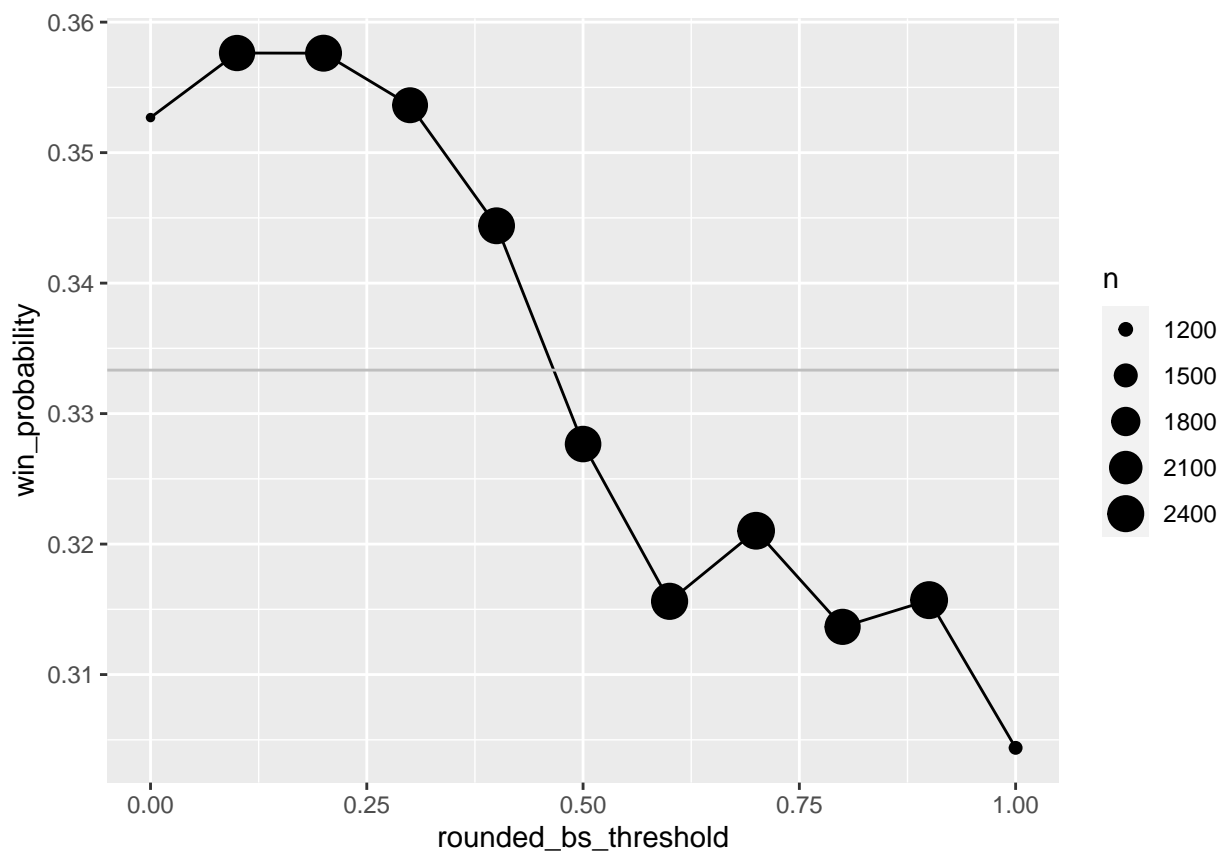# Cacho: Simulation Results

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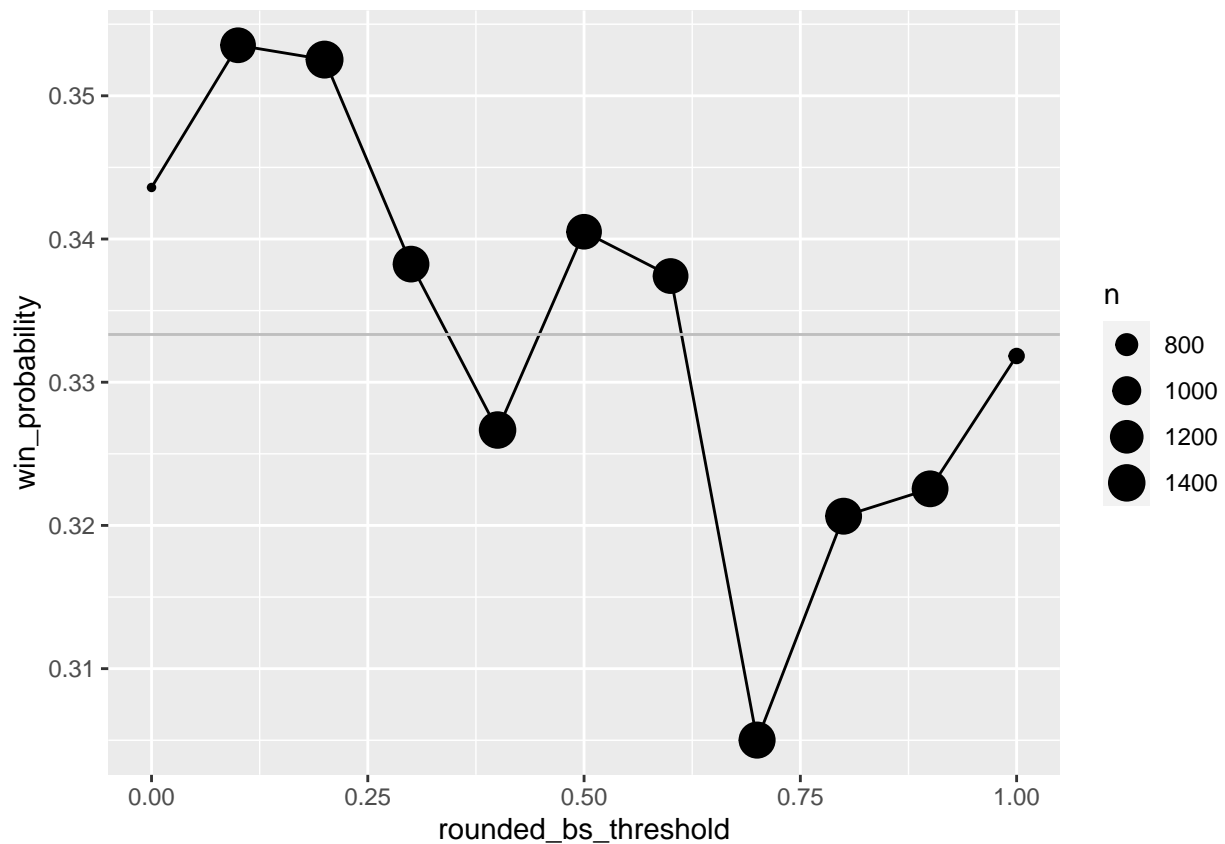
```r
simulation_results = simulation_data %>%
  mutate(rounded_bs_threshold = round(call_bullshit_threshold, 1)) %>%
  group_by(rounded_bs_threshold) %>%
  summarise(win_probability = mean(win_bool), n = n())


ggplot(simulation_results, aes(x=rounded_bs_threshold, y=win_probability)) +
  geom_point(aes(size=n)) +
  geom_line() +
  geom_hline(yintercept = 1/3, color = 'grey')
```



```r
simulation_results2 = sim_data2 %>%
  mutate(rounded_bs_threshold = round(call_bullshit_threshold, 1)) %>%
```

```
  group_by(rounded_bs_threshold) %>%
  summarise(win_probability = mean(win_bool), n = n())


ggplot(simulation_results2, aes(x=rounded_bs_threshold, y=win_probability)) +
  geom_point(aes(size=n)) +
  geom_line() +
  geom_hline(yintercept = 1/3, color = 'grey')
```



```
library(geomtextpath)
library(latex2exp)

p = seq(0, 1, 0.01)
alpha = 10 * (1/3)
beta = 10 * (2/3)
mean = round(alpha / (alpha + beta), 2)
beta_density = dbeta(x = p, shape1 = alpha, shape2 = beta)
beta_df = data_frame(p=p, density=beta_density)
```

```
## Warning: `data_frame()` was deprecated in tibble 1.1.0.
## i Please use `tibble()` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
beta_prior = ggplot(beta_df, aes(x=p, y=density)) +
  geom_line() +
  theme_minimal() +
  geomtextpath::geom_textvline(xintercept = alpha / (alpha + beta), linetype = 2, label = paste0('Mean
  labs(title = unname(TeX('Prior: Beta Distribution with Parameters $\\alpha = 10 \\times \\frac{1}{3},
  theme(plot.title = element_text(hjust = 0.5))
```

$\alpha_{d,0}$ = **number of unseen dice $\times$ probability of d**

$\beta_{d,0}$ = **number of unseen dice $\times$ probability of not d**

$\alpha_{d,1} = \alpha_{d,0} + I(\mathbf{d}$ **called on last turn**$)$

$\beta_{d,1} = \beta_{d,0} + I(\mathbf{d}$ **not called on last turn**$)$

$\hat{p}_{3,1} = \frac{\alpha_{d,1}}{\alpha_{d,1} + \beta_{d,1}}$