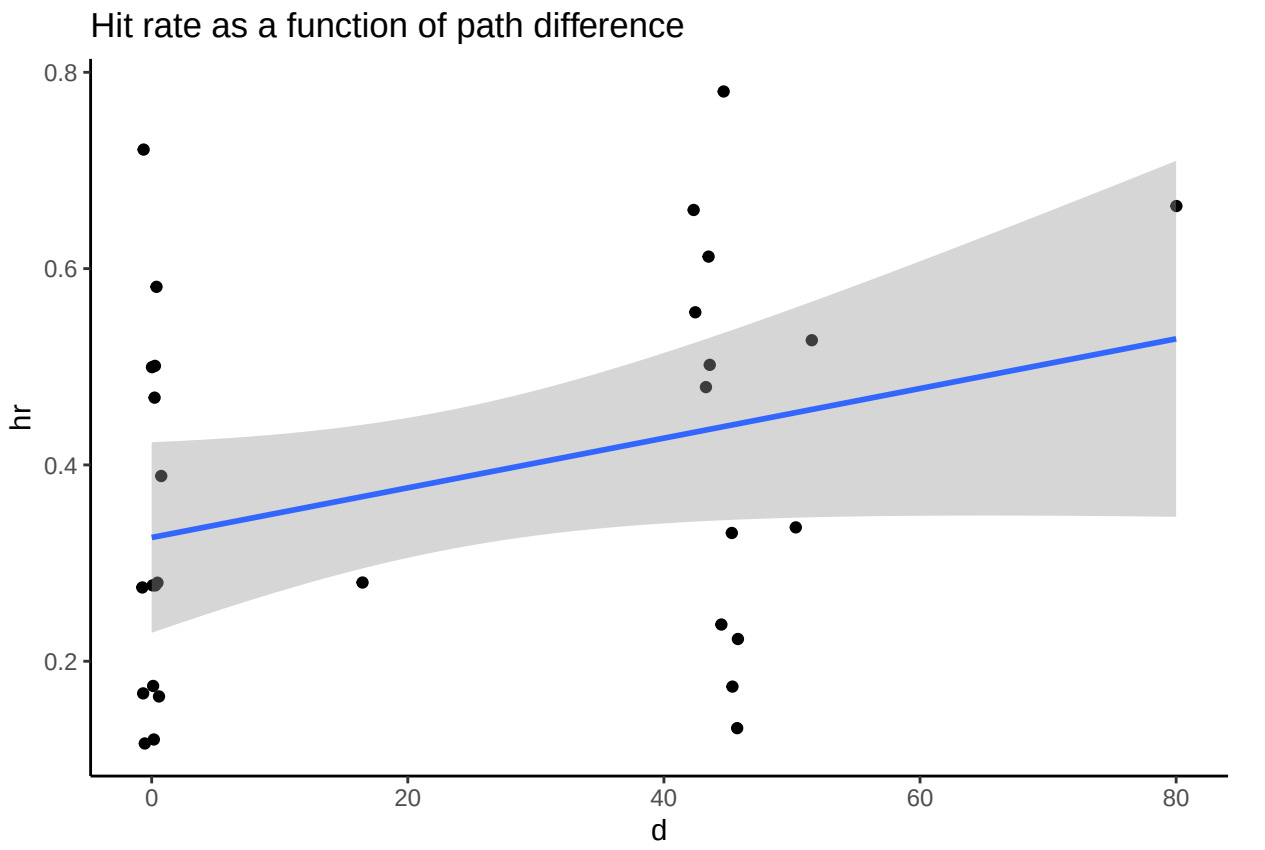
```
parsed_trials <- read_csv("~/output/experiments/pilot/parsed_trials.csv")
exp_data <- read_csv("~/output/scenes/pilot.csv") %>%
  rename(scene = id)
```

```
ate_data <- parsed_trials %>%
  left_join(exp_data, by = c("scene", "furniture", "move")) %>%
  mutate(resp_same = Response == "j",
         correct = !xor(base, resp_same))
```

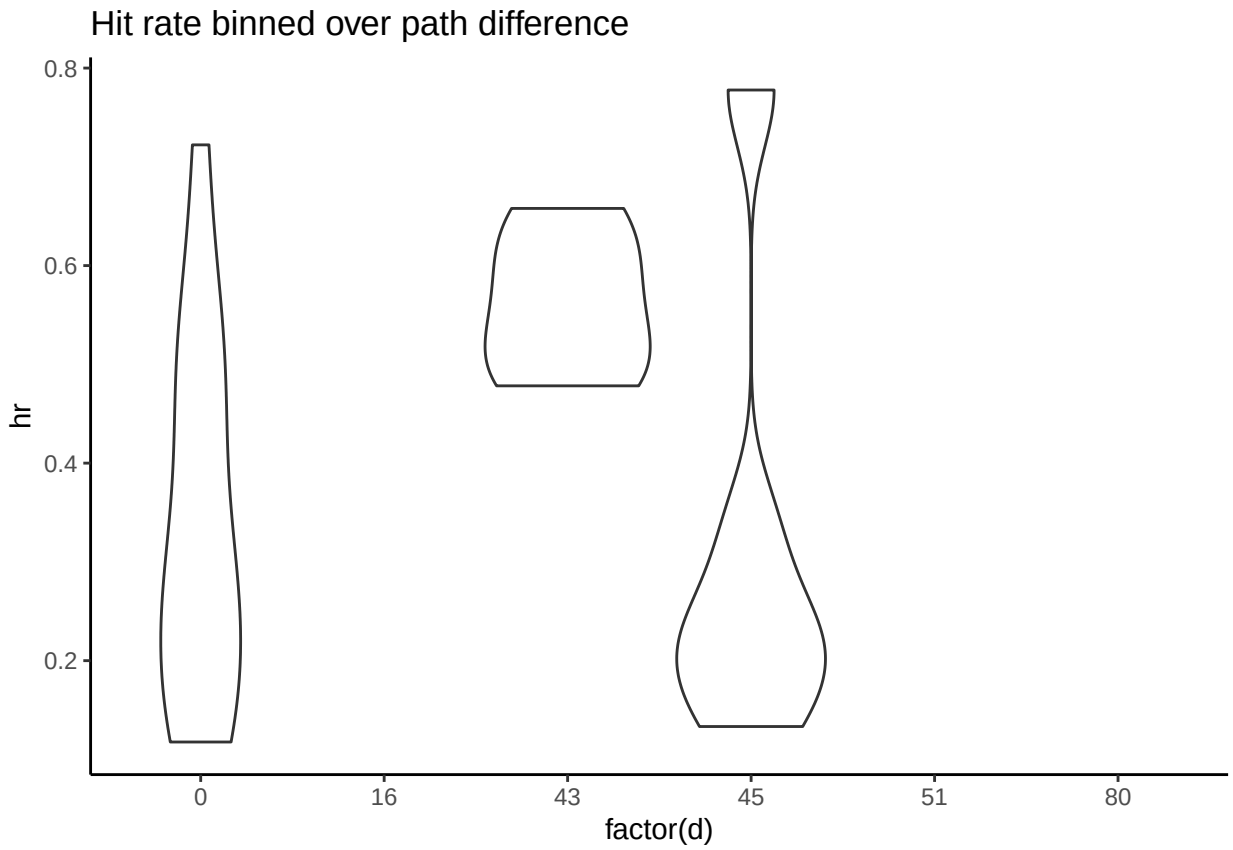
```
by_subj <- ate_data %>%
  group_by(ID)

hr_by_subj <- by_subj %>%
  filter(!base) %>%
  summarise(hr = mean(correct))

fp_by_subj <- by_subj %>%
  filter(base) %>%
  summarise(fp = 1.0 - mean(correct))

subject_performance <- hr_by_subj %>%
  left_join(fp_by_subj, by = "ID")

passed_subjects <- subject_performance %>%
  filter(hr > 1.5*fp)

good_data <- passed_subjects %>%
  left_join(ate_data)
```

```
by_trial <- good_data %>%
  group_by(scene, furniture, move)

hr_by_trial <- by_trial %>%
  filter(!base) %>%
  summarise(hr = mean(correct),
            d = mean(d))
```

```
hr_by_trial %>%
  ggplot(aes(x = d, y = hr)) +
  geom_jitter() +
  geom_smooth(method = "lm") +
  ggtitle("Hit rate as a function of path difference")
```



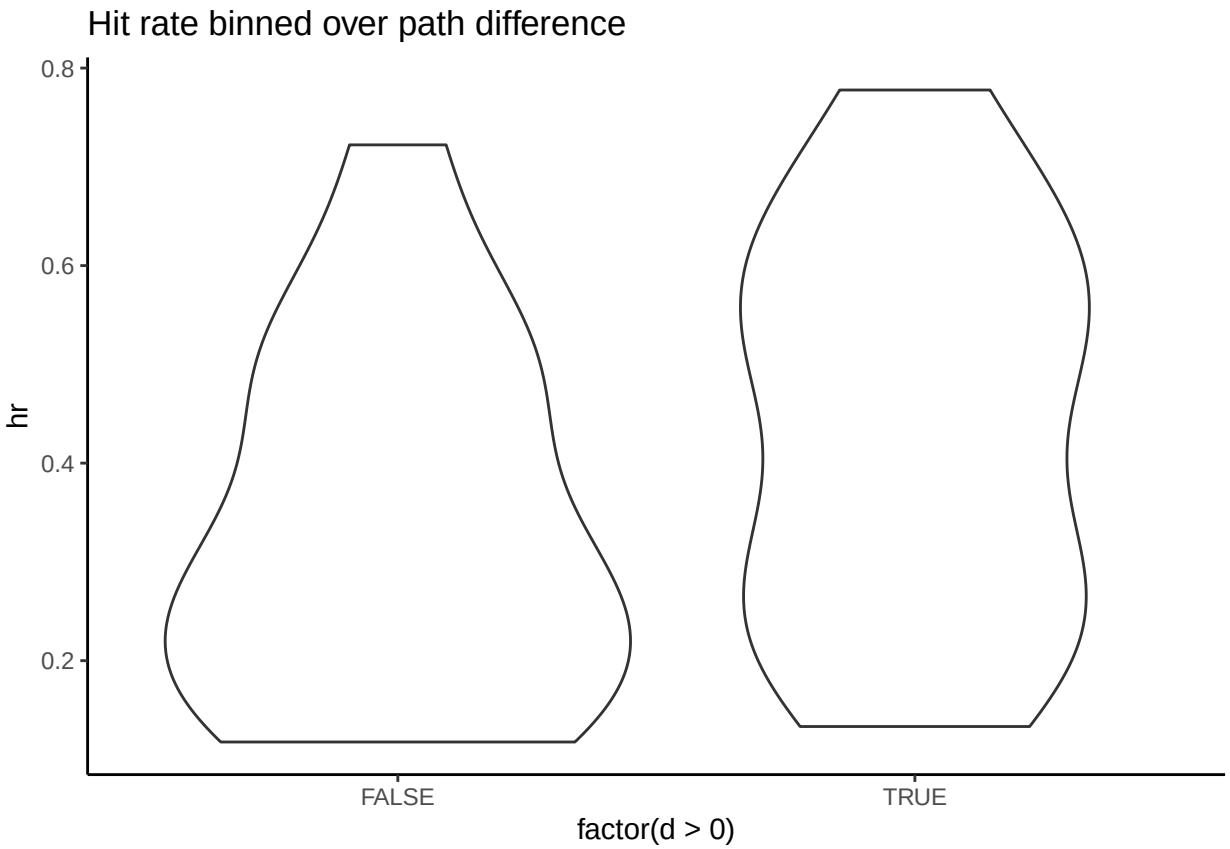

```
hr_by_trial %>%
  ggplot(aes(x = factor(d), y = hr)) +
  geom_violin() +
  ggtitle("Hit rate binned over path difference")
```




```
hr_by_trial %>%
  with(lm(hr ~ (d > 0))) %>%
  summary()
```

```
##
## Call:
## lm(formula = hr ~ (d > 0))
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.29923 -0.16563 -0.05697  0.15790  0.38747
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.33475    0.04992   6.706  2.8e-07 ***
## d > 0TRUE    0.09781    0.07059   1.386    0.177
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1933 on 28 degrees of freedom
## Multiple R-squared:  0.06417,    Adjusted R-squared:  0.03075
## F-statistic:  1.92 on 1 and 28 DF,  p-value: 0.1768
```

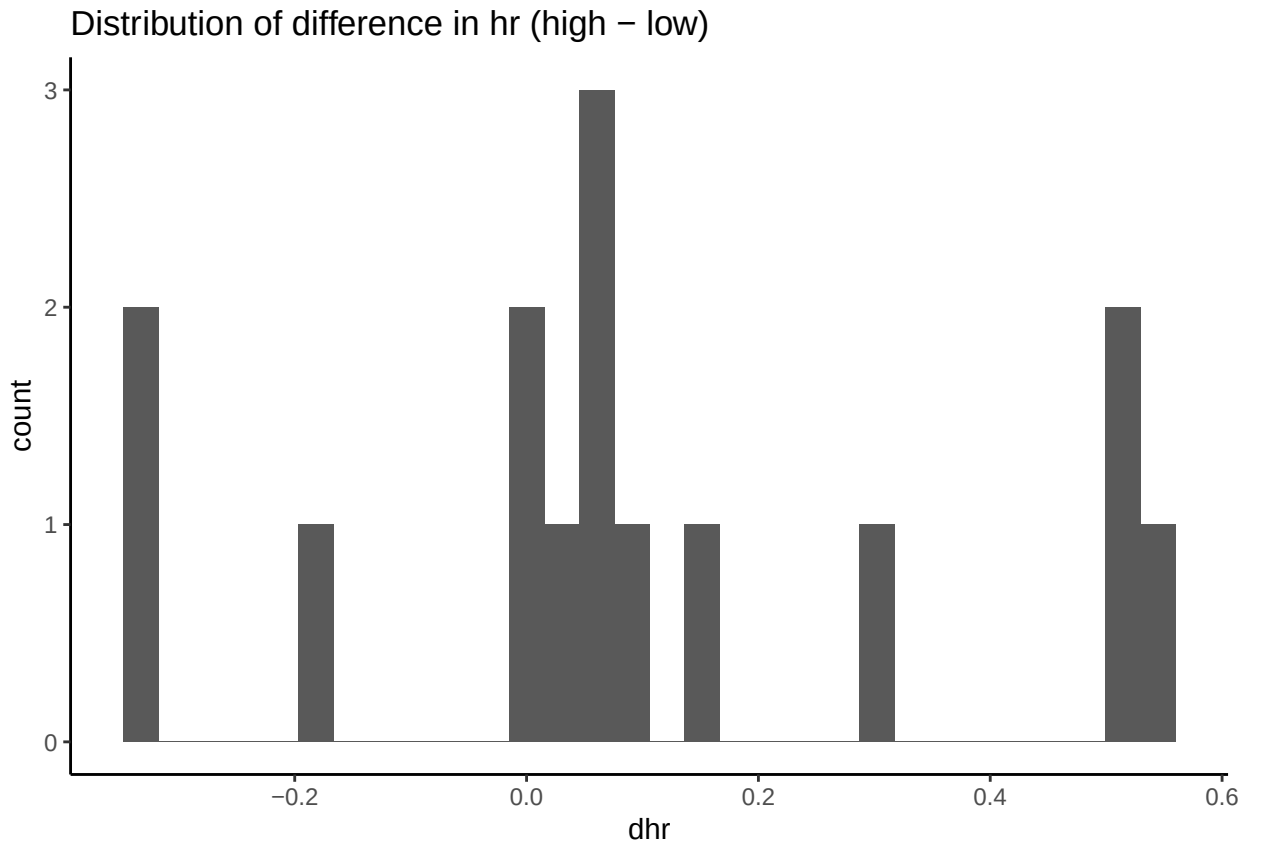
```
hr_by_trial %>%
  ggplot(aes(x = factor(d > 0), y = hr)) +
  geom_violin() +
  ggtitle("Hit rate binned over path difference")
```



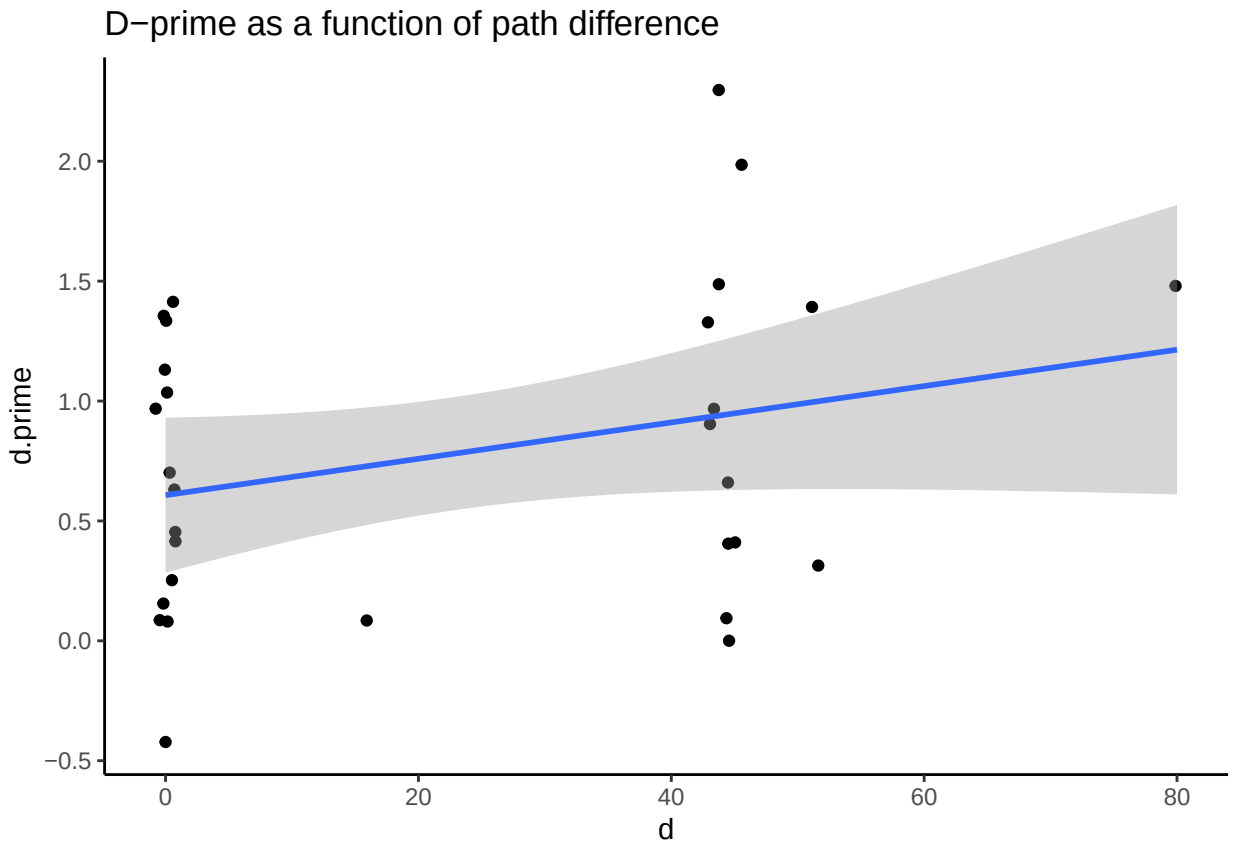

```
delta_hr_by_scene <- hr_by_trial %>%
  arrange(d) %>%
  group_by(scene) %>%
  summarise(dhr = diff(hr),
            dd = diff(d))


delta_hr_by_scene %>%
  with(lm(dhr ~ scale(dd))) %>%
  summary()
```

```
##
## Call:
## lm(formula = dhr ~ scale(dd))
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.43099 -0.08125 -0.03491  0.13333  0.46180
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.09781    0.06819   1.434    0.175
## scale(dd)    0.09484    0.07059   1.344    0.202
##
## Residual standard error: 0.2641 on 13 degrees of freedom
## Multiple R-squared:  0.1219, Adjusted R-squared:  0.05439
## F-statistic: 1.805 on 1 and 13 DF,  p-value: 0.2021
```

```r
delta_hr_by_scene %>%
  ggplot(aes(dhr)) +
  geom_histogram() +
  ggtitle("Distribution of difference in hr (high - low)")
```



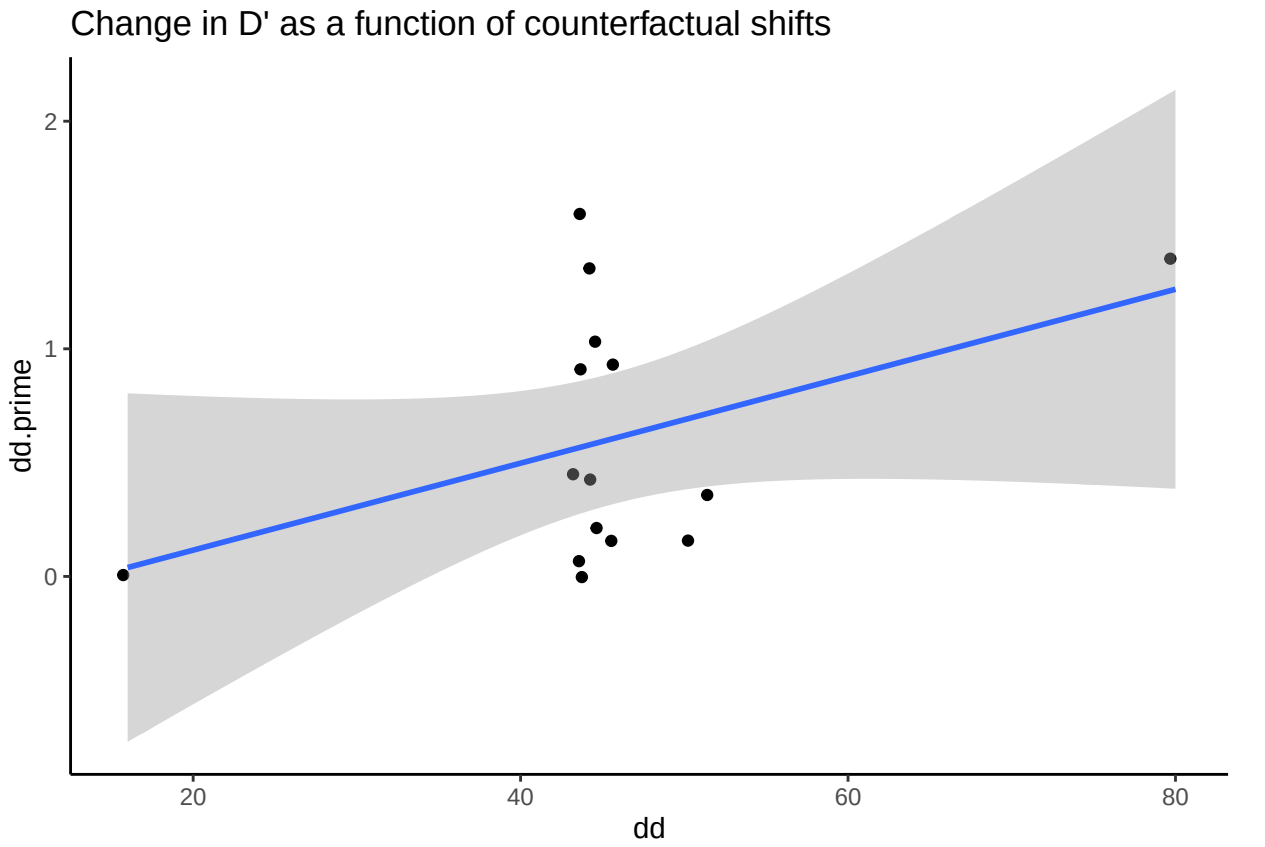

```r
fp_by_scene <- good_data %>%
  group_by(scene) %>%
  filter(base) %>%
  summarise(fp = 1 - mean(correct))

dprime_by_trial <- hr_by_trial %>%
  left_join(fp_by_scene, by = "scene") %>%
  mutate(d.prime = qnorm(hr) - qnorm(fp),
         zd = scale(d))

dprime_by_trial %>%
  ggplot(aes(x = d, y = d.prime)) +
  geom_jitter() +
  geom_smooth(method = "lm") +
  ggtitle("D-prime as a function of path difference")
```



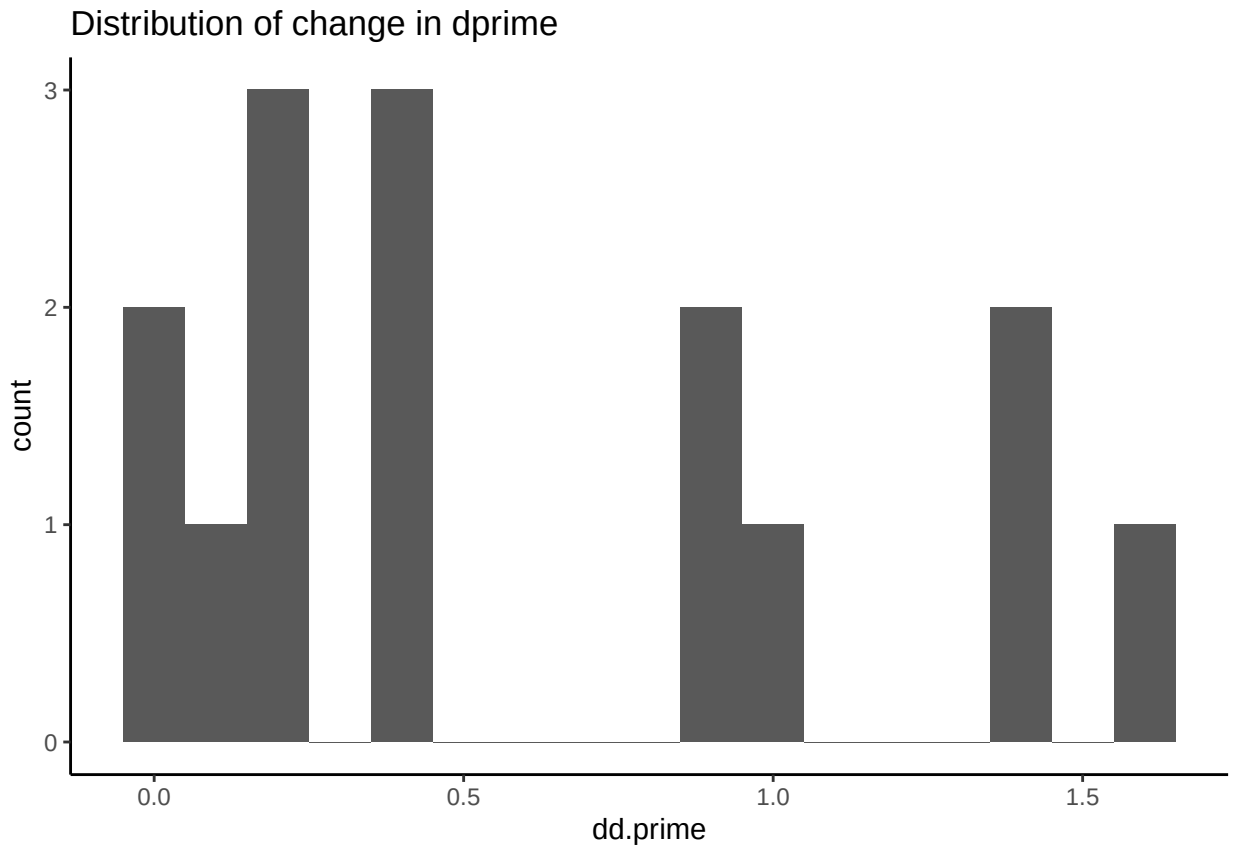

```
delta_dprime_by_scene <- dprime_by_trial %>%
  arrange(d) %>%
  group_by(scene) %>%
  summarise(dd.prime = abs(diff(d.prime)),
            dd = diff(d))


delta_dprime_by_scene %>%
  with(lm(dd.prime ~ dd)) %>%
  summary()
```

```
##
## Call:
## lm(formula = dd.prime ~ dd)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.5549 -0.4100 -0.1051  0.3469  1.0387
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.26652    0.52343  -0.509    0.619
## dd           0.01910    0.01112   1.718    0.109
##
## Residual standard error: 0.5159 on 13 degrees of freedom
## Multiple R-squared:  0.1851, Adjusted R-squared:  0.1224
## F-statistic: 2.953 on 1 and 13 DF,  p-value: 0.1094
```

```r
delta_dprime_by_scene %>%
  ggplot(aes(y = dd.prime, x = dd)) +
  geom_jitter() +
  geom_smooth(method = "lm") +
  ggtitle("Change in D' as a function of counterfactual shifts")
```




```r
delta_dprime_by_scene %>%
  ggplot(aes(x = dd.prime)) +
  geom_histogram(binwidth = 0.1) +
  ggtitle("Distribution of change in dprime")
```


Distribution of change in dprime
count
dd.prime
0
1
2
3
0.0
0.5
1.0
1.5