IMPACT OF SELECT VARIABLES ON
Alexandra Trusova's Jump Execution

Team Hunger Games: Catching Meyer

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FIGURE SKATING

Figure skating is a sport in which athletes complete programs full of jumps, spins, and footwork.

Scoring for figure skating consists of two components:

1. the technical score

2. the artistic score.

Recently, the sport has experienced a sort of "quad revolution." With the increase in difficult jumps, questions have arisen regarding their effect on the artistic side of skating and on the skater's other jumps.

THE VARIABLES

Name	Description
season	The competition season, in years
altitude_in_m	The altitude, in meters, of the competition location
distance_moscow_km	Distance, in kilometers, of the competition from Moscow
jump	The code entered for the jumping pass
jump_bv	The difficulty value, in points, of the jumping pass
goe_raw	The grade of execution, a measure of the quality of the jump

OUR
QUESTION

How does the difficulty of the jump and the location of the competition affect Alexandra Trusova's execution of jumps?

Rank	Name			Nation	Starting Number	Total Segment Score	Total Element Score		Program Component Score (factored)	Total	Total Deductions
1	Alexandra TRUSOVA			RUS	22	153.49	92.35		61.14		0.00

#	Executed Elements	Info	Base Value	GOE	J1	J2	J3	J4	J5	J6	J7	J8	J9	Ref	Scores of Panel
1	4S		10.50	2.00	1	2	2	3	2	2	2	3	1		12.50
2	4T		10.30	0.57	0	1	0	2	2	0	-1	1	0		10.87
3	FCSp4		3.20	1.00	2	2	2	2	2	1	2	2	2		4.20
4	StSq4		3.90	1.30	1	2	2	2	2	1	2	1	2		5.20
5	3Lz		6.60 x	1.70	2	2	3	3	3	2	3	3	2		8.30
6	3F+1Lo+3S		11.22 x	1.00	1	1	2	2	2	1	0	1	2		12.22
7	3Lz+3Lo		12.21 x	1.50	2	2	2	3	2	1	2	2	2		13.71
8	3F+3T		10.56 x	1.30	1	1	1	3	1	2	2	2	2		11.86
9	2A		3.63 x	0.93	2	1	1	3	2	2	2	2	2		4.56
10	CCoSp4		3.50	0.86	1	1	1	2	1	1	2	3	2		4.36
11	FCCoSp4		3.50	1.07	1	2	2	2	1	2	3	2	2		4.57
			79.12												92.35

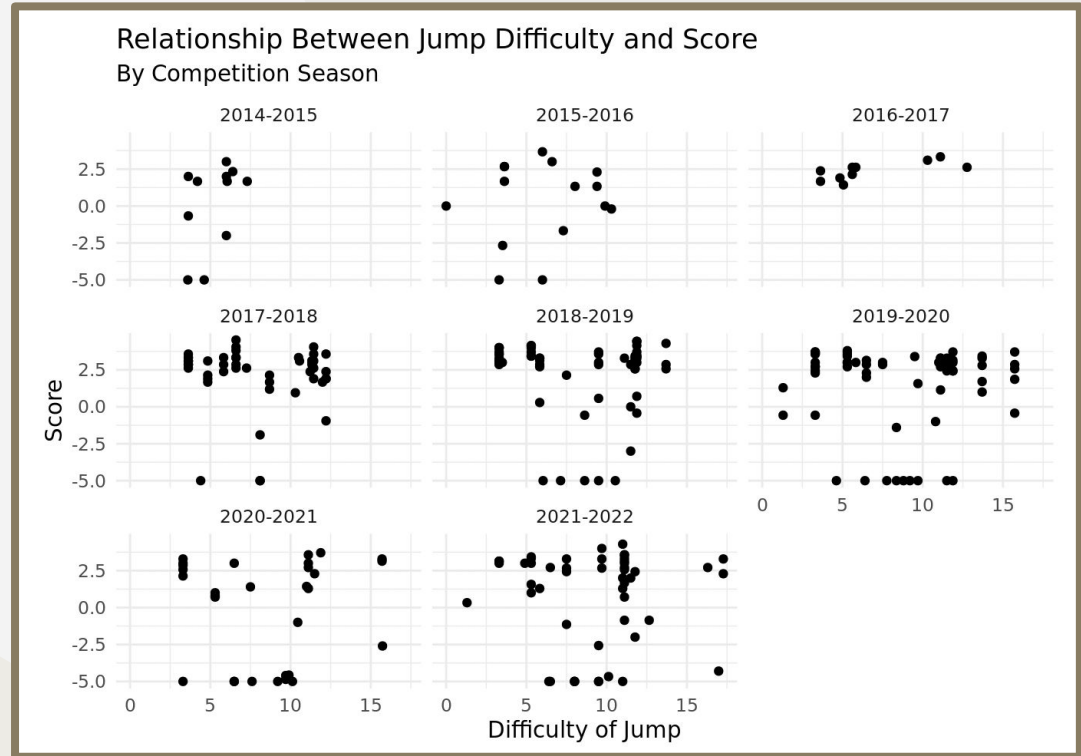| Program Components		Factor									
Skating Skills		1.60	7.50	7.25	7.75	8.25	8.25	7.50	7.00	7.75	8.00	
Transitions		1.60	6.75	7.50	7.75	8.00	7.75	7.00	7.25	7.75	7.50	7.71
Performance		1.60	7.25	7.25	8.00	8.50	8.25	7.50	7.50	7.75	8.00	7.50
Composition		1.60	7.50	7.50	7.75	8.25	7.75	7.25	7.50	8.00	7.75	7.75
Interpretation of the Music		1.60	7.50	7.25	7.75	8.00	8.00	7.25	7.00	7.50	7.75	7.68
												7.57
Judges Total Program Component Score (factored)												61.14
Deductions												0.00

Initial Visualization

Difficulty vs. Score
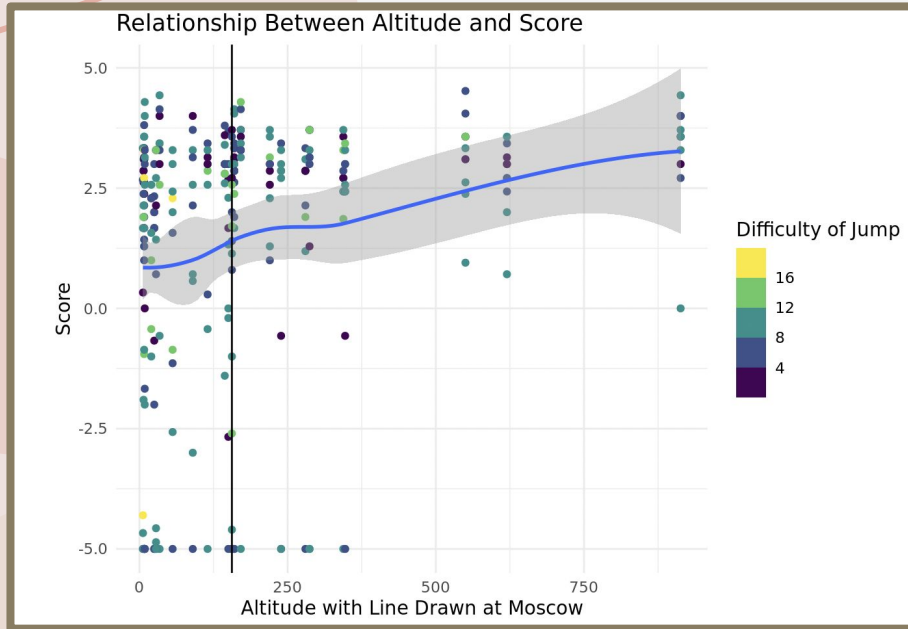
How does the difficulty of the jump effect Trusova's execution?
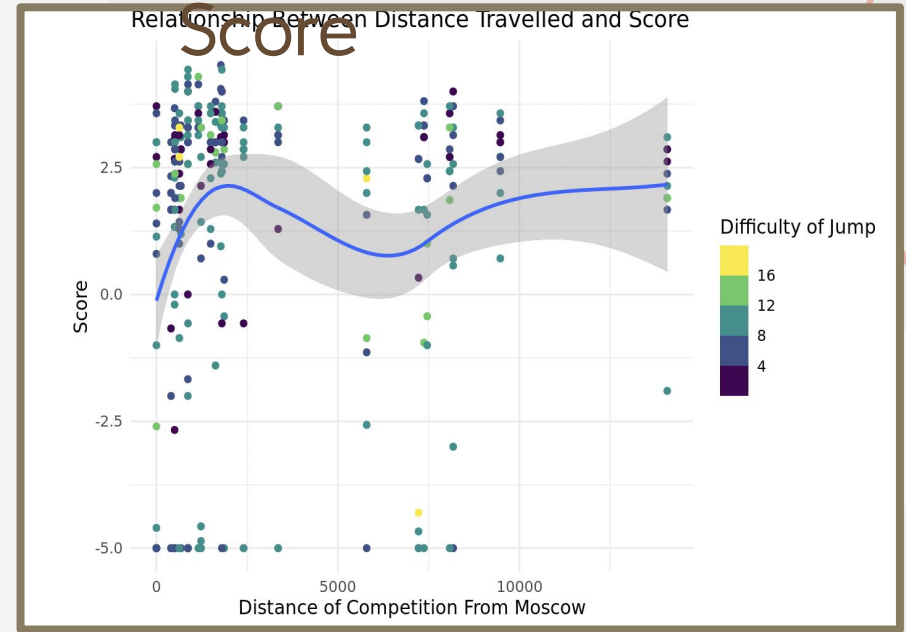
Virtually no correlation based on the visualization.

Relationship Between Jump Difficulty and Score
By Competition Season

Secondary Visualizations

Altitude vs. Score

Weak, positive correlation based on visualization

Distance vs. Score

Swells at certain points, inconclusive correlation
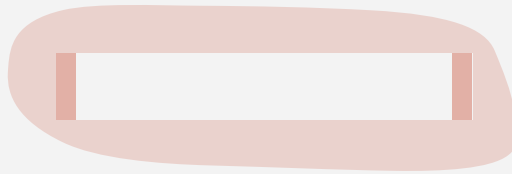
HYPOTHESIS TESTS: effect on jump execution (score)

JUMP DIFFICULTY

Conclude Null:

score: $\mu_{easy} - \mu_{hard} = 0.356$

$H_0: \mu_e - \mu_h = 0$
$H_a: \mu_e - \mu_h > 0$

$\alpha\ 0.05 < $ p-value 0.152

ALTITUDE

Conclude Null:

score: $\mu_{high} - \mu_{low} = 0.606$

$H_0: \mu_h - \mu_l = 0$
$H_a: \mu_h - \mu_l \neq 0$

$\alpha\ 0.05 < $ p-value 0.056

DISTANCE-MOSCOW

Conclude Null:

score: $\mu_{long} - \mu_{short} = 0.603$

$H_0: \mu_l - \mu_s = 0$
$H_a: \mu_l - \mu_s < 0$

$\alpha\ 0.05 < $ p-value 0.958

PREDICTIVE MODELS

Explanatory Variable(s)	Adjusted R^2	AIC
Altitude	0.04228525	1438.663
Difficulty (of jump)	-0.003212615	1452.262
Distance (from Moscow)	-0.0003385914	1451.421
Difficulty + Altitude	0.03911718	1440.622
Difficulty + Distance	-0.003458247	1453.325
Altitude + Distance	0.04217186	1439.689
Altitude + Distance + Difficulty	0.03907736	1441.622

Results

01
Adjusted R^2 < 0.05

Best: altitude, 0.04228525.

02
AIC > 1400 for all of the models

Best: altitude, 1438.663

Possibilities:
- Looking at incorrect variables
- No singular factor plays a large role in a skater's performance
  - Critics claims are unfounded

CONCLUSION

No singular factor that has a significant impact on Trusova's jump performance

Valid data, but not necessarily reliable

- Small sample size → limited by data collection process
- Bias and variability in judging

Results cannot be generalized to the sport of figure skating as a whole until it can be supported by data gathered from the careers of other skaters

- Competitions need to collect additional data, include skater-specific sensitive information from a larger variety of skaters

THANKS FOR LISTENING!!

Sincerely,
Lab 7 Team 5