

# The application of calibrated difference-from-control for sensory quality control of distilled beverages

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DIAGEO



Compusense.



The Institute of Brewing & Distilling  
Scottish Section

WORLDWIDE

**DISTILLED SPIRITS**  
CONFERENCE

29<sup>TH</sup> MAY - 1<sup>ST</sup> JUNE 2017, GLASGOW

# Summary

FDFC provides immediate onscreen feedback

Scale calibration provides a more objective measurement for decision-making

Both panel leader and DFC assessors save time

Recommended for ongoing panel maintenance







REF



621



Extremely  
Different

No  
Difference

0

1

2

3

4

5

6

7

8

9

10





Extremely  
Different

No  
Difference



Extremely  
Different

No  
Difference







REF



435



Extremely  
Different

No  
Difference

0

1

2

3

4

5

6

7

8

9

10



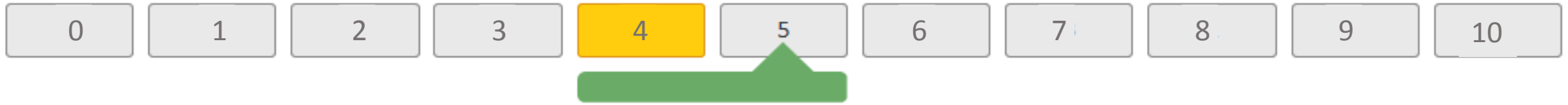
Extremely  
Different

No  
Difference



Extremely  
Different

No  
Difference





# Study 1

**FDFC trials at Diageo North America, Plainfield, IL, USA**

Existing sensory quality control program

New assessors are employees who are trained to identify taints and familiarized with DFC method

DIAGEO

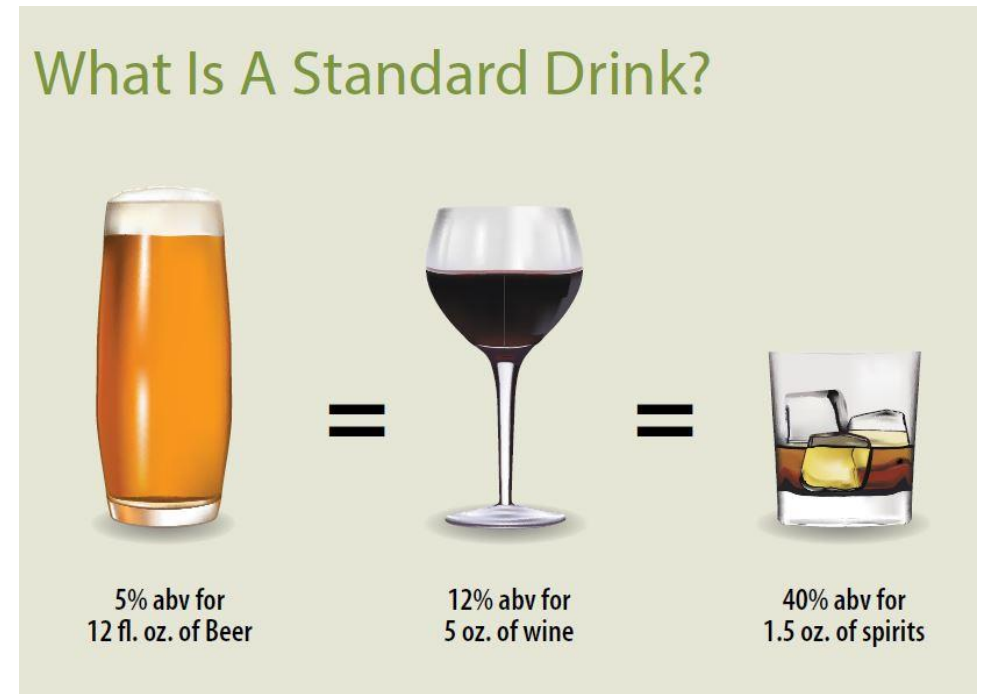


Compusense.

# Serving Samples

Diageo has strict policies regarding [responsible alcohol research](#) and serving of liquids.

- All panelists [sign consent forms](#) stating they are of Legal Drinking Age and have no medical conditions that alcohol could interfere with
- For the majority of Quality evaluations, panelists are instructed to [expectorate](#)
- At the end of each study, panelists confirm that they expectorated all samples
- If the study does require swallowing, Diageo will serve a [maximum of 1 legal drink](#) per day
- After a panel that requires swallowing, panelists are not allowed to drive or operate equipment for a [minimum of 2 hours](#).



The percent of "pure" alcohol, expressed here as alcohol by volume (alc/vol), varies by beverage.



**Off-note****Exemplar****Musty / Earthy**

REF + Musty Flavour from flavour company

**Rubber**

REF + Rubber Type Flavour from flavour company

**Rum**

REF + Myers's White Rum



## Flavor Score

Very Strong  
Aroma  
and/or  
Flavor

Equal to  
Standard

Cleaner than  
Standard

1

2

3

4

5

6

7

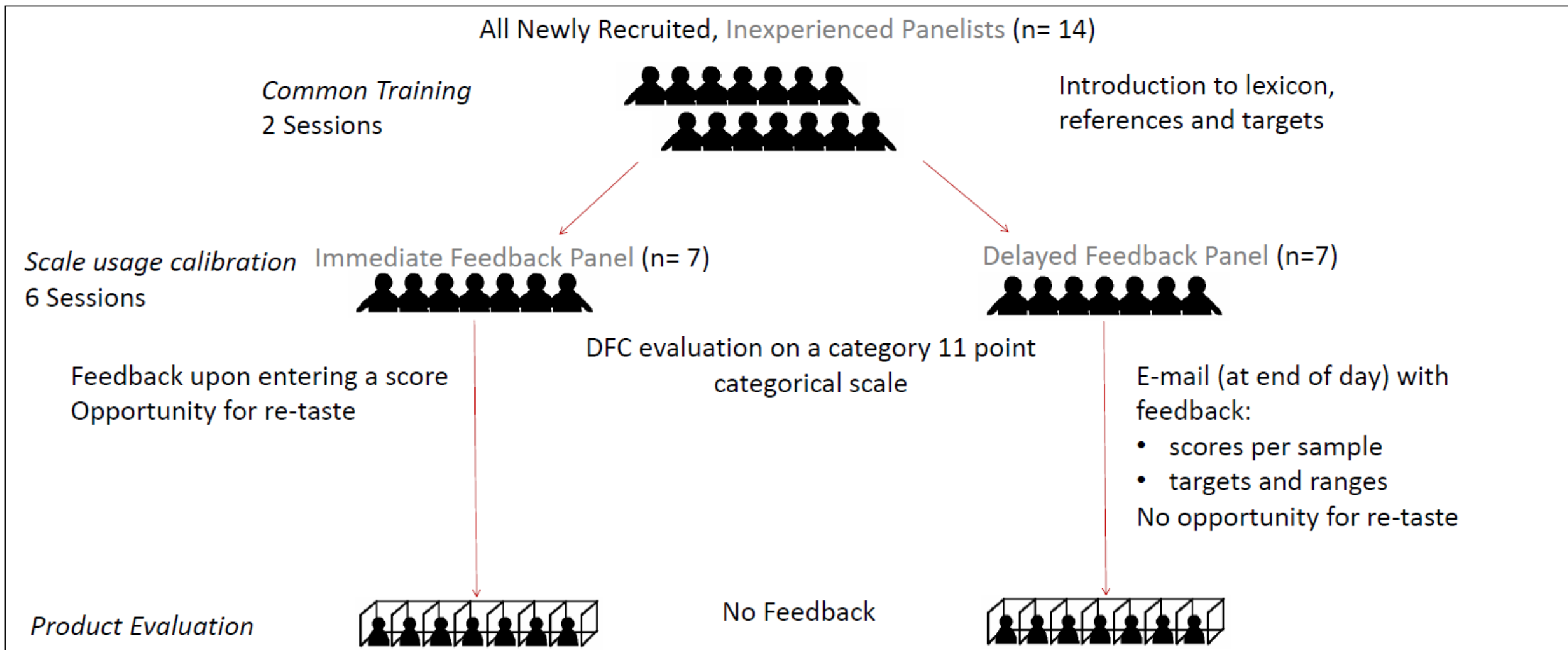
8

9

10

11

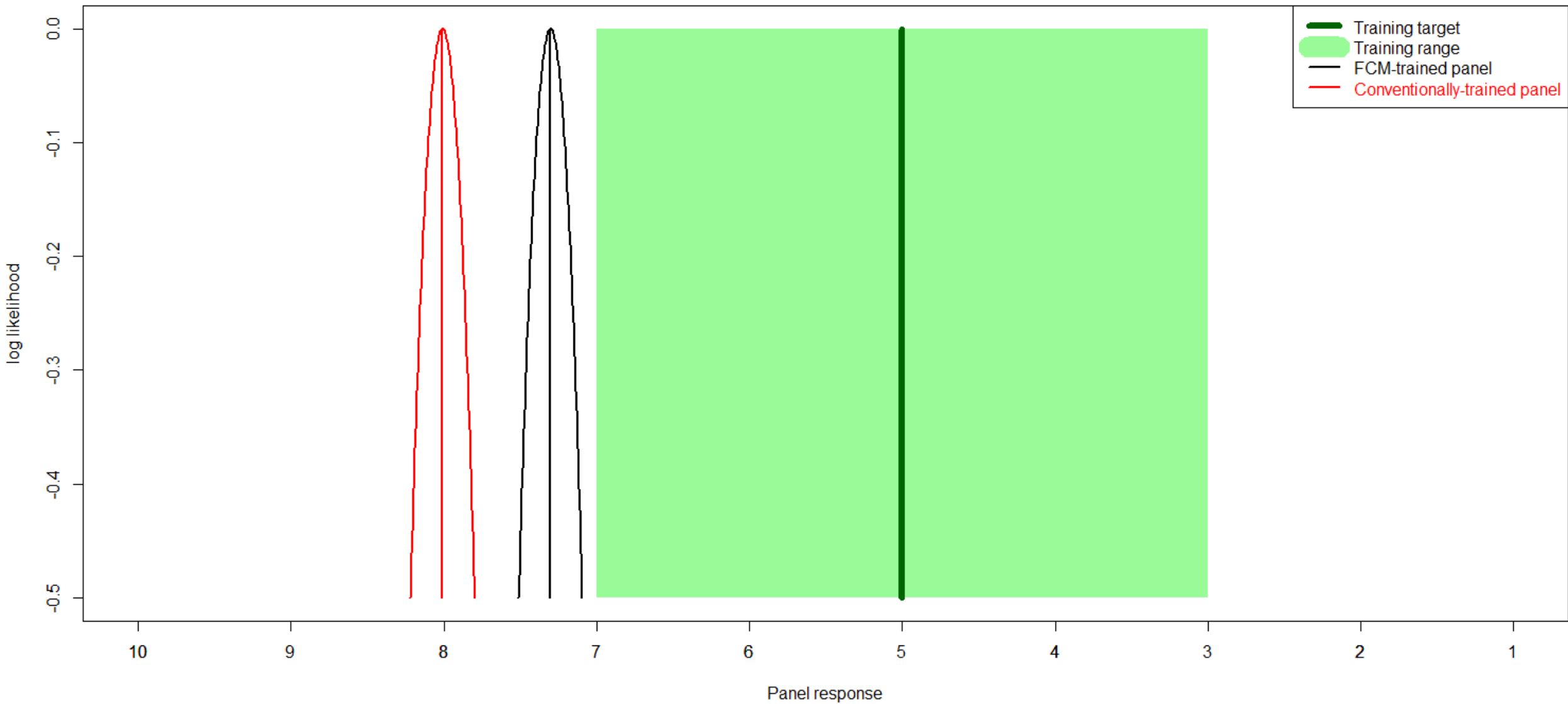
# Study 1



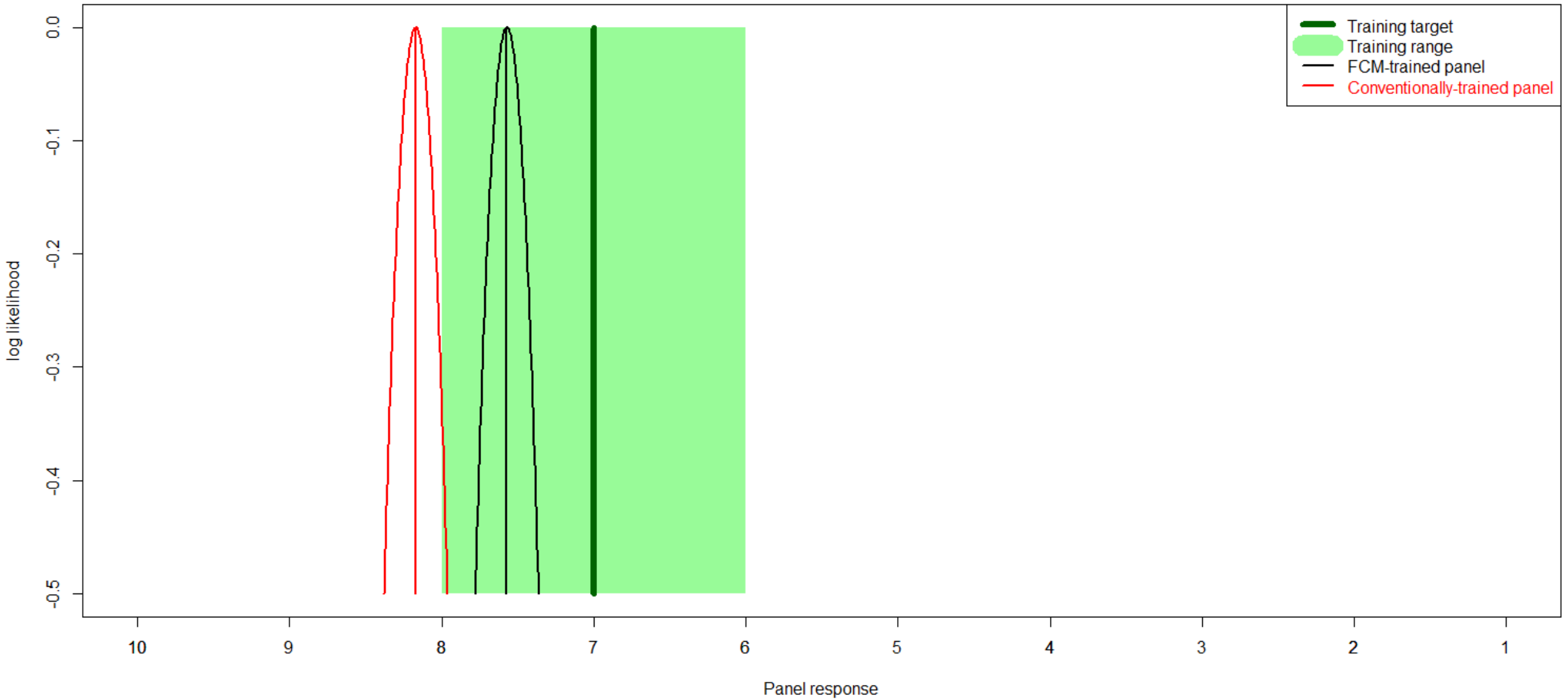
Off-note:

**Musty**

# Musty – high spike (aroma)



# Musty – low spike (flavour)

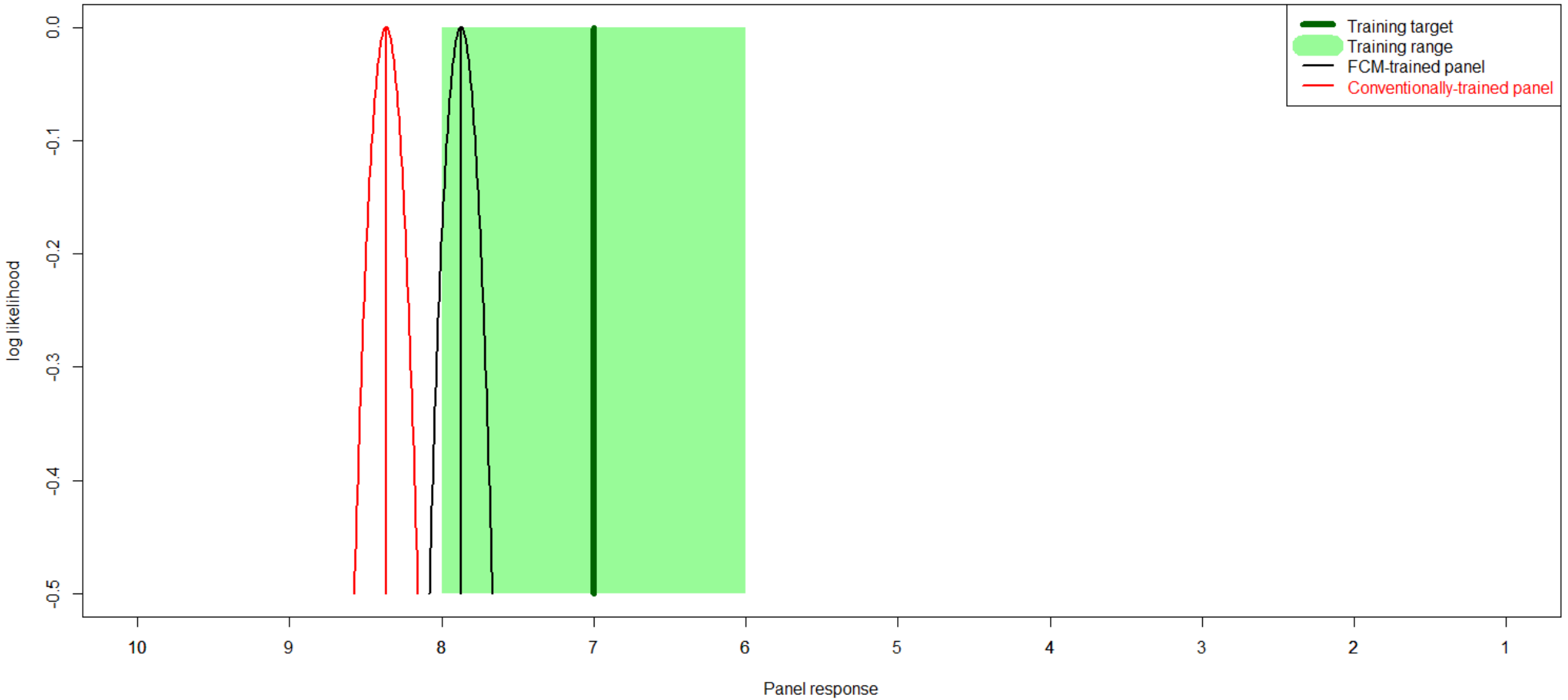




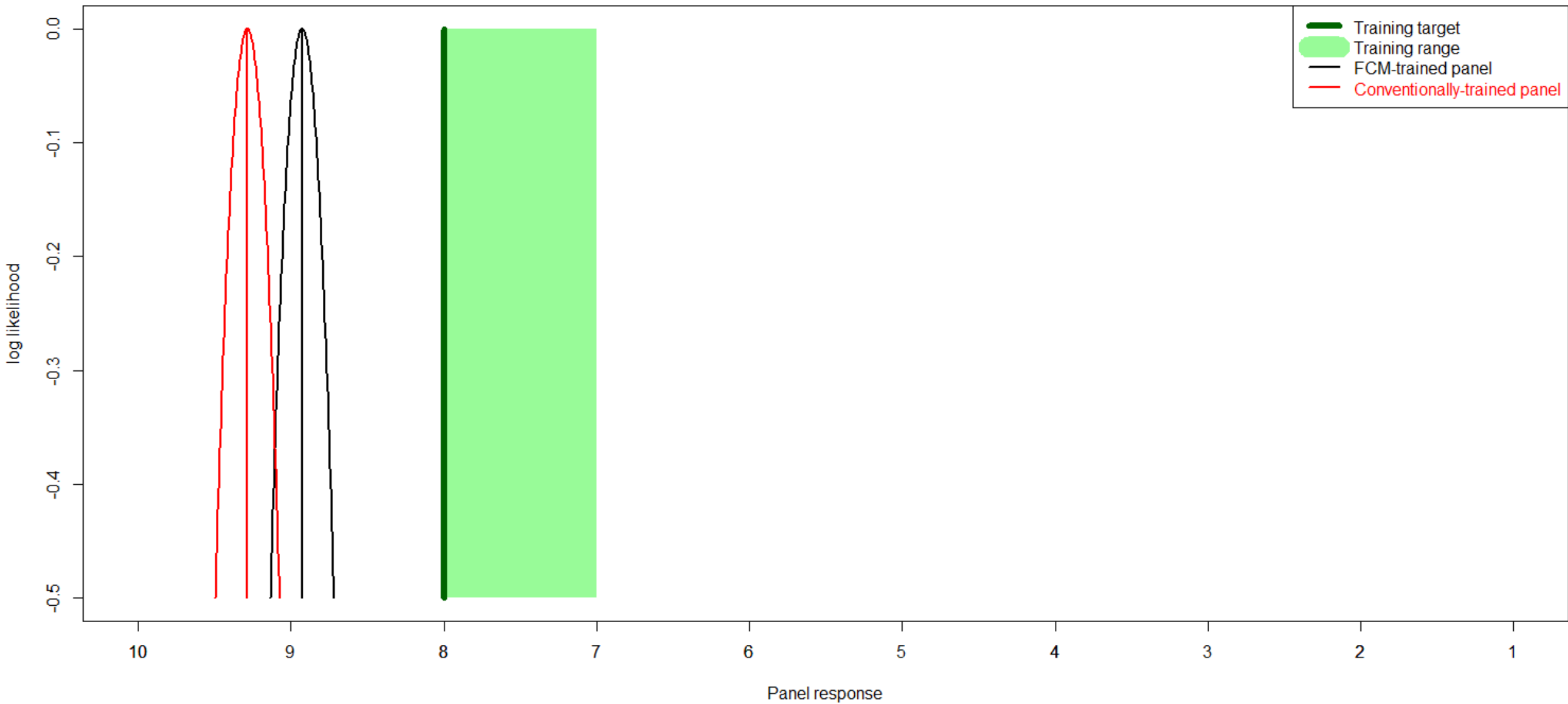
Off-note:

**Rubber**

# Rubber – mid spike (flavour)



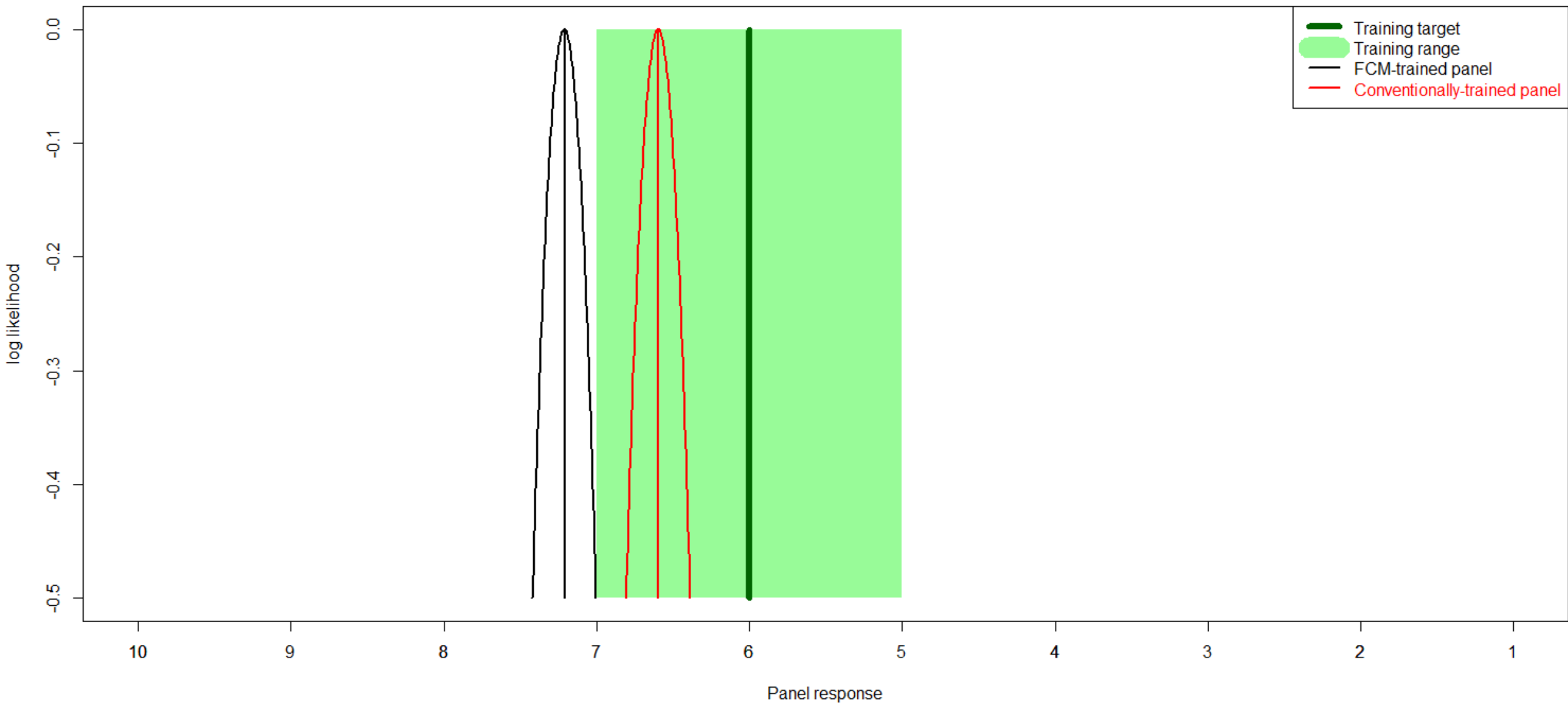
# Rubber – low spike (flavour)



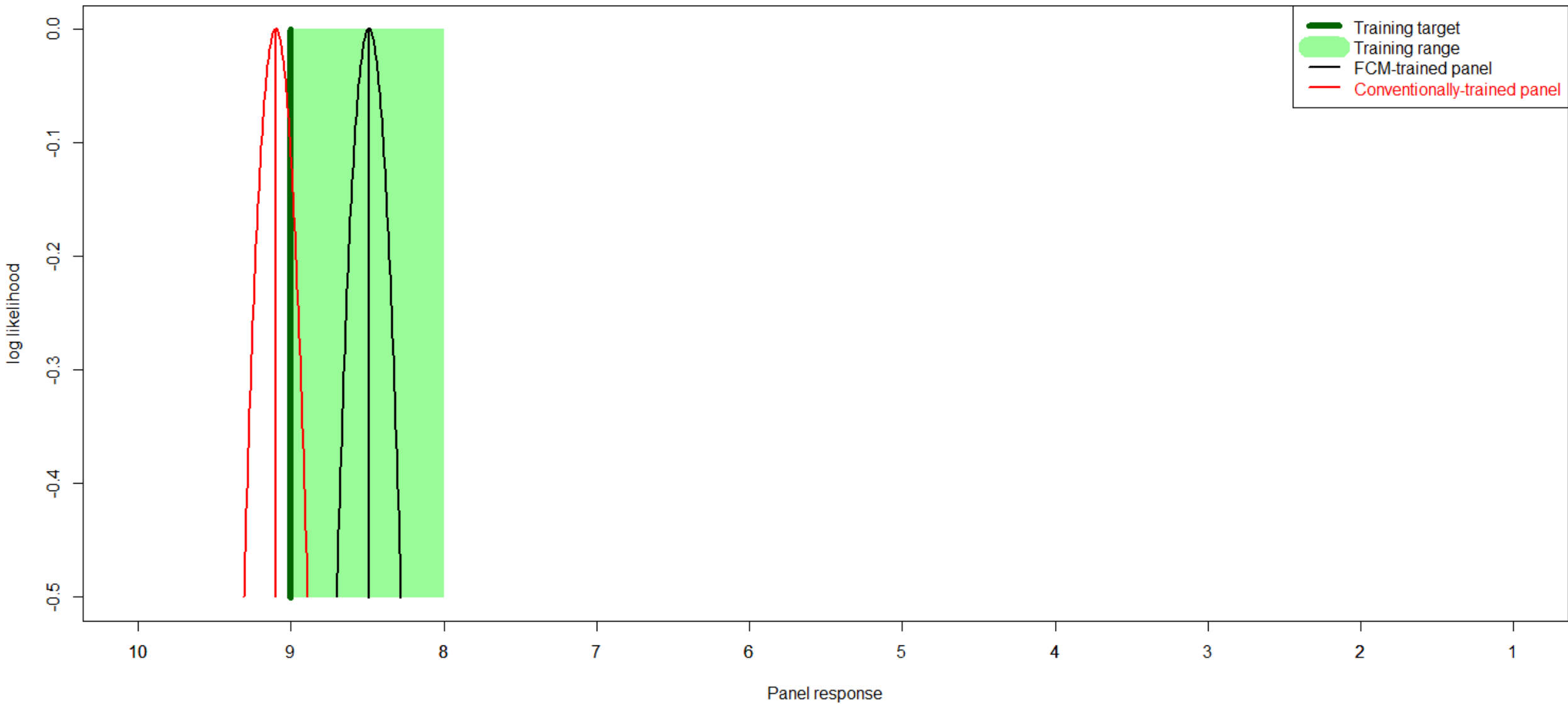
Off-note:

**Rum**

# Rum – high spike (aroma)

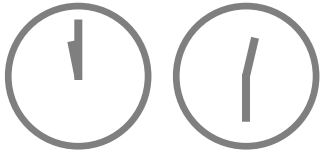


# Rum – low spike (flavour)

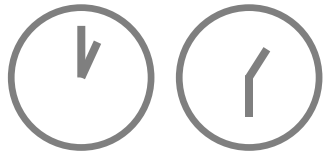




# Conventional Training



# Conventional Training



**Flavor Score**  
Very Strong  
Aroma  
and/or  
Flavor



**DFC evaluations**  
Standard Standard

1	2	3	4	5	6	7	8	9	10	11
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# Conventional Training



Flavor Score

Very Strong  
Aroma  
and/or  
Flavor

DFC evaluations

Standard Standard

1 2 3 4 5 6 7 8 9 10 11



Sample Order	Sample Blinding Code	Your Score	Target	Range	Panel Mean (s.d.)
1	301	6	4	3 – 5	6.4 (2.4)
2	948	10	10	10 – 10	6.1 (2.2)
3	369	4	2	2 – 3	5.3 (2.8)
4	476	8	7	6 – 7	8.1 (1.9)
5	587	8	10	9 – 10	7.5 (2.4)
6	299	7	5	4 – 5	7.3 (2.5)
7	811	5	3	2 – 4	5.5 (3.1)

Delayed feedback sent via email

# FDFC Training



# FDFC Training



**Flavor Score**  
Very Strong  
Aroma  
and/or  
Flavor

**FDFC training during evaluations**

Standard Standard

1	2	3	4	5	6	7	8	9	10	11
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# Study 2

5 untrained assessors

Control (REF) sample: Crown Royal De Luxe Canadian Whisky (CR)

REF and these products were each adjusted to 20% abv

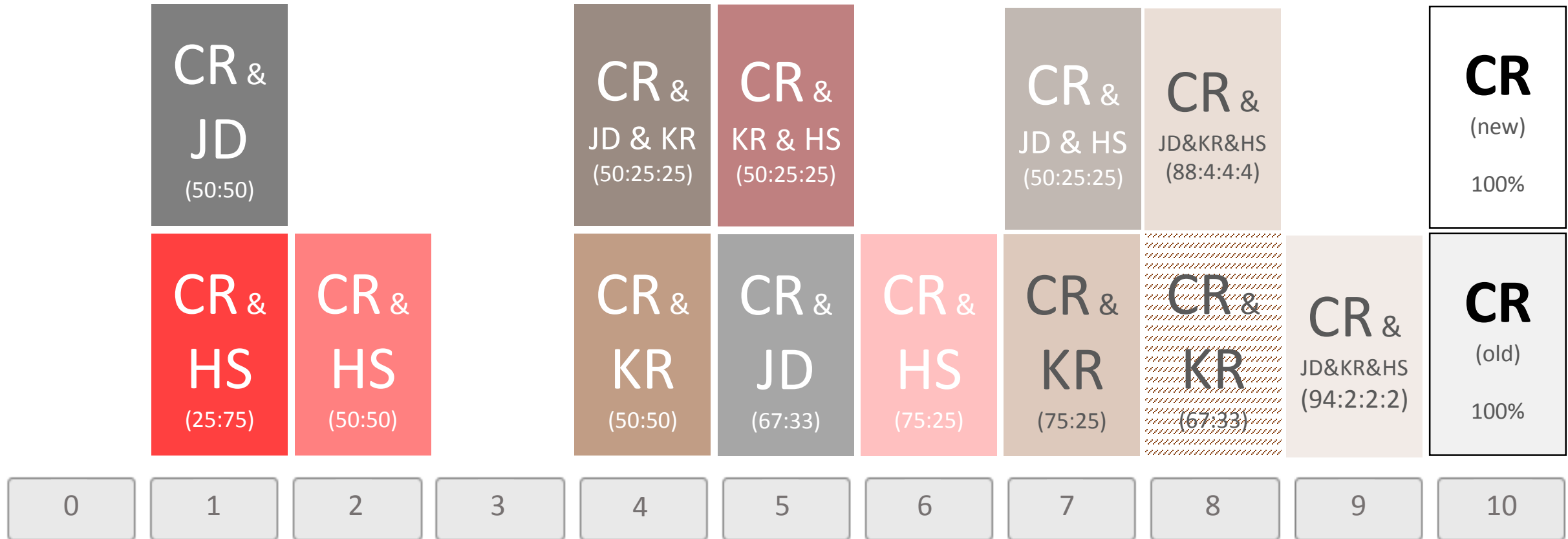
- Jack Daniel's Old No. 7 Tennessee Whiskey (JD)
- The Kraken Black Spiced Rum (KR)
- Harveys Bristol Cream Sherry (HS)

then mixed to create training samples as indicated on the next slide.





# Targets for training samples





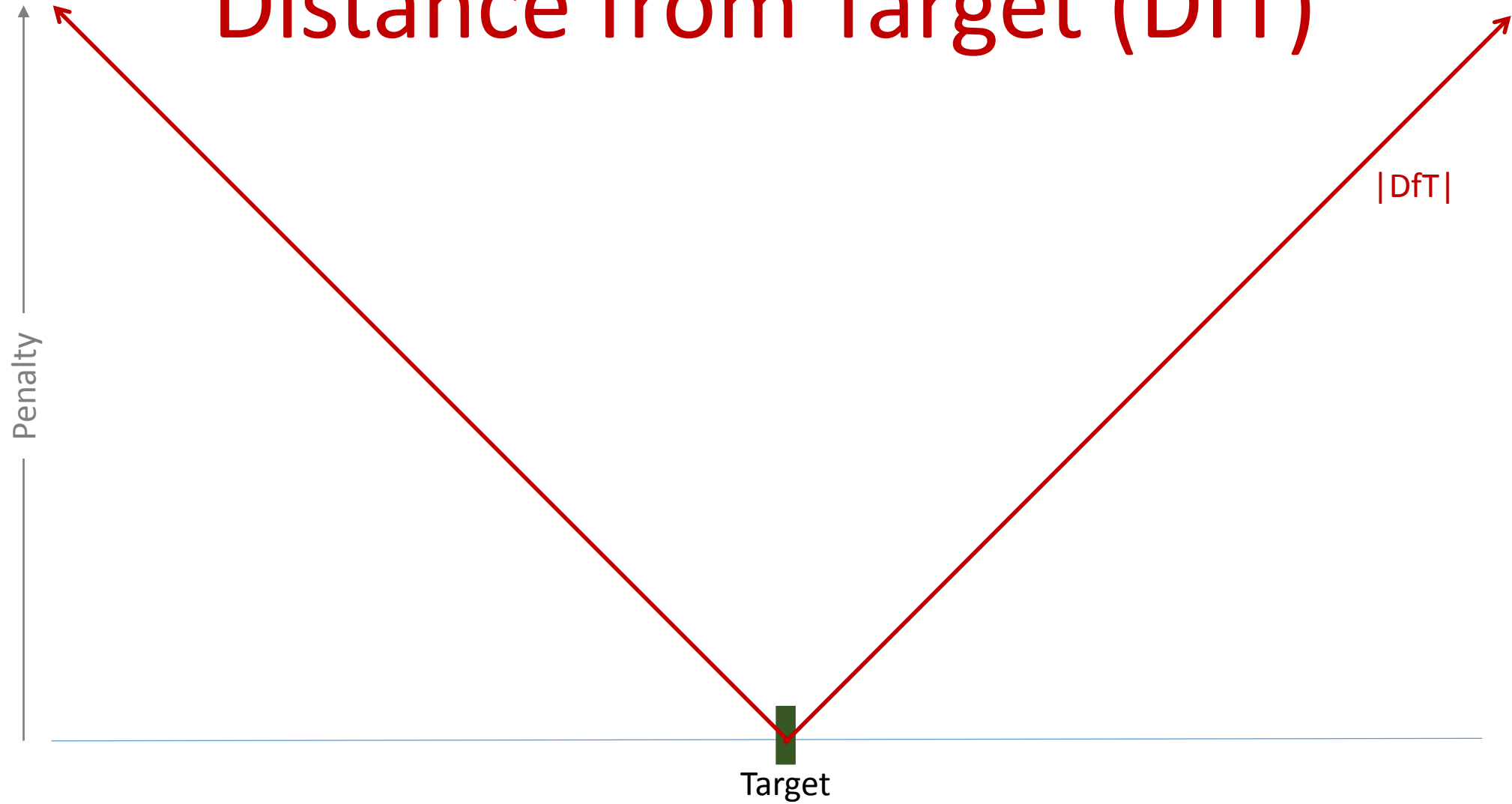
REF



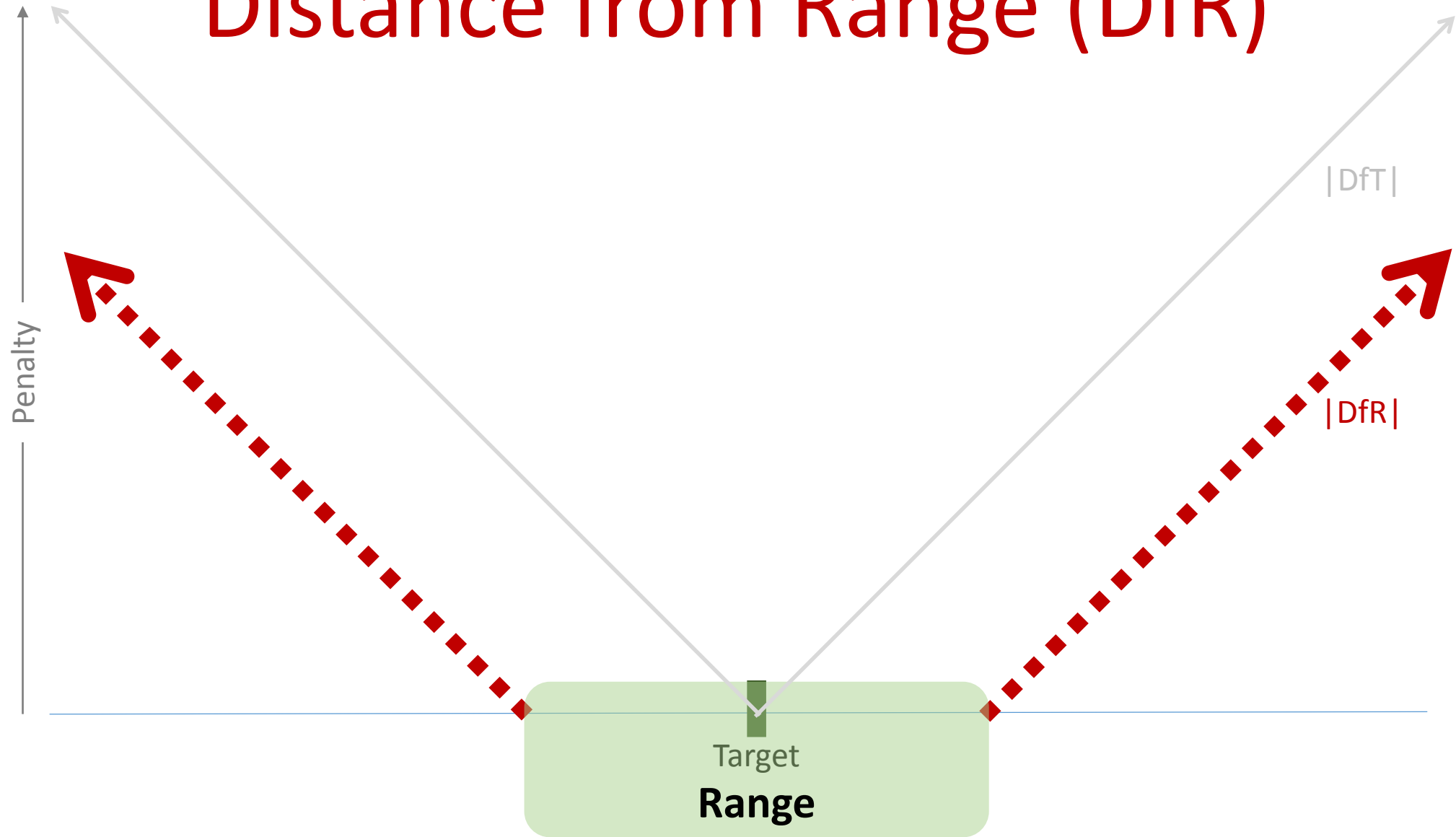
621

Samples presented according to experimental design

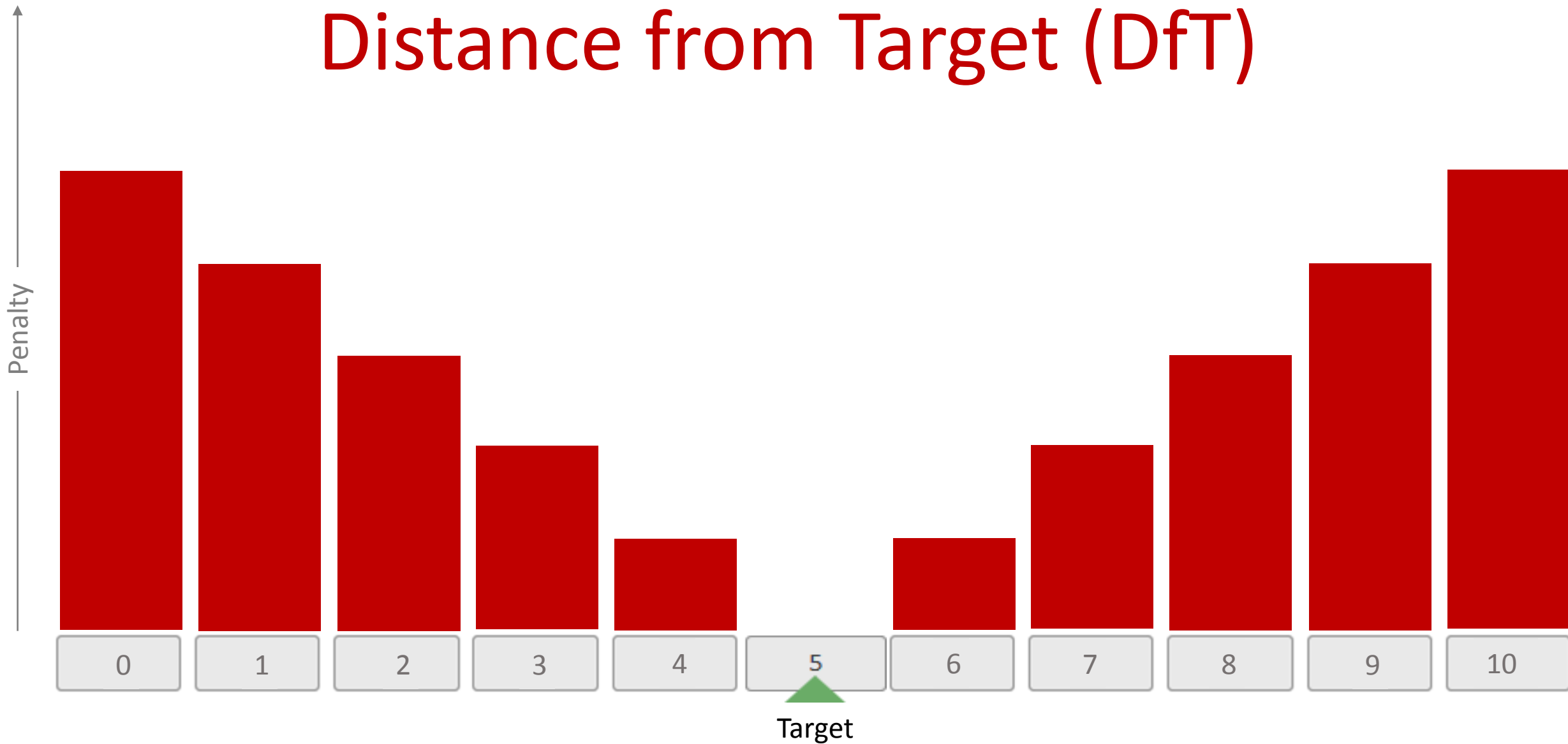
# Distance from Target (DfT)



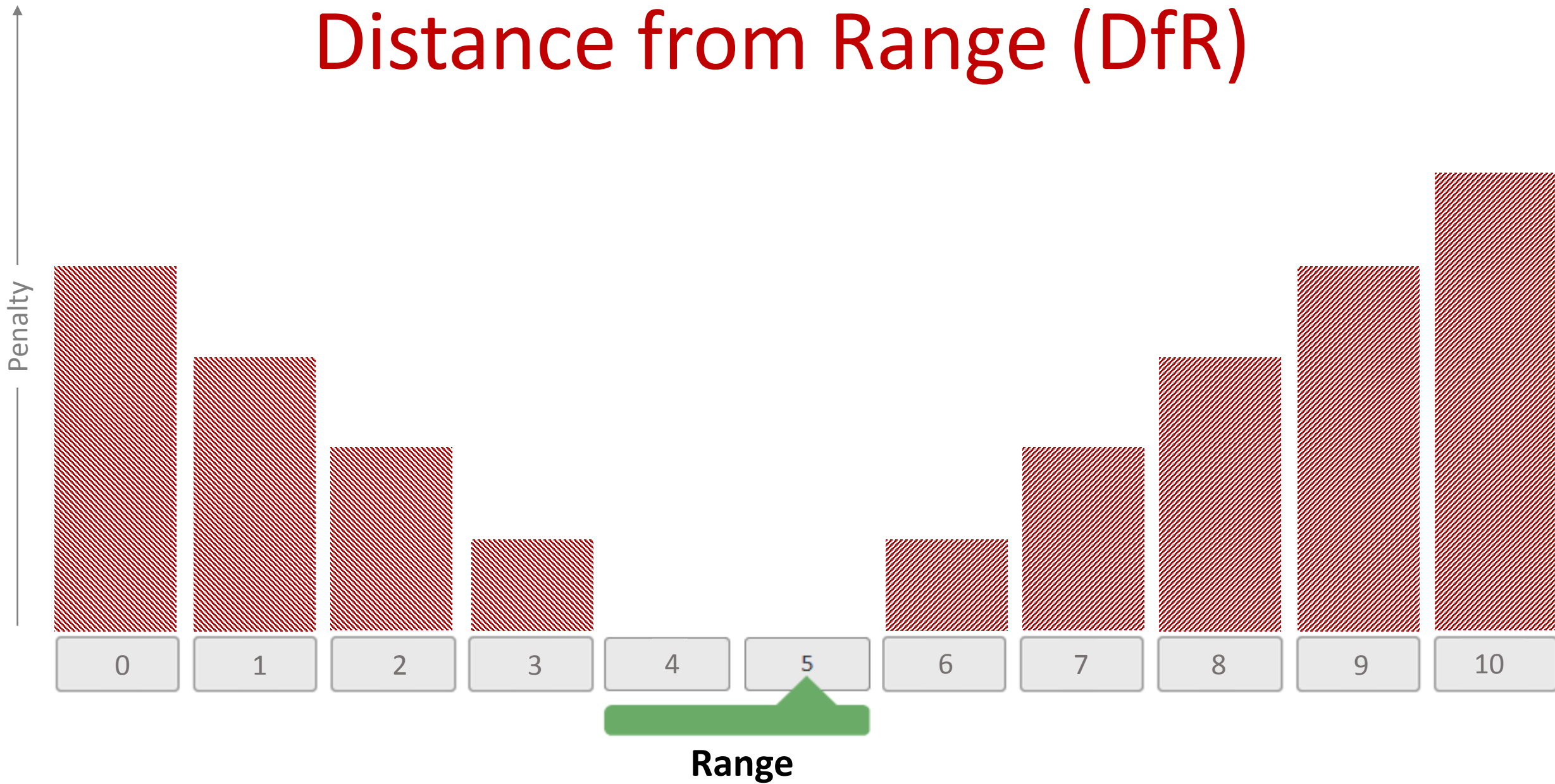
# Distance from Range (DfR)



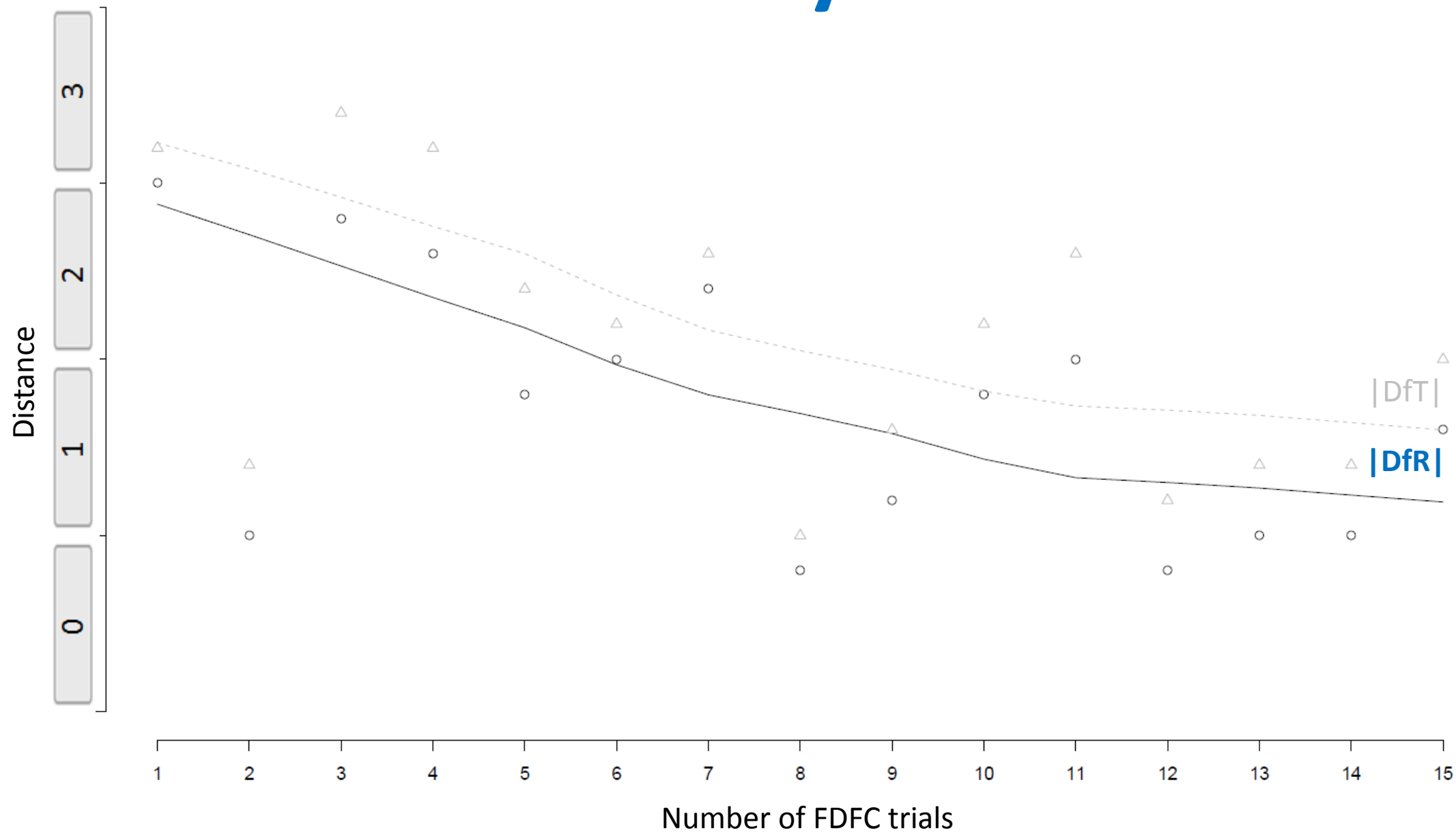
# Distance from Target (DfT)



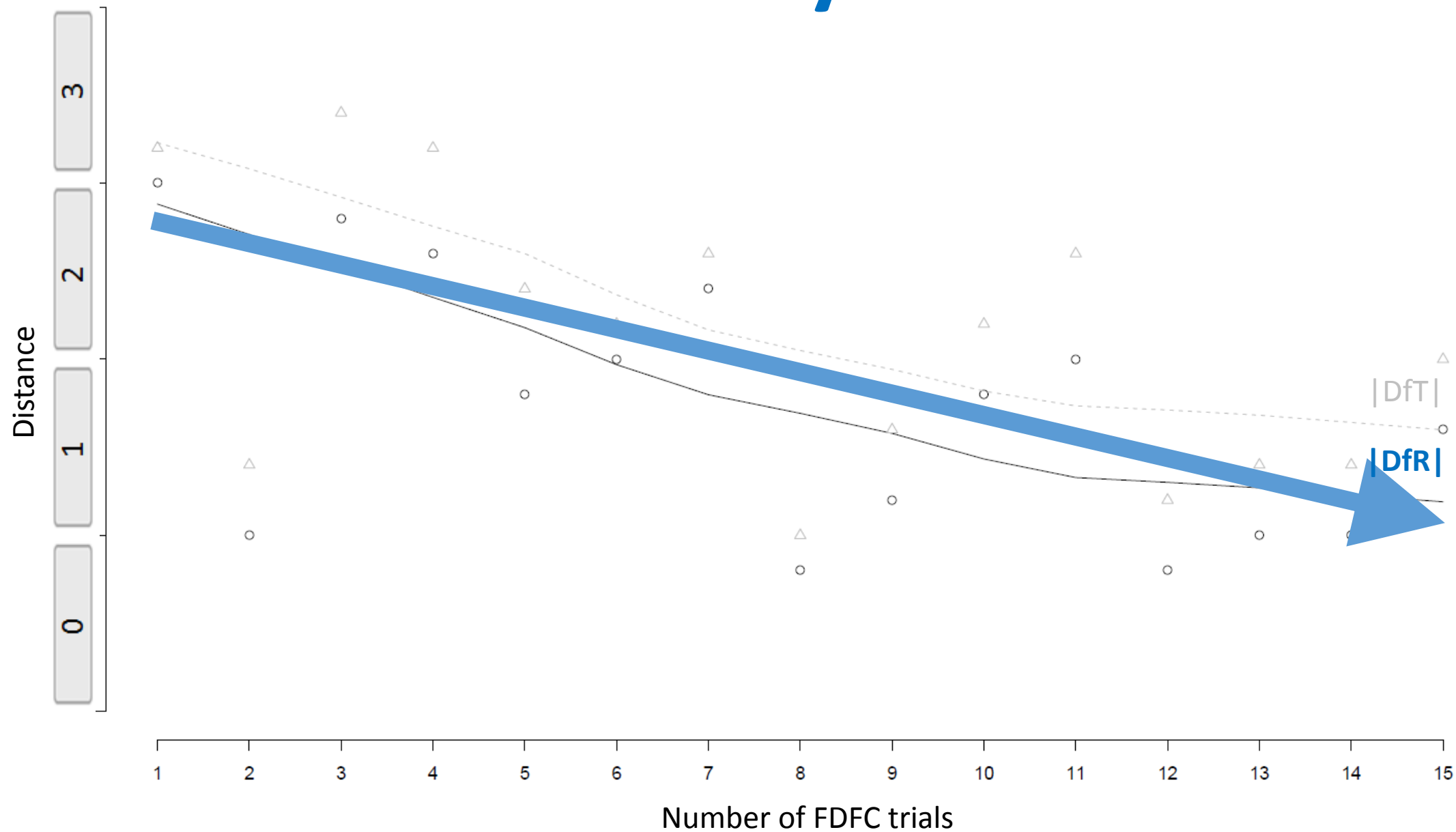
# Distance from Range (DfR)



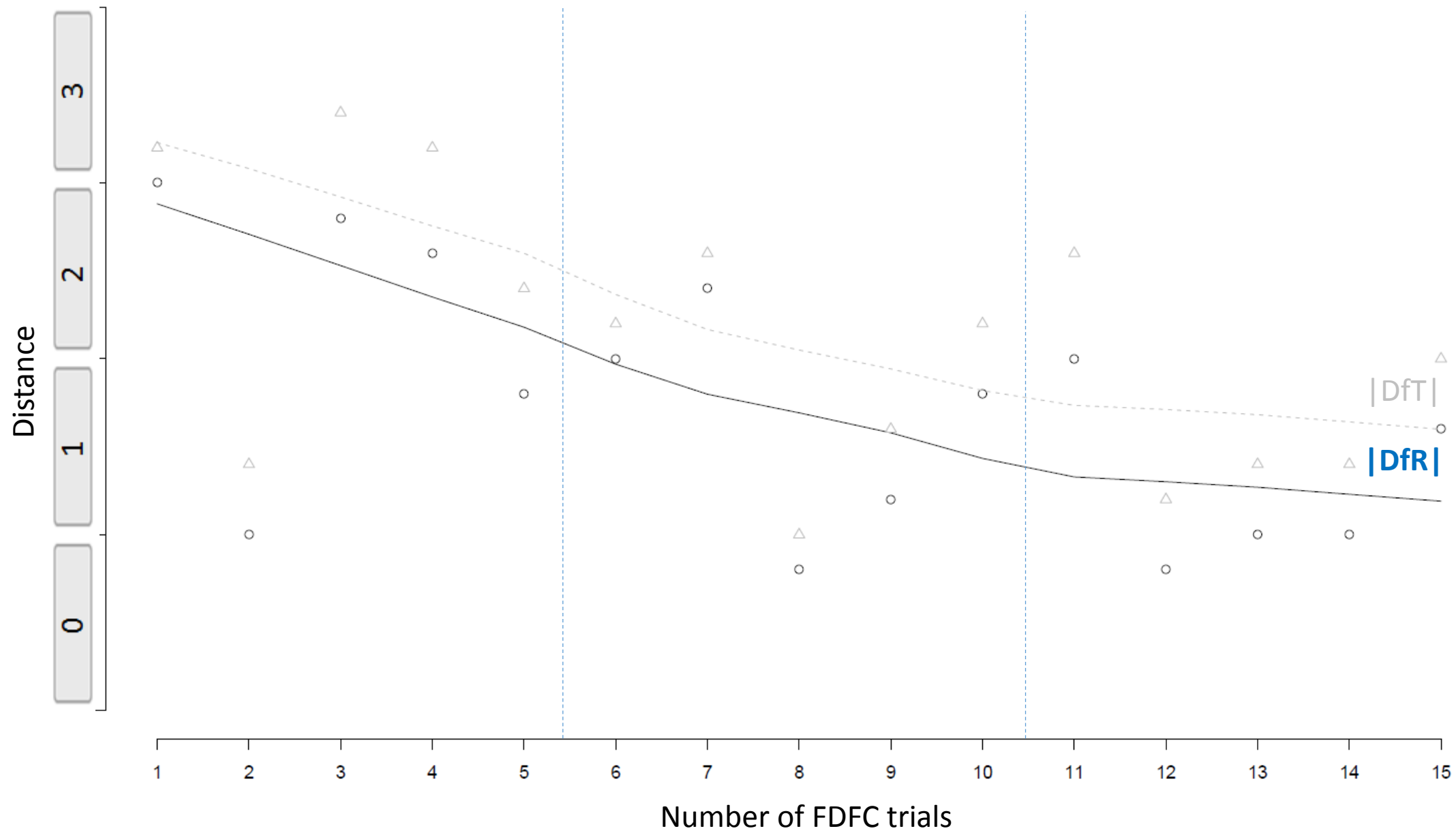
# Study 2

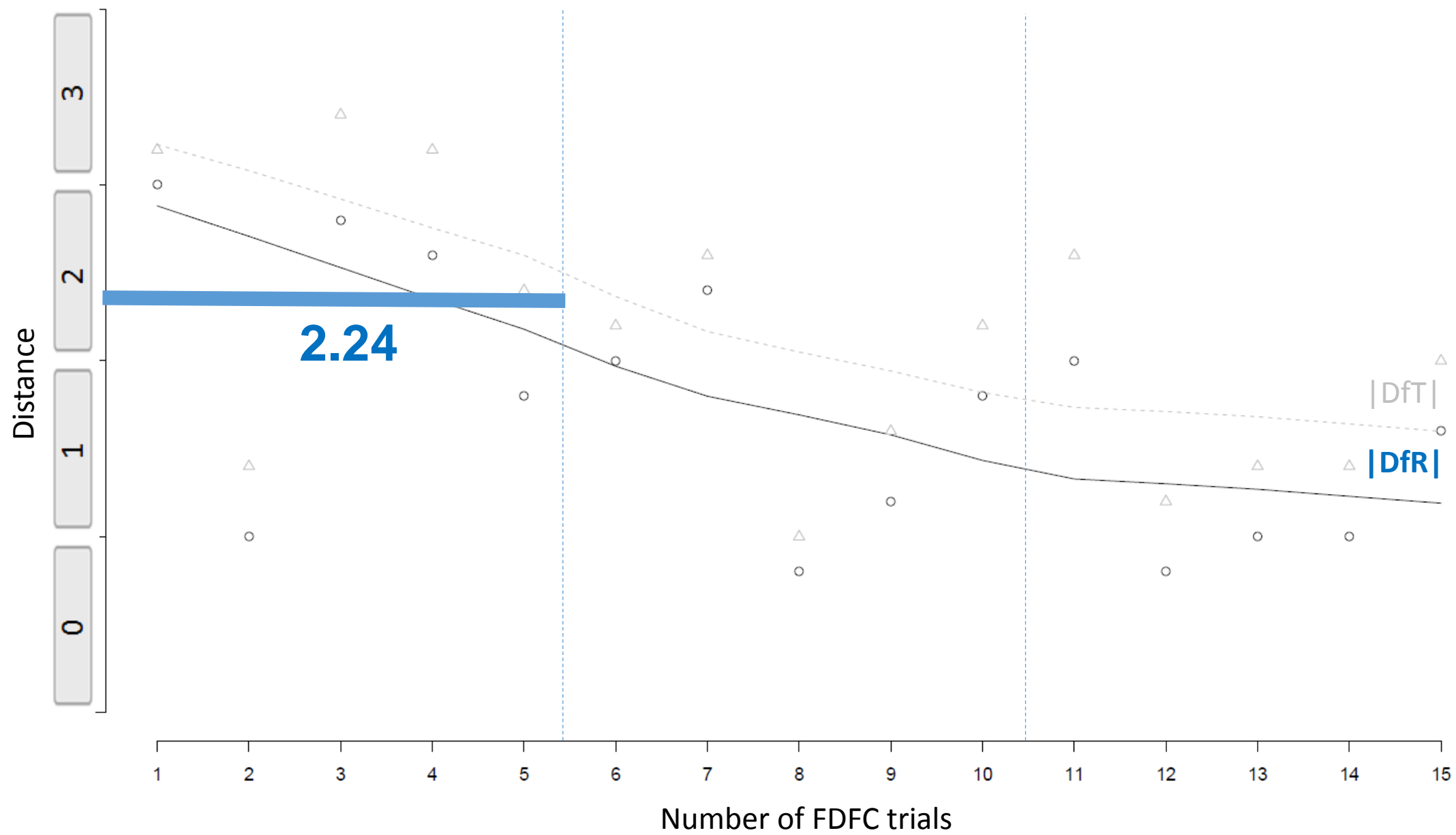


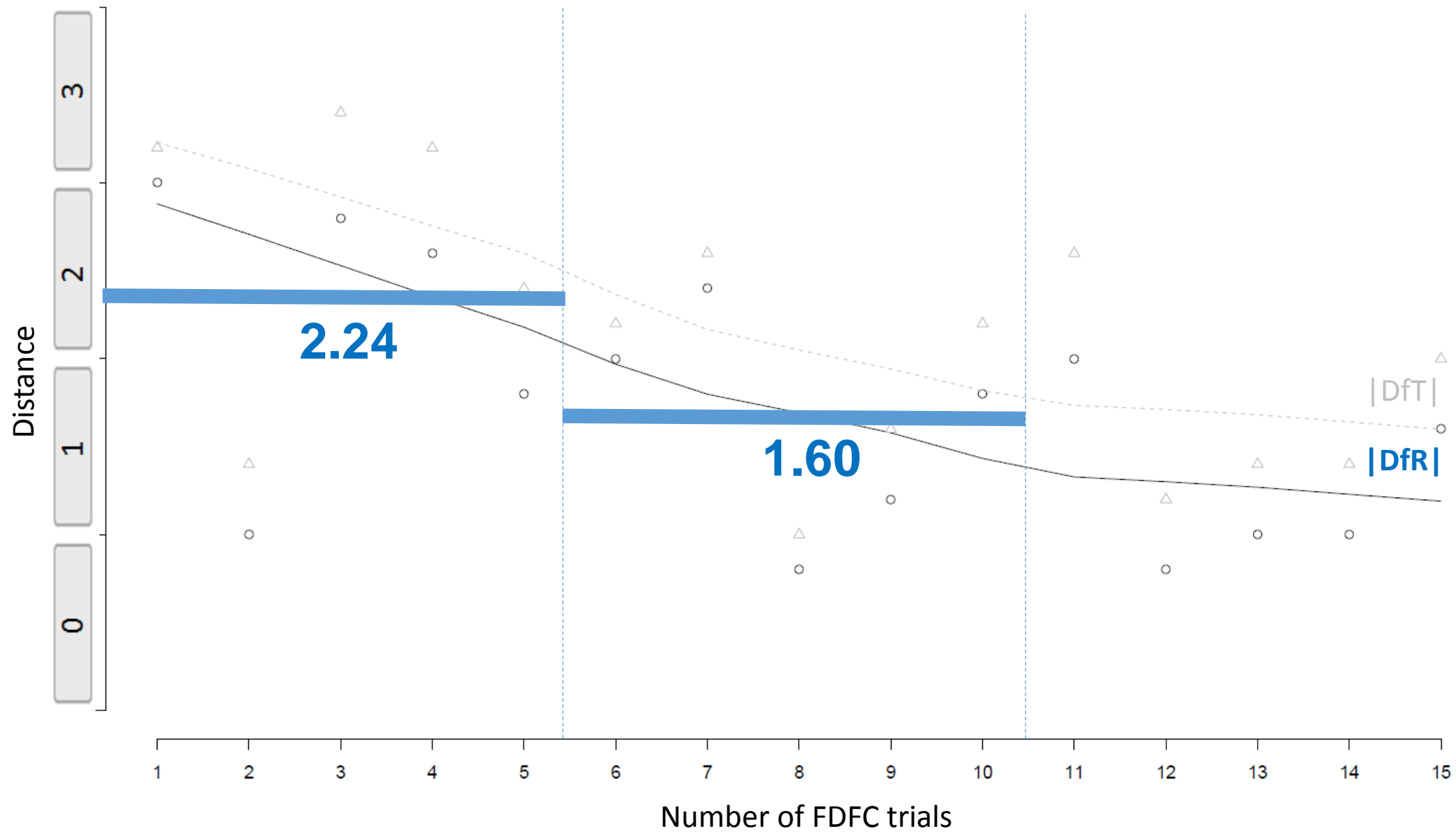
# Study 2

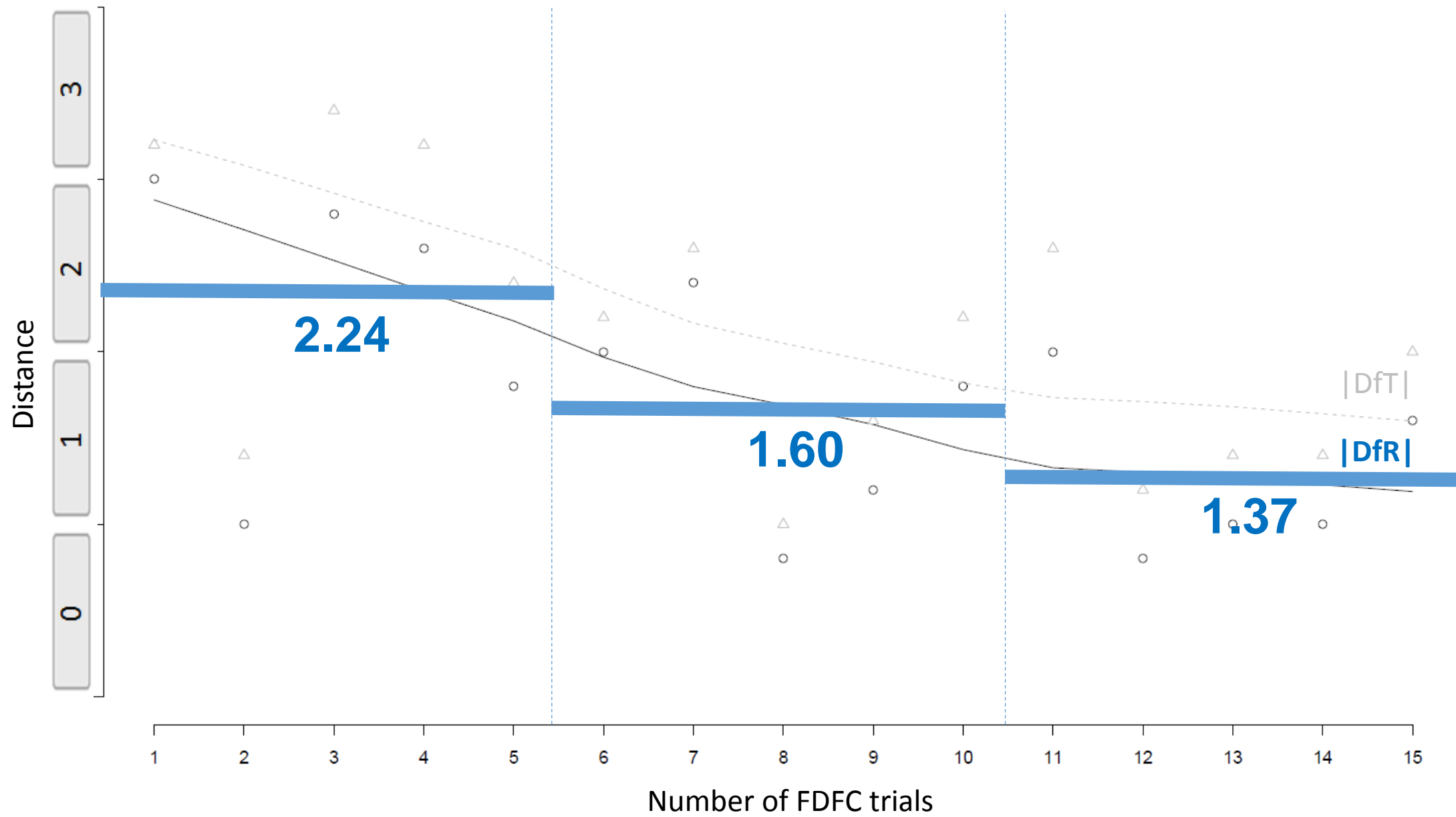


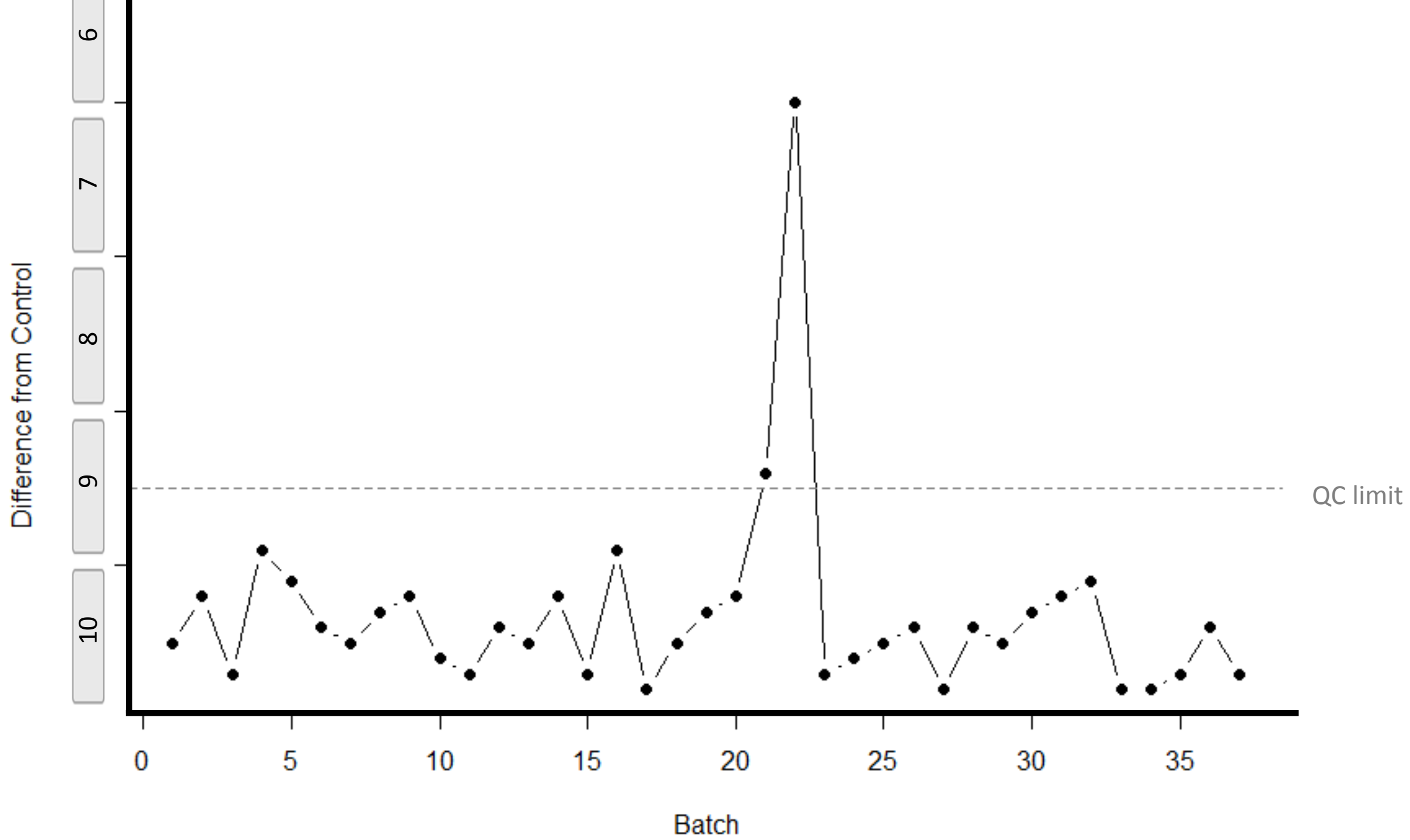












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Recommended for ongoing panel maintenance

Thank you for your kind attention

John C. Castura

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