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Interim rank and risk-taking: Evidence from long jump competitions

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Abstract

Using data from long jump competitions from IAAF World Championships and Olympics from 2005 to 2017, we find evidence that interim rank is an important determinant of risk-taking and that ranking information can impact risk-taking in different ways across gender. An athlete's rank relative to (1) their peers' performances, (2) their own ability, and (3) their peers' abilities all appear to be important in different scenarios.

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1. Introduction

In major International Association of Athletics Federation (IAAF) competitions, long jump tournaments are set up as sequential rank-order tournaments. Athletes compete sequentially across a series of jumps with the winner of the competition determined by which athlete had the longest jump across all jumps within the tournament. Research dating back to Lazear and Rosen (1981) has investigated the role that a rank-order tournament setting has on an individual's effort and risk-taking. Individuals competing in rank-order tournaments are concerned with their relative ranking within the tournament, rather than their absolute performance, and in some tournaments, information about a participant's current standing is learned throughout the tournament. In this paper, we seek to understand how this ranking information discovered within the tournament might influence a participant's risk-taking.

Information about how an athlete is performing, which is learned throughout the tournament, provides three important measures of relative performance. By viewing the live leaderboard, athletes learn how they are currently performing relative to how their peers are currently performing, relative to their own ability, and relative to their peers' abilities. Often, researchers hypothesize that a higher ranked athlete might succumb to the psychological pressure of being in front, which can lead to "choking" behaviors. Within long jump competitions, only the athlete's longest jump among all of their attempts counts in their final ranking. As a result, an athlete cannot reduce their standing during an attempt, so top ranked athletes are less likely to choke due to psychological pressure like they can in other settings.

Rather, we hypothesize that the ranking information learned within the tournament reflects changes in the tradeoffs an athlete faces when deciding how much risk to take. In long jump competitions, the athletes attempt to jump as far as possible without fouling. In an ideal outcome, the athlete will run at their optimal speed and take off for the jump as close to the foul line as possible without fouling. This requires the athletes to balance running quickly down the runway with ensuring that they take off before crossing the foul line. An athlete could always avoid fouling but this will likely lead to a shorter jump. With the interim ranking information, athletes might weigh these tradeoffs differently and behave differently.

An athlete who has nothing to lose or who has performed well relative to their peers or their own ability will not necessarily be harmed from fouling, so we hypothesize that this could lead to greater risk-taking and more fouling. These tradeoffs likely change throughout the tournament, so we also consider how the information affects risk-taking differently throughout the tournament. Finally, we also consider whether the information affects male and female athletes differently as research has shown that there can be gender differences in how athletes respond to tournament incentives (Wozniak (2012), Gilsdorf and Sukhatme (2013), Böheim et.al. (2022)).

Closely related to our research, other studies have investigated whether an athlete's interim, ordinal rank in a tournament affects the athlete's performance.[1] Using weightlifting data, Genakos and Pagliero (2012) find that athletes underperform and take on more risk when ranked closer to the top. Genakos, Pagliero, and Garbi (2015) replicate this result using diving data and

[1] Our focus is on whether interim rank affects performance, but researchers have also examined whether order of play (Apesteguia and Palacios-Huerta (2010); Brady and Insler (2019); Hill (2014); and Emerson and Hill (2014)), monetary incentives (Hickman and Metz, 2015), or the presence of a superstar (Brown (2011) and Hill (2014)) influence athlete performance.

find that divers ranked closer to the top tend to underperform. Hickman, Kerr, and Metz (2018) use golf data to reach a similar conclusion; golfers playing in the lead tend to underperform.

Similar to Hickman, Kerr, and Metz (2018), one advantage to using long jump competitions is that the athletes attempt the exact same task during each attempt of the tournament: jump as far as possible. Weight lifters choose the weight they will attempt to lift before each lift and divers choose their dives before the competition begins so the athletes are attempting different tasks as the tournament progresses. A substantial difference between our setting and the golf setting is that only a jumper's longest jump is used in determining tournament rankings. When an individual athlete jumps, the athlete can improve their distance on the leaderboard but their leaderboard distance will not decline no matter how the athlete performs. An improvement in distance might not improve the athlete's ranking but nothing the athlete does on their attempt can reduce their ranking.

An advantage of our setting over golf is the availability of information regarding interim rank for all athletes. Hickman, Kerr, and Metz (2018) discuss the possibility that golfers ranked far from first place potentially suffer from a lack of information regarding their live ranking. Because long jump competitions have only twelve athletes in the finals and a common competition space, athletes have full and complete information about current rankings at each jump within the tournament. This allows us to remove information asymmetry as a potential determinant of our results.

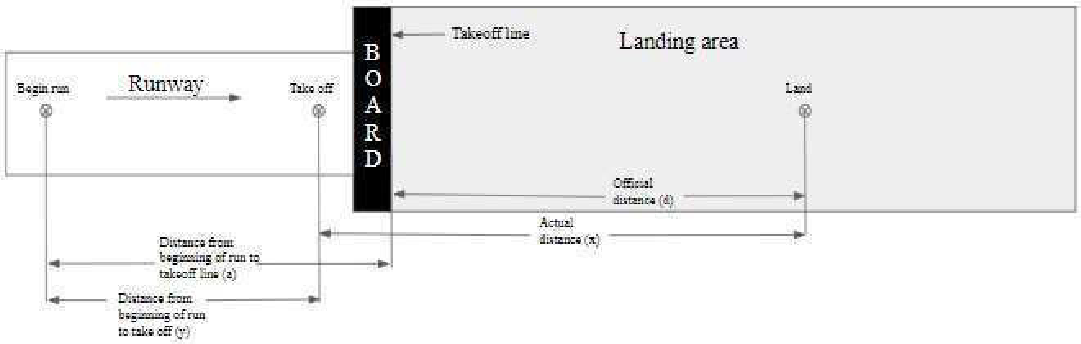
While we are concerned with how interim rank affects performance of athletes, researchers have also focused on how interim rank affects performance in academic settings. For example, Elsner and Isphording (2017) use data from the National Longitudinal Study of Adolescent to Adult Health to show that a student's ordinal rank, controlling for absolute ability, in high school leads to stronger academic achievements later in life. Murphy and Weinhardt (2020) use administrative data from English schools and also show that students with ordinal rankings closer to the top of the class tend to have better future achievements, regardless of absolute ability.

Using data from the long jump events during the World Championships and Olympics from 2005-2017, our results indicate that an athlete's interim rank affects their risk-taking, and this affect varies across gender and within the tournament. When using a rank relative to their peers' current performance, we consistently find that athletes are more likely to foul when they are ranked higher, and this effect gets larger throughout the tournament for both male and female athletes. By measuring rank relative to one's own ability, we find that athletes are more likely to foul when they have set their season best, but this effect is only found for female athletes. Finally, when we look at an athlete's rank relative to their peers' abilities, we find that athletes are more likely to foul during early attempts and less likely to foul during later attempts when they can potentially be passed by other competitors.

2. Long jump competitions

In long jump competitions, athletes compete over a series of attempts where each athlete sprints down a runway and jumps as far as possible into a landing area filled with sand. See Figure 1 for an illustration. At the end of the runway is a take-off board which the athlete targets to maximize their distance. The official distance of the jump (d) is recorded by measuring the distance from the edge of the takeoff line nearest to the landing area to the location in the sand where the athlete first made a break in the sand with their body or anything attached to their body.[2] The distance is measured to the nearest centimeter. If the athlete touches the ground beyond the takeoff board while leaping (y>a), a foul is committed. If so, the distance is not measured and the athlete is considered to have failed the attempt, and receives no distance for that attempt of the tournament.

Figure 1: Long jump diagram[3]



The athlete is attempting to jump as far as possible (maximize x), which requires running at a fast speed down the runway. The athlete also wants to minimize the distance between x and d without fouling, so they want to take off as close to the takeoff line as possible without crossing it. An athlete could always avoid fouling by running slower and ensuring that they are able to take off before fouling, but this will reduce x and d. They could also run fast but ensure they leap well before the takeoff line, but this will reduce d. As a result, the athlete faces a tradeoff between behaving aggressively (running fast and taking off close to foul line) or safely (running slowly or taking off far from the foul line).

The finishing position of the athletes within the tournament is determined by comparing each athlete's longest recorded official distance (d) across all attempts of the tournament. If two or more athletes have the same longest distance, the athlete whose second longest recorded jump is farther is ranked higher. If the athletes have the same second longest jump, relative positions are determined by looking at whose third longest jump is longer, and so on. In IAAF tournaments with more than eight competitors, all athletes in the finals are guaranteed at least three attempts.[4] After all athletes have completed their first three attempts, the eight athletes with the longest recorded distances are awarded three additional attempts.

With only one long jump runway and landing area per tournament, athletes take their jumps in sequential order. The tournament begins with each athlete making their first jump attempt in sequence. After all athletes have completed the first attempt, the tournament continues with each athlete making their second jump attempt in sequence. This process then continues throughout the tournament. According to IAAF rules, the sequential order in which athletes take the first attempt is randomly determined by lots. Once this initial jump order is determined, the order remains unchanged throughout the first three attempts of the tournament. For the athletes who are awarded three additional jumps, the order for the final three attempts of the tournament is a reverse ranking order of the athletes after all athletes have completed their first three

[2] See IAAF (2017) for more information about competition rules.
[3] Figure 1 is the authors' drawing of a similar image seen in Ladany, Humes, and Sphicas (1975).
[4] In IAAF competitions, there is also a qualifying round where athletes compete over a similarly structured tournament but the only goal is to qualify for the finals. All analysis in our paper examines only the finals.

attempts. The athlete with the longest recorded distance after the conclusion of the first three attempts of the tournament jumps last over the final three attempts of the tournament and the athlete with the eighth longest recorded distance after the first three attempts jumps first over the final three attempts.

Tournaments following this structure include those organized by the International Association of Athletic Federations (IAAF) which is responsible for organizing the Olympic Games and the World Championships in Athletics.[5] Since 1991, the IAAF has held the World Championships biennially and the Olympics have been held every four years since 1912. The structure described above is the same for both male and female tournaments. Table 1 below shows the results from the women's long jump competition at the 2017 IAAF World Championships. The table shows each athlete's results over the six attempts of the tournament with their longest jump recorded based on all jumps. The table is ordered by finishing position and does not reflect the order in which the jumps were taken. The finishing position is determined based on the longest recorded jump after all attempts are taken. As seen in Table 1, Brittney Reese won the tournament with a jump of 7.02 meters which she recorded on her third attempt. When athletes were judged to have failed the attempt, the distance of the jump is not measured and the athlete is awarded an X for that attempt.

Table 1: IAAF World Championships, 2017

	Attempt							
Athlete	1	2	3	4	5	6	Longest jump	Finishing position
Brittney Reese	6.75	X	7.02	X	X	X	7.02	1
Darya Klishina	6.78	6.88	X	6.91	7.00	6.83	7.00	2
Tianna Bartoletta	6.56	6.60	X	6.64	6.88	6.97	6.97	3
Ivana Španovic	X	6.96	6.77	X	X	6.91	6.96	4
Lorraine Ugen	X	X	6.72	X	X	6.40	6.72	5
Brooke Stratton	6.27	6.54	6.67	6.55	6.67	6.64	6.67	6
Chantel Malone	6.52	6.44	6.57	X	X	6.52	6.57	7
Blessing Okagbare	6.40	6.55	6.47	6.49	X	6.31	6.55	8
Lauma Griva	6.54	X	6.42				6.54	9
Claudia Salman-Rath	6.39	6.29	6.54				6.54	10
Eliane Martins	6.52	X	X				6.52	11
Alina Rotaru	6.29	6.20	6.46				6.46	12

The table is ordered based on finishing position. It does not show the order in which the jumps were taken. X indicates that the athlete fouled on the attempt.

3. Risk-taking and relative rank

In order to determine whether interim information affects athletes' risk-taking, we use an indicator of whether athlete *i* fouled on an attempt *a* in tournament *t* ($foul_{ita}$). Fouling is likely an incomplete measure of risk-taking since an athlete could have taken a high-risk attempt and not

[5] See www.iaaf.org for more information about the association.

fouled. In that case, the athlete likely achieved an improved mark, maybe even a new season best or personal best. However, an elite long jumper who fouls on an attempt has likely taken too much risk on that jump attempt. We will therefore use fouling as a measure of (extreme) risk taking in elite long jump competitions.

With our risk-taking measure defined, we next consider the construction of our relative rank measures. The sequential nature of the tournament allows for athletes to observe a live updated leaderboard with information from all jumps already taken in the tournament, including the jump by the immediately preceding athlete during the current attempt of the tournament. As a result, prior to every jump attempt, an athlete is able to compare their performance to their peers' current performance, their own ability, and their peers' abilities.

To compare an athlete's performance to their peers' current performances, we construct live leaderboard rankings. This live leaderboard rank variable, $rank_{ita}$, is a relative ranking of athlete *i*'s longest jump in tournament t prior to taking attempt *a* compared to all other athletes' longest jumps completed up to that point in the tournament. The rank for each athlete is recalculated after each jump attempt taken throughout the tournament, regardless of which athlete has made the jump attempt, and includes all information about jump attempts completed in the tournament prior to athlete *i*'s current attempt.[6] After constructing the live leaderboard rank variable, we then convert the absolute rank to a rank percentile, where the top ranked athlete has a rank percentile of 100, as done for class rank in Elsner and Isphording (2017) and Murphy and Weinhardt (2020). Converting absolute rank to a rank percentile will allow our methods to be more easily extended to other situations and data sets.

To compare an athlete's performance to their own ability, we create the variable $setbest_{ita}$, which is equal to 1 if athlete *i*'s leaderboard distance is longer than their pretournament season best, and 0 otherwise. Athletes who are ranked well relative to their own ability will have a *setbest* equal to 1. Finally, to compare an athlete's performance to their peers' abilities, we create $bepassed_{ita}$, which is equal to 1 if at least one trailing athlete, with at least one additional upcoming attempt, has a pretournament season best that is longer than athlete *i*'s leaderboard distance during attempt *a* of tournament *t*, and 0 otherwise (note that during the 6th, and final, attempt of the tournament an athlete who has already completed their last attempt is no longer able to pass another athlete, regardless of pretournament season best).[7] When athletes have a *bepassed* value of 0, they may perceive little risk from fouling so might take more risk. However, if the athlete cannot be passed because they are performing poorly, they might want to take on less risk in order to secure a good jump. When *bepassed* is equal to 1, the athlete can be harmed by fouling so may take less risk. However, an athlete who can be passed may take more risk for the chance to increase their distance and become more difficult to pass. Thus, it is unclear whether athletes would be more likely to take more risk when *bepassed* is 0 or 1.

To illustrate the leaderboard information for a specific athlete, Table 2 shows the live leaderboard settings that exist before Brittney Reese attempts her second jump in the 2017 World Championships. Brittney Reese jumped 6.75 meters on her first attempt, and by the time she is ready for her second attempt, that mark leaves her in third place with a *rank* percentile of 81.2%.

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[6] With the live leaderboard, athletes have a sense of their live leaderboard rank as soon as the first athlete has taken their first jump attempt. However, our analysis only includes information for attempts 2-6 for each athlete.

[7] We also consider a variable that captures whether an athlete has competitors ranked above them whose leaderboard distance is less than the athlete's season best. This variable captures whether there are competitors that the athlete could reasonably expect to pass. However, since this variable is highly correlated with *setbest*, it is not included in the analysis.

Brittney Reese's season best is 7.13 meters so she is not ranked well relative to her own ability and *setbest* is 0. Six of the nine athletes trailing Brittney Reese have season best jumps that are farther than 6.75 meters (indicated with * in the table) and each of these athletes has at least one more upcoming jump attempt, so Brittney Reese does not rank well relative to her peers' abilities and *bepassed* is 1.

Table 2: Live leaderboard for Brittney Reese's 2nd attempt at the 2017 IAAF World Championships

Athlete	Jump order	Live leaderboard	Rank	Season best
Ivana Španovic	3	6.96	1	7.24
Darya Klishina	4	6.88^	2	6.84
Brittney Reese	10	6.75	3	7.13
Tianna Bartoletta	11	6.56	4	7.01*
Blessing Okagbare	2	6.55	5	6.77*
Lauma Griva	7	6.54	6	6.72
Chantel Malone	5	6.52	7	6.67
Eliane Martins	6	6.52	8	6.69
Claudia Salman-Rath	8	6.39	9	6.94*
Alina Rotaru	9	6.29	10	6.78*
Brooke Stratton	12	6.27	11	6.79*
Lorraine Ugen	1	X	12	6.97*

The table is ordered based on rank immediately before Brittney Reese's second attempt. X indicates that the athlete has not yet recorded a mark. * indicate athletes ranked below Brittney Reese but with longer season bests (note that all athletes have at least one more attempt in the tournament). ^ indicate athletes who have set their season best.

The final attempt of the tournament differs from the earlier attempts since, once an athlete completes their sixth attempt, they have no additional attempts in the tournament. Table 3 shows the live leaderboard settings that exist before Brittney Reese attempts her sixth, and final, jump in the 2017 World Championships. Brittney Reese's longest jump at this point in the tournament occurred on her third attempt (7.02 meters), and by the time she is ready for her sixth attempt, that mark keeps her in first place with a *rank* percentile of 100%. Brittney Reese's season best is 7.13 meters so she is not ranked well relative to her own ability and *setbest* is 0. One of the seven athletes trailing Brittney Reese has a season best jump that is farther than 7.02 meters, but that athlete has already completed her last attempt and, therefore, cannot pass Brittney Reese, meaning *bepassed* is 0.

Table 3: Live leaderboard for Brittney Reese's 6th attempt at the 2017 IAAF World Championships

Athlete	Jump order	Live leaderboard	Rank	Season best
Brittney Reese	8	7.02	1	7.13
Darya Klishina	6	7^	2	6.84
Tianna Bartoletta	3	6.97	3	7.01
Ivana Španovic	7	6.96	4	7.24

Lorraine Ugen	5	6.72	5	6.97
Brooke Stratton	4	6.67	6	6.79
Chantel Malone	2	6.57	7	6.67
Blessing Okagbare	1	6.55	8	6.77

The table is ordered based on rank before Brittney Reese's sixth attempt. ^ indicate athletes who have set their season best. Reese cannot be passed since all other athletes have taken their last attempt.

4. Data

Data collected include information on 113 athletes comprising 766 observations from the World Championships in Athletics and Olympics that occurred from 2005 to 2017. As the tournament progresses, the impact of the interim ranking information might have different effects, so our analysis below considers whether the impacts differ by attempt. Table 4 provides summary statistics across the attempts. As seen in the table, athletes, including female and male athletes, foul on 34% of their attempts and are ranked near the 54th percentile on average. The foul probabilities remain somewhat stable with slightly higher probabilities in later attempts, and an athlete's rank percentile tends to be higher in the last three attempts as only the top 8 athletes continue.

Table 4: Summary statistics, by attempt

	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Attempt 6	Overall
			Overall (N=766)			
foul	0.31	0.30	0.37	0.41	0.34	0.34
rank	37.44	46.81	65.64	65.56	66.56	54.14
setbest	0.05	0.08	0.16	0.17	0.23	0.13
bepassed	0.93	0.82	0.73	0.75	0.18	0.71
			Female (N=384)			
foul	0.33	0.28	0.38	0.45	0.30	0.34
rank	37.59	46.40	66.19	65.91	66.62	54.12
setbest	0.04	0.07	0.17	0.17	0.23	0.13
bepassed	0.95	0.78	0.78	0.80	0.13	0.72
			Male (N=382)			
foul	0.28	0.32	0.36	0.38	0.39	0.34
rank	37.29	47.22	65.09	65.21	66.51	53.99
setbest	0.05	0.08	0.16	0.17	0.22	0.13
bepassed	0.91	0.86	0.67	0.70	0.23	0.71

Source: Authors' calculations based on data from IAAF World Championships and Olympics from 2005-2017. Calculations are from all jumps after the first round of attempts.

Overall, athletes can be passed 71% of the time with similar percentages for female (72%) and male (71%) athletes, but this likelihood is lower in the final attempt of the tournament. Finally, athletes have set a season best 13% of the time, and the probability that an athlete has set their season best increases as the tournament progresses.

5. Empirical strategy

In order to estimate the impact that the interim ranking has on long jumpers throughout the tournament, we estimate a model of the following form:

$$foul_{ita} = \propto + \beta_1 rank_{ita} + \beta_2 setbest_{ita} + \beta_3 bepassed_{ita} + \beta_4 attempt3_{ita} + \beta_5 attempt4_{ita} + \beta_6 attempt5_{ita} + \beta_7 attempt6_{ita} + \beta_8 (rank_{ita} * attempt3_{ita}) + \beta_9 (rank_{ita} * attempt4_{ita}) + \beta_{10} (rank_{ita} * attempt5_{ita}) + \beta_{11} (rank_{ita} * attempt6_{ita}) + \beta_{12} (setbest_{ita} * attempt3_{ita}) + \beta_{13} (setbest_{ita} * attempt4_{ita}) + \beta_{14} (setbest_{ita} * attempt5_{ita}) + \beta_{15} (setbest_{ita} * attempt6_{ita}) + \beta_{16} (bepassed_{ita} * attempt3_{ita}) + \beta_{17} (bepassed_{ita} * attempt4_{ita}) + \beta_{18} (bepassed_{ita} * attempt5_{ita}) + \beta_{19} (bepassed_{ita} * attempt6_{ita}) + \delta jumpwind_{ita} + \lambda_{it} + \lambda_a + \varepsilon_{ita} \qquad (1)$$

where *foul* is our measure of risk-taking, *rank, setbest,* and *bepassed* reflect the various rank measures, and *attempt* is a set of dummy variables for attempt. For example, *attempt3* equals 1 if it is the athlete's third attempt and equals 0 otherwise. We also control for the speed of the wind (jumpwind) at the time of the athlete's jump. λ_{it} is a fixed effect for the athlete-tournament, λ_a is a fixed effect for the attempt, and ε_{ita} is an error term. The athlete-tournament fixed effect is included to control for unobserved heterogeneity that is fixed for an athlete within a given tournament and the attempt fixed effect is included to control for variables that are fixed across athletes within a given attempt. We estimate equation (1) for all athletes and separately for female and male athletes to consider whether the information affects athletes differently by gender.

6. Results

Table 5 presents the estimation results of equation (1) with heteroskedasticity-robust standard errors reported in parentheses. The three estimated models reported in columns (1), (2), and (3) of Table 5 are used to estimate marginal effects for (1) all athletes, (2) female athletes, and (3) male athletes, respectively. Note that marginal effects are calculated at the mean values of all variables. Table 6 presents the estimated marginal effects across attempts for all athletes, female athletes, and male athletes.

Results from the top panel of Table 6 show that athletes take on more risk when they are performing well relative to their peers' performances, and the impact of a higher rank relative to how peers are performing increases as the tournament progresses. An increase of 10 percentage points in rank increases the probability of fouling by 3 percentage points on second attempts but by 10 percentage points on the sixth and final attempt. In addition, when athletes have set their season best, they are more likely to take a risk and foul; this occurs during attempts 2 and 3, but not in later attempts. Finally, athletes who are ranked poorly relative to their peers' abilities (*bepassed*=1) are more likely to foul in the second attempt, but less likely to foul in attempt 6.

This highlights how the ranking information can affect risk-taking differently throughout the tournament as the knowledge that peers can potentially outperform an athlete cause them to take on more risk in the second attempt but less risk in the final attempt.

Table 5: OLS estimates

	(1)	(2)	(3)
	Overall (N=766)	Female (N=384)	Male (N=382)
rank	0.003**	0.003**	0.002
	(0.001)	(0.002)	(0.002)
attempt3	-0.068	0.088	-0.186
	(0.133)	(0.258)	(0.148)
attempt4	0.090	0.287	-0.102
	(0.203)	(0.327)	(0.282)
attempt5	0.190	0.555*	-0.151
	(0.208)	(0.328)	(0.288)
attempt6	-0.106	0.117	-0.306
	(0.202)	(0.325)	(0.280)
rank*attemp3	0.004**	0.005**	0.003
	(0.002)	(0.002)	(0.002)
rank*attemp4	0.004	0.005	0.005
	(0.003)	(0.004)	(0.004)
rank*attemp5	0.004	-0.002	0.009**
	(0.003)	(0.004)	(0.004)
rank*attemp6	0.007**	0.005	0.009**
	(0.003)	(0.003)	(0.004)
setbest	0.469**	0.734***	0.225
	(0.187)	(0.283)	(0.197)
setbest*attempt3	-0.143	-0.335	0.018
	(0.190)	(0.309)	(0.185)
setbest*attempt4	-0.437**	-0.823***	-0.087
	(0.188)	(0.263)	(0.206)
setbest*attempt5	-0.237	-0.382	-0.229
	(0.194)	(0.302)	(0.183)
setbest*attempt6	-0.381**	-0.698***	-0.112
	(0.174)	(0.256)	(0.185)
bepassed	0.239*	0.392	0.115
	(0.131)	(0.247)	(0.170)
bepassed*attempt3	-0.142	-0.446	0.077
	(0.159)	(0.289)	(0.188)
bepassed*attempt4	-0.291*	-0.502*	-0.126
	(0.171)	(0.299)	(0.225)
bepassed*attempt5	-0.345**	-0.276	-0.406*
	(0.173)	(0.300)	(0.220)

bepassed*attempt6	-0.490***	-0.621**	-0.405*
	(0.170)	(0.292)	(0.222)
adj. R-sq	0.1687	0.1822	0.1603

The table displays estimates for model (1) with heteroskedasticity-consistent standard errors reported in parentheses. All models include athlete-tournament fixed effects, attempt fixed effects, and jump wind as described in the text. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels.

Results from the middle and bottom panels of Table 6 show some similarities and differences across genders in how interim rank information affects risk-taking. Both female and male athletes are more likely to take on risk when they are performing well relative to how their peers are performing. For female athletes, the impact remains somewhat stable throughout the tournament, but the impact increases throughout the tournament for male athletes. Only female athletes take on more risk when they are performing well relative to their own ability, and this effect is not stable throughout the tournament. On attempts 2 and 5, female athletes are significantly more likely to foul when they have set their season best in the tournament, but this information does not impact risk-taking during other attempts. However, only male athletes are significantly affected by their ranking relative to their peers' abilities, and this effect is not stable throughout the tournament. On attempts 5 and 6, male athletes are significantly less likely to foul if they can potentially be passed by other competitors, but this information does not impact risk-taking during other attempts.

Table 6: Marginal effects by attempt

	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Attempt 6
			Overall (N=766)		
rank	0.003**	0.007***	0.007***	0.007**	0.010***
	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
setbest	0.469**	0.326**	0.032	0.232	0.088
	(0.187)	(0.155)	(0.139)	(0.147)	(0.126)
bepassed	0.239*	0.096	-0.053	-0.106	-0.251**
	(0.131)	(0.115)	(0.111)	(0.117)	(0.103)
			Female (N=384)		
rank	0.003**	0.009***	0.008**	0.002	0.008**
	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)
setbest	0.734***	0.399	-0.089	0.351*	0.036
	(0.283)	(0.244)	(0.197)	(0.191)	(0.168)
bepassed	0.392	-0.055	-0.110	0.115	-0.229
	(0.247)	(0.155)	(0.176)	(0.184)	(0.150)
			Male (N=382)		
rank	0.002	0.005**	0.007*	0.011***	0.011***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)

setbest	0.225	0.243	0.138	-0.003	0.113
	(0.197)	(0.200)	(0.184)	(0.203)	(0.189)
bepassed	0.115	0.192	-0.011	-0.291**	-0.290**
	(0.170)	(0.191)	(0.147)	(0.136)	(0.144)

The table displays marginal effects by attempt, using model (1), calculated at the mean values of variables. Standard errors are reported in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

7. Conclusion

Using data from long jump competitions that occurred during IAAF World Championships and Olympics from 2005 to 2017, we find evidence that an athlete's risk-taking is impacted by that athlete's interim rank and this affect varies across gender and within the tournament. Long jump tournaments provide a nice setting to investigate whether rank information impacts an athlete's risk-taking in a rank-order tournament. The sequential nature of the tournament and the available information provide a scenario in which athletes have live information about rank within the tournament. Because long jump competitions have only twelve athletes in the finals and a common competition space, athletes have full and complete information about current rankings at every jump attempt within the tournament. This allows us to remove information asymmetry as a potential determinant of our results.

The results of our analysis suggest that interim rank is an important determinant of risk-taking. In fact, an athlete's rank relative to their peers' performances, their own ability, and their peers' abilities all seem to matter in different scenarios. Our results add to the literature concerning how interim rankings can impact future performance and risk-taking. Our results show that interim rank is an important determinant of risk-taking, and that ranking information can impact risk-taking in different ways across gender.

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