

Project 1 - Powerlifting Data

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Introduction

This report utilizes a [database](#) that consists of around 3 million observations of different metrics of meet data from power lifters across the globe. Powerlifting is a sport competed at the Global & National level. In a power lifting meet, lifters are given a period of time (usually 6 months) to lift as most weight as possible in 3 lifts. These lifts are seen as the pinnacle of strength standards worldwide, and have existed for more than a century! These lifts include:

- **The Barbell Bench Press**

- Upper Body Dominant, primarily uses the Chest, Triceps, Shoulders, in order to lift a barbell of a certain weight off the chest. A good bench press is seen as smooth, well-leveled barbell, with little to no extraneous movement from the Glutes.

- **The Barbell Back Squat**

- Lower Body Dominant, Primarily uses the Quads, Glutes, & Core to lift a barbell of certain weight in a squatting motion off the shoulders/traps. A Good Barbell Back-Squat lift consists of good posture, smooth movement, and good depth (knee crease reach below 90 degrees).

- **The Barbell Deadlift**

- Arguably the staple of power lifting, the Deadlift requires the coordination of the whole body in order to successfully lift a barbell of certain weight off the ground, to proper lockout. A good Deadlift is seen as smooth, little to no “jerking,” the weight up, and with good-fair posture.

Lifters are given around 3 attempts to lift the most amount of weight possible per lift, which is progressive. These attempts must meet certain standards, or else their “lift,” becomes disqualified. This disqualification comes from judges, and it only takes one judge to disqualify a lift. Lifters can be disqualified for others reasons as well (illegal drugs, using equipment when not allowed, not meeting weight, etc.) These lifts then get their lifts added up to a

total, which consists of their heaviest Squat, Deadlift, and Bench Press. It is important to note that each lift is only counted once, and that each lifter gets the same amount of lifts to attempt. Some meets can be done with equipment, or without (raw).

Equipment usually will improve the amount of weight you can lift by assisting certain muscles that fatigue more quickly than your primary muscle movers. Lifters are categorized by sex, weight class, and sometimes age class. Generally, the higher the weight-class, the higher the total. The lower the weight class, the higher the pound-for-pound ratio (**Total / Body weight**).

Two questions I've come up with while reviewing this data are...

1. **What is the difference between Age & Weight classes on their progression from Raw to Unlimited equipment lifts? Why might this be?**
2. **What is the difference of pound-for-pound strength versus total strength when looking at different weight classes? Why might this be?**

This data consists of a lot of NA variables, especially in the some of the lift columns (Best1SquatKg, Best2DeadliftKg, etc.). We'll be removing ALL character columns (except name) as those are just identifying variables, that don't exactly aid the questions we're trying to answer. We need to remove these vectors first, because we want to keep all the rows with complete lift data. There are many rows that have NA values in their identifier columns, so including the **drop_na()** function after we de-select all of these rows helps us retain the most lift data we can.

I'll also be creating three new columns, AgeClass, WeightClass, and p4p (Pound For Pound). **Pound for Pound is the ratio of a lifter's Total / Body Weight**. Pound for Pound is a great indicator of strength for those who aren't able to achieve "heavyweight" status.

Last but not least, I'll be incorporating some **functions** into the code so I don't have to copy and paste the same line of code 10 times. The use of functions reduces the lines of code I have to write. these and are great for when I want to make an individual change to the structure of a visualization/dataframe without having to change every iteration of the code.

Question 1

What is the difference between Age & Weight classes on their progression from Raw to Unlimited equipment lifts? Why might this be?

Overview

As a lifter wears more equipment, generally, their total increases. However, weight & age have indirect implications of strength. While these metrics are more observant than indicative

(i.e. all water is H2O but not all H2O is water), they can help us gain insight on the limits of strength/potential when looking at elite power-lifters.

Graphs

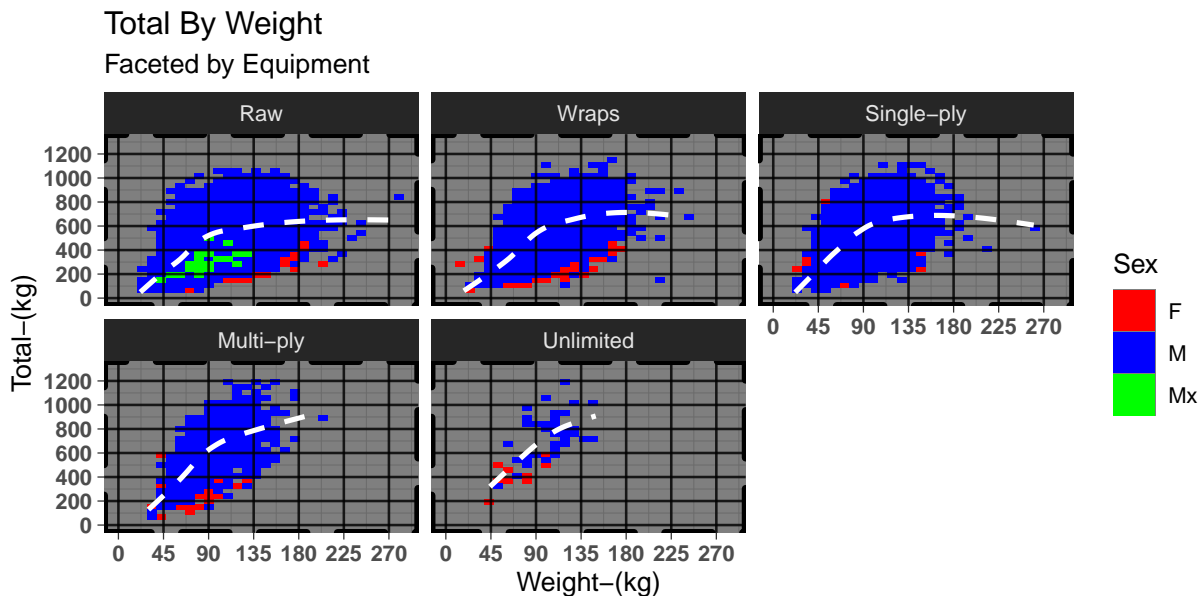
I'll be using a **2d Bin Graph** to express this data in terms of density, rather than just regular points (200,000 observations is allot!). I'll also be comparing the shape & structure that these density plots make, as well as creating a best fit line to highlight the general trend among the data. I'll use the "gam" (General Additive Model) method for `geom_smooth()`, as it is best for data-sets with a high count of observations. Lastly, I'll manually create "**Class-Cages**", in order to better visualize the different Classes. It is also important to note that the Colors are not to scale when comparing the population of different Sex's.

Data/Leaders

Given the vast quantity of observations, I'll display the *top 3* strongest lifters in each Class (*Weight, Age, and Sex*).

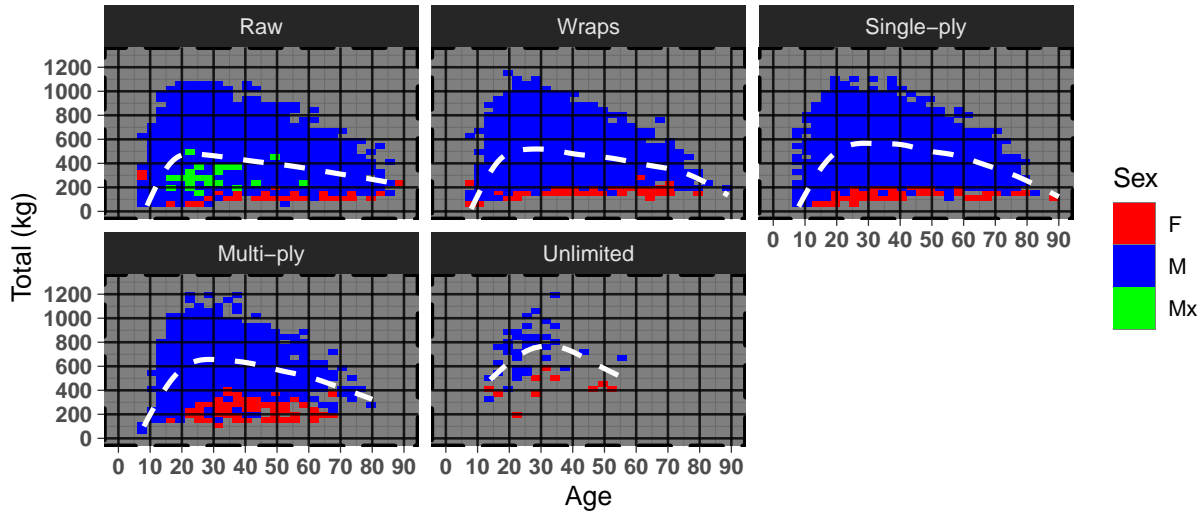
Total

By Weight



By Age

Best Total by Age Faceted by Equipment



Total Leaders

Table 1: Top 3 Lifters by Weight Class

WeightClass	Name	TotalKg	BodyweightKg	Sex	p4p	Age	Equipment
270-315	Jared Viazanko	862.50	285.00	M	3.03	25.0	Raw
225-270	Timothy Edwards	650.00	226.70	M	2.87	58.0	Raw
225-270	Cyrus Tucker	660.00	241.10	M	2.74	26.0	Wraps
225-270	Travis Roberson	872.50	230.80	M	3.78	27.0	Wraps
180-225	Jammie Muniz	410.00	188.80	F	2.17	28.0	Raw
180-225	Stephanie Aliimatafitafi	450.00	185.00	F	2.43	29.0	Raw
180-225	Jiselle Olivarez	540.00	183.10	F	2.95	18.5	Raw
180-225	Doug Allen #1	960.00	180.10	M	5.33	28.0	Raw
180-225	Brandis Dew	982.50	188.20	M	5.22	31.0	Wraps
180-225	Nick Cook #3	1017.50	186.00	M	5.47	25.0	Wraps
135-180	Kasey Croy	645.00	144.79	F	4.45	29.0	Wraps
135-180	Dina Hakeai	650.00	173.20	F	3.75	27.5	Raw
135-180	Lagi Marina AhSang	712.50	153.40	F	4.64	19.5	Raw
135-180	Rodney Woodward Jr	1203.00	156.80	M	7.67	37.0	Multi-ply
135-180	Chuck Fought	1211.09	137.21	M	8.83	21.5	Multi-ply
135-180	Rodney Woodward	1270.01	155.60	M	8.16	36.0	Multi-ply
90-135	Kiersten Scurlock	697.50	98.80	F	7.06	26.0	Wraps
90-135	Kaycee Galitz	714.41	112.80	F	6.33	25.0	Raw

WeightClass	Name	TotalKg	BodyweightKg	Sex	p4p	Age	Equipment
90-135	Tamara Walcott	735.00	132.38	F	5.55	35.0	Raw
90-135	Steve Acquaro	1136.25	128.37	M	8.85	22.5	Multi-ply
90-135	Derrick Bender	1190.68	116.85	M	10.19	35.0	Unlimited
90-135	Jeremy Frey	1210.00	107.73	M	11.23	30.0	Multi-ply
90-135	Willamina O'Keeffe	377.50	126.65	Mx	2.98	35.5	Raw
90-135	Oskar Marchock	467.50	111.00	Mx	4.21	49.0	Raw
90-135	Angel Flores #1	500.00	92.42	Mx	5.41	21.5	Raw
45-90	Hunter Henderson #1	715.00	82.40	F	8.68	27.0	Wraps
45-90	Taylor Ruder	760.00	74.20	F	10.24	29.5	Multi-ply
45-90	K. Hayes	787.50	52.00	F	15.14	14.5	Single-ply
45-90	Michael Johnston	1015.00	81.20	M	12.50	21.5	Raw
45-90	Cody Hairston	1020.00	88.18	M	11.57	21.5	Wraps
45-90	Mike Donovan	1031.92	80.20	M	12.87	29.5	Raw
45-90	Brett Richmond	347.50	81.50	Mx	4.26	32.0	Raw
45-90	Emilia McConnell	350.00	87.00	Mx	4.02	24.5	Raw
45-90	Ryan Frankland	365.00	85.40	Mx	4.27	35.0	Raw
0-45	Yekaterina Osipova	480.00	42.45	F	11.31	14.5	Single-ply
0-45	Wei-Ling Chen	500.00	43.52	F	11.49	20.0	Single-ply
0-45	N. Baker	567.50	44.00	F	12.90	41.0	Multi-ply
0-45	Landon Kaiser	620.00	40.78	M	15.20	30.5	Raw
0-45	Valentin Muntyan	655.00	41.60	M	15.75	10.5	Single-ply
0-45	Jordan Walters	732.50	40.82	M	17.94	12.0	Raw

Table 2: Top 3 Lifters by Age Class

AgeClass	Name	TotalKg	BodyweightKg	Sex	p4p	Age	Equipment
0-9	Elena Moshnikova	277.50	59.40	F	4.67	9.0	Raw
0-9	Emily Cooper	320.00	28.70	F	11.15	8.5	Raw
0-9	A. Gray	615.00	48.00	F	12.81	8.5	Raw
0-9	Larry Butler	670.00	100.00	M	6.70	9.5	Single-ply
0-9	Ryan Elliot	680.00	99.10	M	6.86	9.0	Single-ply
0-9	Joe O'Brien	748.43	90.00	M	8.32	9.5	Single-ply
10-15	A. Alfred	578.33	82.50	F	7.01	14.5	Raw
10-15	Evgenia Kolodko	587.50	80.40	F	7.31	14.5	Single-ply
10-15	K. Hayes	787.50	52.00	F	15.14	14.5	Single-ply
10-15	Oleksandr Lebediev	887.50	66.30	M	13.39	14.5	Single-ply
10-15	Joshua Chovanec	907.50	106.20	M	8.55	14.5	Single-ply
10-15	Max Shethar	920.00	92.90	M	9.90	14.0	Raw
16-20	Ekaterina Sadokhina	620.00	73.65	F	8.42	17.5	Single-ply
16-20	T. Frederick	632.76	80.00	F	7.91	16.5	Single-ply

AgeClass	Name	TotalKg	BodyweightKg	Sex	p4p	Age	Equipment
16-20	Lagi Marina AhSang	712.50	153.40	F	4.64	19.5	Raw
16-20	Thoger Boyum	1050.00	103.40	M	10.15	18.5	Raw
16-20	Ray Bowring	1050.50	153.20	M	6.86	18.5	Single-ply
16-20	Nicolas Stone	1065.94	139.71	M	7.63	18.5	Raw
16-20	Ashton Meaux	200.00	61.00	Mx	3.28	16.0	Raw
16-20	Adam Henson #2	285.00	81.70	Mx	3.49	17.0	Raw
21-30	Kaycee Galitz	714.41	112.80	F	6.33	25.0	Raw
21-30	Hunter Henderson #1	715.00	82.40	F	8.68	27.0	Wraps
21-30	Taylor Ruder	760.00	74.20	F	10.24	29.5	Multi-ply
21-30	Steve Acquaro	1136.25	128.37	M	8.85	22.5	Multi-ply
21-30	Erick Lewis	1156.66	168.92	M	6.85	21.0	Wraps
21-30	Chuck Fought	1211.09	137.21	M	8.83	21.5	Multi-ply
21-30	Daniel Kitchen	322.50	111.50	Mx	2.89	22.5	Raw
21-30	Emilia McConnell	350.00	87.00	Mx	4.02	24.5	Raw
21-30	Angel Flores #1	500.00	92.42	Mx	5.41	21.5	Raw
31-40	Kelly Vogel	660.00	129.18	F	5.11	31.5	Wraps
31-40	Alla Khotimchenko	660.00	90.00	F	7.33	34.5	Single-ply
31-40	Tamara Walcott	735.00	132.38	F	5.55	35.0	Raw
31-40	Rodney Woodward Jr	1203.00	156.80	M	7.67	37.0	Multi-ply
31-40	Jeremy Frey	1210.00	107.73	M	11.23	30.0	Multi-ply
31-40	Rodney Woodward	1270.01	155.60	M	8.16	36.0	Multi-ply
31-40	Jen Hubbard	355.00	114.90	Mx	3.09	36.5	Raw
31-40	Ryan Frankland	365.00	85.40	Mx	4.27	35.0	Raw
31-40	Willamina O'Keeffe	377.50	126.65	Mx	2.98	35.5	Raw
41-50	Cheryl Clodfelter	621.42	90.00	F	6.90	46.0	Multi-ply
41-50	Deb Widdis	642.50	72.67	F	8.84	45.5	Multi-ply
41-50	Tracey Patrick	662.24	66.90	F	9.90	42.5	Multi-ply
41-50	Mathys Herbst	1005.00	152.50	M	6.59	41.5	Raw
41-50	Saka El	1017.50	141.30	M	7.20	42.0	Single-ply
41-50	Brian Hopper	1068.21	108.86	M	9.81	40.0	Raw
41-50	Adrian	240.00	79.70	Mx	3.01	43.0	Raw
	Hyyrlainen-Trett						
41-50	Oskar Marchock	467.50	111.00	Mx	4.21	49.0	Raw
51-60	Bonnie Carlson	510.29	90.72	F	5.62	50.0	Raw
51-60	Collette Bates	542.04	98.52	F	5.50	50.0	Raw
51-60	Patricia Johnson	575.00	98.40	F	5.84	52.5	Raw
51-60	Arne Giseth Geir	887.50	119.12	M	7.45	53.5	Raw
51-60	Mike Swierczynski	893.58	107.32	M	8.33	59.0	Multi-ply
51-60	James Mike Phillips	900.38	97.40	M	9.24	56.0	Raw
51-60	Ardel Thomas	217.50	91.10	Mx	2.39	58.0	Raw
61-70	Oksana Gronovim	427.50	55.52	F	7.70	64.0	Single-ply

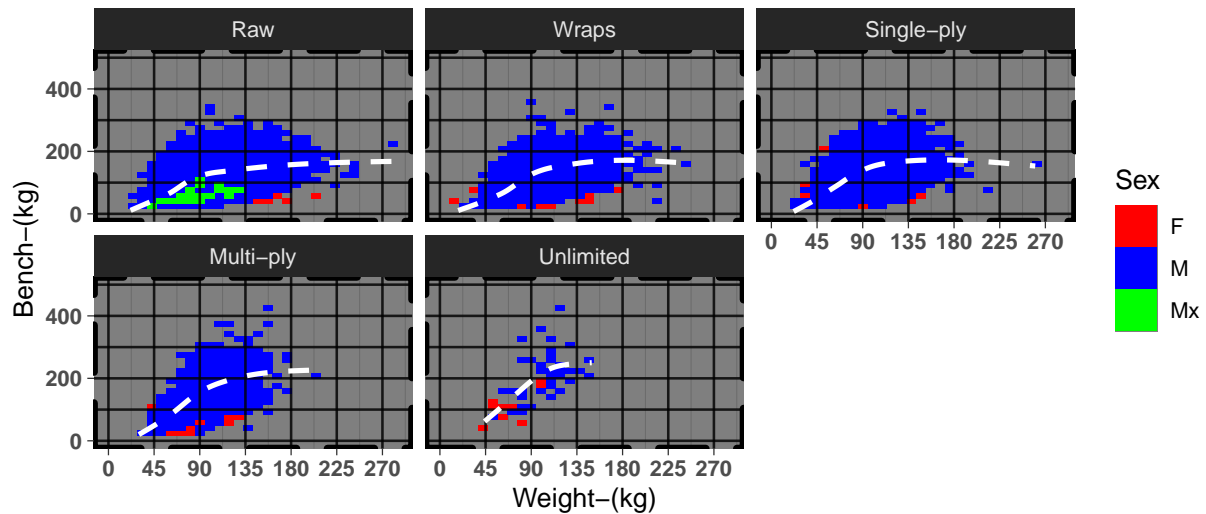
AgeClass	Name	TotalKg	BodyweightKg	Sex	p4p	Age	Equipment
61-70	Ruth Walker	437.50	51.60	F	8.48	63.5	Raw
61-70	Melissa Bales	457.50	67.50	F	6.78	66.0	Multi-ply
61-70	Petr Kochetov	790.00	135.80	M	5.82	61.5	Single-ply
61-70	Robert Coleman	830.00	62.50	M	13.28	60.0	Single-ply
61-70	Greg Collins	862.28	81.90	M	10.53	60.5	Raw
71-80		340.00	65.85	F	5.16	71.5	Raw
71-80	Judy Glenney	376.48	61.55	F	6.12	70.5	Raw
71-80	Barbara Haiden	480.00	80.50	F	5.96	71.0	Wraps
71-80	Hal Mulholland	673.58	122.68	M	5.49	71.5	Raw
71-80	Charles Clonce	677.50	106.20	M	6.38	70.5	Single-ply
71-80	B. Amanzholov	692.50	81.20	M	8.53	71.5	Single-ply
81+	Ruth Coak	177.50	57.29	F	3.10	80.0	Raw
81+	Gretchen Beers	177.50	55.00	F	3.23	81.0	Raw
81+	Natalie Attino	217.50	63.95	F	3.40	89.0	Raw
81+	Bryan McMaster	340.00	72.40	M	4.70	82.0	Raw
81+	Tito Bastianelli Sr	410.00	85.55	M	4.79	87.0	Raw
81+	Emil Alin	535.00	112.70	M	4.75	81.5	Raw

Bench

By Weight

Best Bench by Weight

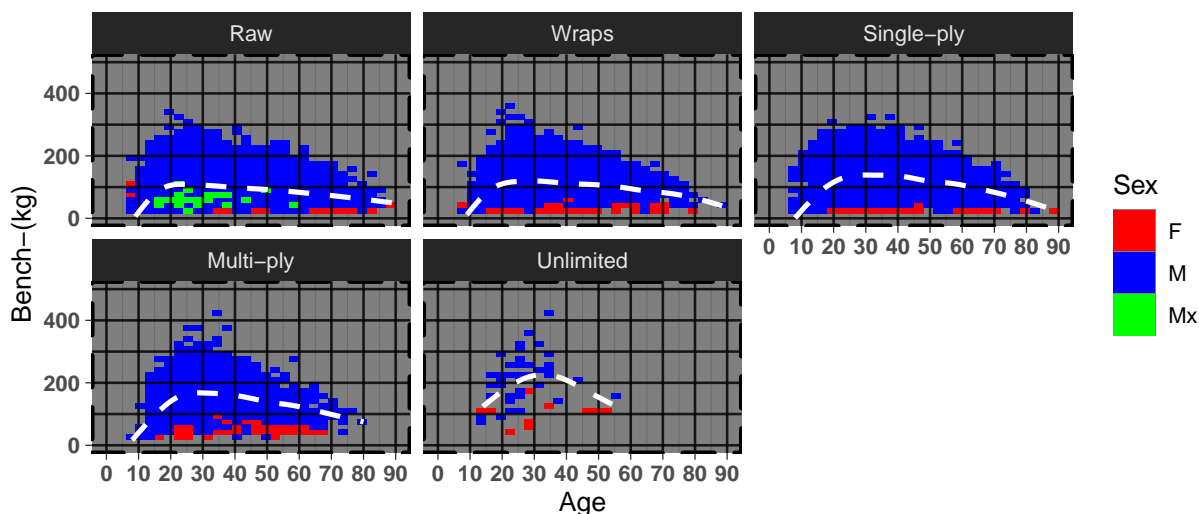
Faceted by Equipment



By Age

Best Bench by Age

Faceted by Equipment



Bench Leaders

Table 3: Top 3 Lifters by Weight Class

WeightClass	Name	BestBenchKg	BodyweightKg	Sex	p4p	Age	Equipment
270-315	Jared Viazanko	222.50	285.00	M	3.03	25.0	Raw
225-270	Dmitriy Vasin	160.00	260.00	M	2.19	32.5	Single-ply
225-270	Cyrus Tucker	165.00	241.10	M	2.74	26.0	Wraps
225-270	Travis Roberson	215.00	230.80	M	3.78	27.0	Wraps
180-225	Jammie Muniz	95.00	188.80	F	2.17	28.0	Raw
180-225	Stephanie Aliimatafitafi	95.00	185.00	F	2.43	29.0	Raw
180-225	Jiselle Olivarez	127.50	183.10	F	2.95	18.5	Raw
180-225	Cody O'Connell	245.00	196.10	M	4.44	26.0	Raw
180-225	Nick Cook #3	252.50	186.00	M	5.47	25.0	Wraps
180-225	Brandis Dew	257.50	188.20	M	5.22	31.0	Wraps
135-180	Kasey Croy	137.50	144.79	F	4.45	29.0	Wraps
135-180	Dina Hakeai	155.00	173.20	F	3.75	27.5	Raw
135-180	Lagi Marina AhSang	177.50	153.40	F	4.64	19.5	Raw
135-180	Erick Lewis	349.27	168.92	M	6.85	21.0	Wraps
135-180	Rodney Woodward Jr	382.00	156.80	M	7.67	37.0	Multi-ply

WeightClass	Name	BestBenchKg	BodyweightKg	Sex	p4p	Age	Equipment
135-180	Rodney Woodward	432.50	155.60	M	8.16	36.0	Multi-ply
90-135	Tamara Walcott	172.50	132.38	F	5.55	35.0	Raw
90-135	Kaycee Galitz	181.44	112.80	F	6.33	25.0	Raw
90-135	Emmali Pfister	183.70	100.79	F	5.78	32.0	Unlimited
90-135	Jeremy Frey	369.68	107.73	M	11.23	30.0	Multi-ply
90-135	Elliot Baum	376.48	121.11	M	7.83	25.5	Multi-ply
90-135	Derrick Bender	419.57	116.85	M	10.19	35.0	Unlimited
90-135	Jen Hubbard	72.50	114.90	Mx	3.09	36.5	Raw
90-135	Oskar Marchock	100.00	111.00	Mx	4.21	49.0	Raw
90-135	Angel Flores #1	110.00	92.42	Mx	5.41	21.5	Raw
45-90	Niki Stein	179.17	80.20	F	7.92	30.0	Multi-ply
45-90	Taylor Ruder	190.00	74.20	F	10.24	29.5	Multi-ply
45-90	K. Hayes	207.50	52.00	F	15.14	14.5	Single-ply
45-90	James Donaldson	310.71	88.00	M	10.08	21.0	Wraps
45-90	Robert Paxson	324.32	80.69	M	11.97	32.0	Unlimited
45-90	Cody Hairston	355.00	88.18	M	11.57	21.5	Wraps
45-90	Ryan Frankland	67.50	85.40	Mx	4.27	35.0	Raw
45-90	Brett Richmond	77.50	81.50	Mx	4.26	32.0	Raw
45-90	Emilia McConnell	85.00	87.00	Mx	4.02	24.5	Raw
0-45	N. Baker	110.00	44.00	F	12.90	41.0	Multi-ply
0-45	C. Sharp	115.67	44.00	F	10.57	16.5	Single-ply
0-45	Yekaterina Osipova	122.50	42.45	F	11.31	14.5	Single-ply
0-45	Mikhail Filippov	155.00	35.20	M	16.34	10.5	Single-ply
0-45	Jordan Walters	160.00	40.82	M	17.94	12.0	Raw
0-45	Valentin Muntyan	167.50	41.60	M	15.75	10.5	Single-ply

Table 4: Top 3 Lifters by Age Class

AgeClass	Name	BestBenchKg	BodyweightKg	Sex	p4p	Age	Equipment
0-9	Elena Moshnikova	52.50	59.40	F	4.67	9.0	Raw
0-9	Emily Cooper	72.50	28.70	F	11.15	8.5	Raw
0-9	A. Gray	115.00	48.00	F	12.81	8.5	Raw
0-9	Anthony Richardson	170.10	93.44	M	6.70	9.0	Wraps
0-9	Gabriel Sosa	187.50	49.60	M	12.30	8.5	Raw
0-9	Joe O'Brien	188.24	90.00	M	8.32	9.5	Single-ply

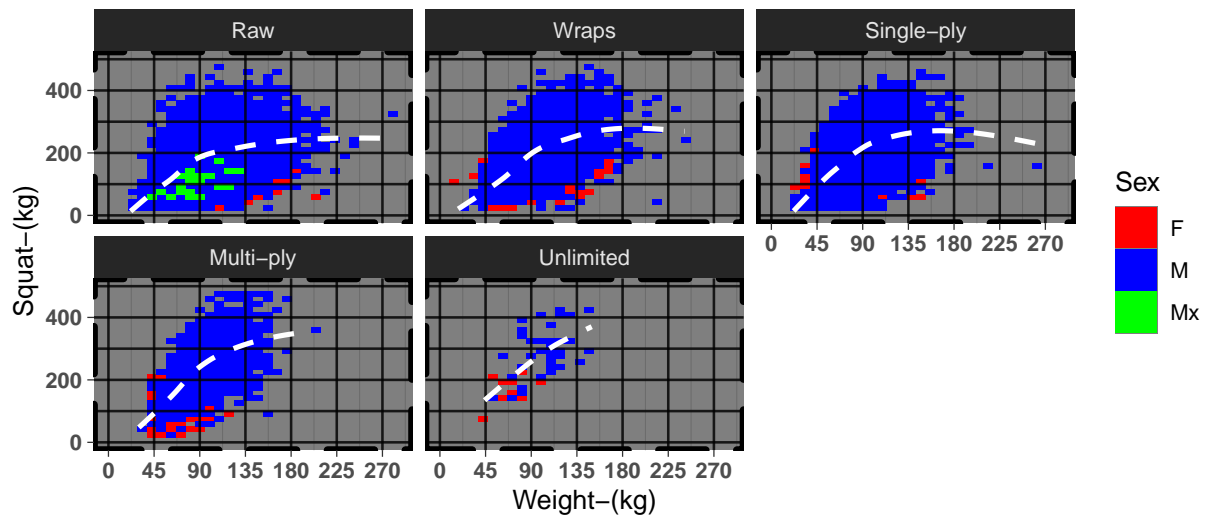
AgeClass	Name	BestBenchKg	BodyweightKg	Sex	p4p	Age	Equipment
10-15	A. Alfred	125.00	82.50	F	7.01	14.5	Raw
10-15	Bethanie Rodriguez	142.88	102.69	F	5.41	14.5	Single-ply
10-15	K. Hayes	207.50	52.00	F	15.14	14.5	Single-ply
10-15	Trey Villarreal	240.40	84.73	M	9.58	13.5	Single-ply
10-15	Oleksandr Lebediev	250.00	66.30	M	13.39	14.5	Single-ply
10-15	Joshua Chovanec	250.00	106.20	M	8.55	14.5	Single-ply
16-20	T. Frederick	165.56	80.00	F	7.91	16.5	Single-ply
16-20	N. Hall	175.00	58.50	F	9.40	18.0	Single-ply
16-20	Lagi Marina AhSang	177.50	153.40	F	4.64	19.5	Raw
16-20	Mykyta Skobelev	280.00	92.50	M	10.54	19.5	Single-ply
16-20	Bryson Muniz	281.23	98.88	M	9.54	18.5	Multi-ply
16-20	Thoger Boyum	347.50	103.40	M	10.15	18.5	Raw
16-20	Ashton Meaux	42.50	61.00	Mx	3.28	16.0	Raw
16-20	Adam Henson #2	52.50	81.70	Mx	3.49	17.0	Raw
21-30	Patricia Morgan #2	175.00	82.50	F	7.52	21.0	Multi-ply
21-30	Kaycee Galitz	181.44	112.80	F	6.33	25.0	Raw
21-30	Taylor Ruder	190.00	74.20	F	10.24	29.5	Multi-ply
21-30	Cody Hairston	355.00	88.18	M	11.57	21.5	Wraps
21-30	Christopher Kuchta	362.87	103.19	M	10.33	28.0	Unlimited
21-30	Elliot Baum	376.48	121.11	M	7.83	25.5	Multi-ply
21-30	Daniel Kitchen	72.50	111.50	Mx	2.89	22.5	Raw
21-30	Emilia McConnell	85.00	87.00	Mx	4.02	24.5	Raw
21-30	Angel Flores #1	110.00	92.42	Mx	5.41	21.5	Raw
31-40	Tamara Walcott	172.50	132.38	F	5.55	35.0	Raw
31-40	Niki Stein	179.17	80.20	F	7.92	30.0	Multi-ply
31-40	Emmali Pfister	183.70	100.79	F	5.78	32.0	Unlimited
31-40	Rodney Woodward Jr	382.00	156.80	M	7.67	37.0	Multi-ply
31-40	Derrick Bender	419.57	116.85	M	10.19	35.0	Unlimited
31-40	Rodney Woodward	432.50	155.60	M	8.16	36.0	Multi-ply
31-40	Jen Hubbard	72.50	114.90	Mx	3.09	36.5	Raw
31-40	Willamina O’Keeffe	72.50	126.65	Mx	2.98	35.5	Raw
31-40	Brett Richmond	77.50	81.50	Mx	4.26	32.0	Raw
41-50	Deb Widdis	140.62	72.67	F	8.84	45.5	Multi-ply
41-50	Annie Rivieccio	157.50	81.40	F	7.59	40.0	Multi-ply
41-50	Tracey Patrick	174.63	66.90	F	9.90	42.5	Multi-ply
41-50	Brian Hopper	290.30	108.86	M	9.81	40.0	Raw
41-50	Jason Christus	292.50	162.65	M	6.15	40.0	Single-ply
41-50	Jay Knobler	300.00	121.50	M	6.58	46.0	Single-ply
41-50	Adrian Hyyrlainen-Trett	60.00	79.70	Mx	3.01	43.0	Raw

AgeClass	Name	BestBenchKg	BodyweightKg	Sex	p4p	Age	Equipment
41-50	Oskar Marchock	100.00	111.00	Mx	4.21	49.0	Raw
51-60	Patricia Johnson	120.00	98.40	F	5.84	52.5	Raw
51-60	Candice Maness	122.50	69.90	F	5.90	56.0	Single-ply
51-60	Bonnie Carlson	130.00	90.72	F	5.62	50.0	Raw
51-60	Jim Ljungqvist	240.00	119.30	M	6.89	51.5	Single-ply
51-60	Joashim Flett	247.50	100.00	M	7.40	52.0	Multi-ply
51-60	Mike Swierczynski	276.69	107.32	M	8.33	59.0	Multi-ply
51-60	Ardel Thomas	42.50	91.10	Mx	2.39	58.0	Raw
61-70	Oksana Gronovim	95.00	55.52	F	7.70	64.0	Single-ply
61-70	Ruth Walker	102.50	51.60	F	8.48	63.5	Raw
61-70	Melissa Bales	110.00	67.50	F	6.78	66.0	Multi-ply
61-70	Glenn Smith	204.12	96.16	M	7.81	61.0	Raw
61-70	Robert Coleman	215.00	62.50	M	13.28	60.0	Single-ply
61-70	Greg Collins	220.00	81.90	M	10.53	60.5	Raw
71-80	Toni M Wolfe	72.50	67.40	F	4.49	71.0	Wraps
71-80	Judy Glenney	77.11	61.55	F	6.12	70.5	Raw
71-80	Barbara Haiden	130.00	80.50	F	5.96	71.0	Wraps
71-80	Charles Clonce	165.00	106.20	M	6.38	70.5	Single-ply
71-80	B. Amanzholov	172.50	81.20	M	8.53	71.5	Single-ply
71-80	Hal Mulholland	177.50	122.68	M	5.49	71.5	Raw
81+	Ruth Coak	35.00	57.29	F	3.10	80.0	Raw
81+	Gretchen Beers	35.00	55.00	F	3.23	81.0	Raw
81+	Natalie Attino	40.00	63.95	F	3.40	89.0	Raw
81+	Tito Bastianelli Sr	87.50	85.55	M	4.79	87.0	Raw
81+	Blade McClelland	87.50	82.50	M	3.94	82.0	Raw
81+	Emil Alin	135.00	112.70	M	4.75	81.5	Raw

Squat

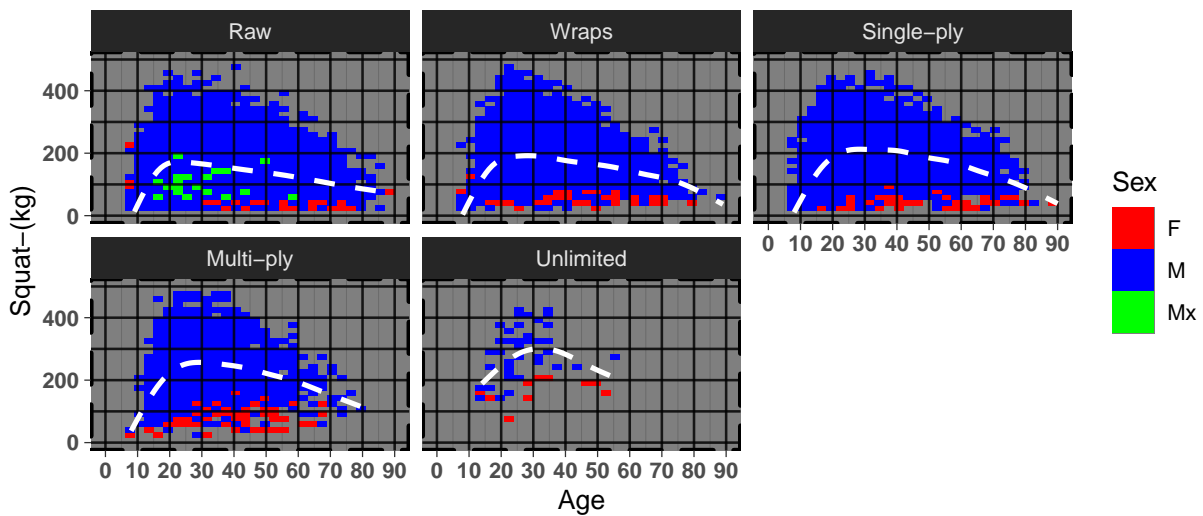
By weight

Best Squat by Weight Faceted by Equipment



By Age

Best Squat by Age Faceted by Equipment



Squat Leaders

Table 5: Top 3 Lifters by Weight Class

WeightClass	Name	BestSquatKg	BodyweightKg	Sex	p4p	Age	Equipment
270-315	Jared Viazanko	320.00	285.00	M	3.03	25.0	Raw
225-270	Timothy Edwards	240.00	226.70	M	2.87	58.0	Raw
225-270	Cyrus Tucker	247.50	241.10	M	2.74	26.0	Wraps
225-270	Travis Roberson	347.50	230.80	M	3.78	27.0	Wraps
180-225	Jammie Muniz	140.00	188.80	F	2.17	28.0	Raw
180-225	Stephanie Aliimatafitafi	182.50	185.00	F	2.43	29.0	Raw
180-225	Jiselle Olivarez	227.50	183.10	F	2.95	18.5	Raw
180-225	Brandis Dew	385.00	188.20	M	5.22	31.0	Wraps
180-225	Nick Cook #3	392.50	186.00	M	5.47	25.0	Wraps
180-225	Doug Allen #1	412.50	180.10	M	5.33	28.0	Raw
135-180	Julia Hamilton #1	267.50	142.50	F	4.28	32.0	Wraps
135-180	Aisha Garcia	270.00	156.20	F	3.68	19.5	Single-ply
135-180	Lagi Marina AhSang	300.00	153.40	F	4.64	19.5	Raw
135-180	Chuck Fought	492.15	137.21	M	8.83	21.5	Multi-ply
135-180	Daniel Clarke #3	510.00	178.62	M	6.24	37.0	Multi-ply
135-180	Rodney Woodward	517.50	155.60	M	8.16	36.0	Multi-ply
90-135	Kiersten Scurlock	302.50	98.80	F	7.06	26.0	Wraps
90-135	Kaycee Galitz	317.51	112.80	F	6.33	25.0	Raw
90-135	Kelly Vogel	320.00	129.18	F	5.11	31.5	Wraps
90-135	Monty Crotzer	476.27	122.29	M	9.14	25.5	Multi-ply
90-135	Andrew John Pfefferle	500.00	133.20	M	8.13	29.0	Multi-ply
90-135	Jason Ehlert	510.00	120.40	M	9.43	34.0	Multi-ply
90-135	Willamina O’Keeffe	150.00	126.65	Mx	2.98	35.5	Raw
90-135	Oskar Marchock	172.50	111.00	Mx	4.21	49.0	Raw
90-135	Angel Flores #1	190.00	92.42	Mx	5.41	21.5	Raw
45-90	K. Hayes	297.50	52.00	F	15.14	14.5	Single-ply
45-90	Hunter Henderson #1	305.00	82.40	F	8.68	27.0	Wraps
45-90	Taylor Ruder	317.50	74.20	F	10.24	29.5	Multi-ply
45-90	Christen Haywood	417.50	88.00	M	11.49	28.0	Multi-ply
45-90	Chad Penson	420.00	81.33	M	12.26	23.0	Raw
45-90	Michael Johnston	440.00	81.20	M	12.50	21.5	Raw
45-90	Jules Tucher	130.00	80.90	Mx	3.92	22.0	Raw
45-90	Brett Richmond	130.00	81.50	Mx	4.26	32.0	Raw
45-90	Ryan Frankland	137.50	85.40	Mx	4.27	35.0	Raw

WeightClass	Name	BestSquatKg	BodyweightKg	Sex	p4p	Age	Equipment
0-45	Yekaterina Osipova	187.50	42.45	F	11.31	14.5	Single-ply
0-45	N. Baker	205.00	44.00	F	12.90	41.0	Multi-ply
0-45	Wei-Ling Chen	210.00	43.52	F	11.49	20.0	Single-ply
0-45	Semyon Chernousov	237.50	40.00	M	15.06	13.5	Raw
0-45	Valentin Muntyan	255.00	41.60	M	15.75	10.5	Single-ply
0-45	Jordan Walters	292.50	40.82	M	17.94	12.0	Raw

Table 6: Top 3 Lifters by Age Class

AgeClass	Name	BestSquatKg	BodyweightKg	Sex	p4p	Age	Equipment
0-9	Hannah Dittrich	102.50	46.05	F	5.56	8.5	Raw
0-9	Emily Cooper	105.00	28.70	F	11.15	8.5	Raw
0-9	A. Gray	230.00	48.00	F	12.81	8.5	Raw
0-9	Ryan Elliot	245.00	99.10	M	6.86	9.0	Single-ply
0-9	Larry Butler	255.00	100.00	M	6.70	9.5	Single-ply
0-9	Joe O'Brien	283.50	90.00	M	8.32	9.5	Single-ply
10-15	Bethanie Rodriguez	238.14	102.69	F	5.41	14.5	Single-ply
10-15	Evgenia Kolodko	250.00	80.40	F	7.31	14.5	Single-ply
10-15	K. Hayes	297.50	52.00	F	15.14	14.5	Single-ply
10-15	Oleksandr Lebediev	340.00	66.30	M	13.39	14.5	Single-ply
10-15	Joshua Chovanec	340.00	106.20	M	8.55	14.5	Single-ply
10-15	Max Shethar	347.50	92.90	M	9.90	14.0	Raw
16-20	Aisha Garcia	270.00	156.20	F	3.68	19.5	Single-ply
16-20	Alyssa Ramirez	275.00	88.43	F	6.62	18.5	Single-ply
16-20	Lagi Marina AhSang	300.00	153.40	F	4.64	19.5	Raw
16-20	Nicolas Stone	453.59	139.71	M	7.63	18.5	Raw
16-20	JT Krivinskas	454.05	99.74	M	10.24	17.0	Multi-ply
16-20	Mike Cogoni	456.31	134.08	M	7.21	18.0	Multi-ply
16-20	Ashton Meaux	65.00	61.00	Mx	3.28	16.0	Raw
16-20	Adam Henson #2	115.00	81.70	Mx	3.49	17.0	Raw
21-30	Hunter Henderson #1	305.00	82.40	F	8.68	27.0	Wraps
21-30	Taylor Ruder	317.50	74.20	F	10.24	29.5	Multi-ply
21-30	Kaycee Galitz	317.51	112.80	F	6.33	25.0	Raw
21-30	Monty Crotzer	476.27	122.29	M	9.14	25.5	Multi-ply
21-30	Chuck Fought	492.15	137.21	M	8.83	21.5	Multi-ply

AgeClass	Name	BestSquatKg	BodyweightKg	Sex	p4p	Age	Equipment
21-30	Andrew John Pfefferle	500.00	133.20	M	8.13	29.0	Multi-ply
21-30	Emilia McConnell	125.00	87.00	Mx	4.02	24.5	Raw
21-30	Jules Tucher	130.00	80.90	Mx	3.92	22.0	Raw
21-30	Angel Flores #1	190.00	92.42	Mx	5.41	21.5	Raw
31-40	Tamara Walcott	272.50	132.38	F	5.55	35.0	Raw
31-40	Diane Gmitter Flemming	283.50	87.09	F	7.58	35.0	Multi-ply
31-40	Kelly Vogel	320.00	129.18	F	5.11	31.5	Wraps
31-40	Jason Ehlert	510.00	120.40	M	9.43	34.0	Multi-ply
31-40	Daniel Clarke #3	510.00	178.62	M	6.24	37.0	Multi-ply
31-40	Rodney Woodward	517.50	155.60	M	8.16	36.0	Multi-ply
31-40	Ryan Frankland	137.50	85.40	Mx	4.27	35.0	Raw
31-40	Jen Hubbard	137.50	114.90	Mx	3.09	36.5	Raw
31-40	Willamina O'Keeffe	150.00	126.65	Mx	2.98	35.5	Raw
41-50	Cheryl Clodfelter	249.48	90.00	F	6.90	46.0	Multi-ply
41-50	Deb Widdis	272.16	72.67	F	8.84	45.5	Multi-ply
41-50	Tracey Patrick	275.00	66.90	F	9.90	42.5	Multi-ply
41-50	Saka El	412.50	141.30	M	7.20	42.0	Single-ply
41-50	Volodimy Ivanenko	415.50	109.20	M	8.97	42.5	Single-ply
41-50	Brian Hopper	467.20	108.86	M	9.81	40.0	Raw
41-50	Adrian Hyyrlainen-Trett	80.00	79.70	Mx	3.01	43.0	Raw
41-50	Oskar Marchock	172.50	111.00	Mx	4.21	49.0	Raw
51-60	Bonnie Carlson	195.04	90.72	F	5.62	50.0	Raw
51-60	Patricia Johnson	202.50	98.40	F	5.84	52.5	Raw
51-60	Collette Bates	204.12	98.52	F	5.50	50.0	Raw
51-60	Keith Banner	365.00	128.50	M	6.77	51.5	Raw
51-60	Mike Swierczynski	367.41	107.32	M	8.33	59.0	Multi-ply
51-60	Terry Davis #1	385.00	118.16	M	7.49	55.0	Raw
51-60	Ardel Thomas	65.00	91.10	Mx	2.39	58.0	Raw
61-70	Ruth Walker	160.00	51.60	F	8.48	63.5	Raw
61-70	Terry Harrell	161.03	53.80	F	7.04	60.0	Wraps
61-70	Melissa Bales	170.00	67.50	F	6.78	66.0	Multi-ply
61-70	Robert Lawson	300.28	84.93	M	8.13	64.5	Raw
61-70	Brant Givler	305.00	106.28	M	7.13	61.0	Raw
61-70	Greg Collins	327.50	81.90	M	10.53	60.5	Raw
71-80		130.00	65.85	F	5.16	71.5	Raw
71-80	Judy Glenney	140.61	61.55	F	6.12	70.5	Raw
71-80	Barbara Haiden	175.00	80.50	F	5.96	71.0	Wraps
71-80	Smuk Ferenc	242.50	91.40	M	6.37	71.0	Wraps

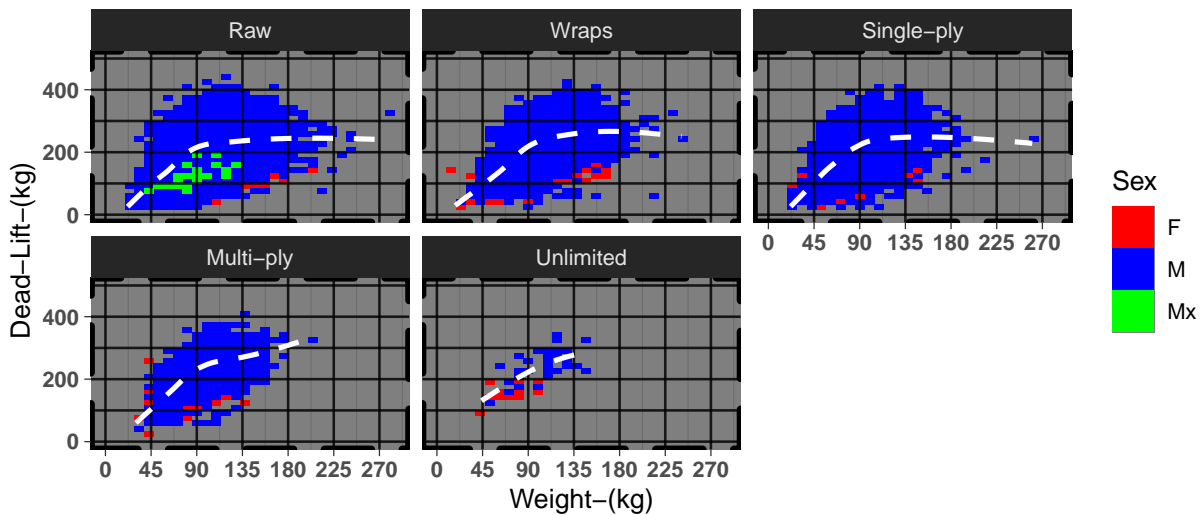
AgeClass	Name	BestSquatKg	BodyweightKg	Sex	p4p	Age	Equipment
71-80	B. Amanzholov	250.00	81.20	M	8.53	71.5	Single-ply
71-80	Charles Clonce	282.50	106.20	M	6.38	70.5	Single-ply
81+	Gretchen Beers	52.50	55.00	F	3.23	81.0	Raw
81+	Margaret Rodda	55.00	54.00	F	3.06	84.0	Raw
81+	Natalie Attino	77.50	63.95	F	3.40	89.0	Raw
81+	Bryan McMaster	120.00	72.40	M	4.70	82.0	Raw
81+	Tito Bastianelli Sr	152.50	85.55	M	4.79	87.0	Raw
81+	Emil Alin	190.00	112.70	M	4.75	81.5	Raw

Dead-Lift

By weight

Best Dead-Lift by Weight

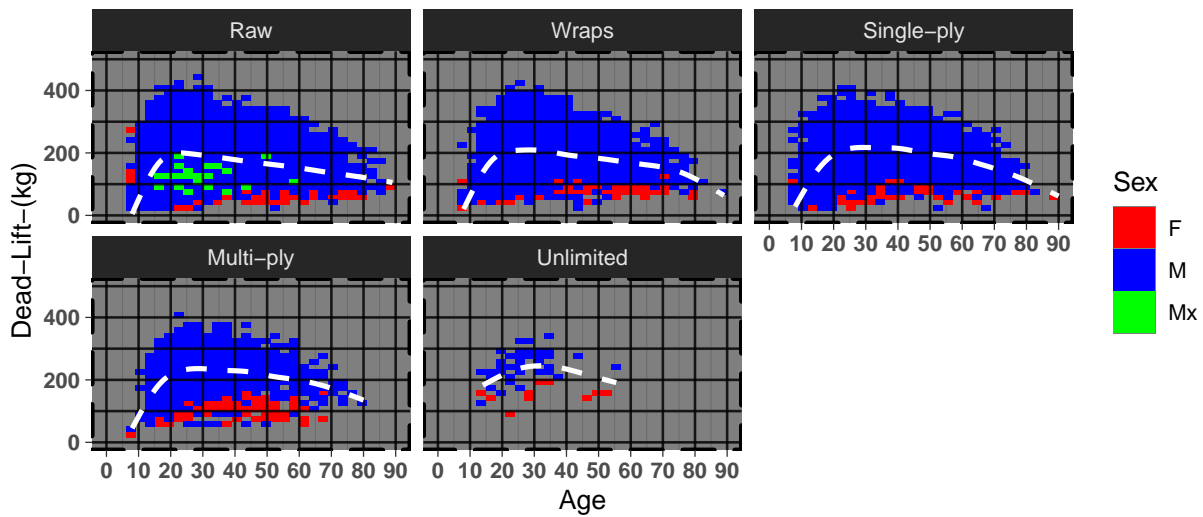
Faceted by Equipment



By Age

Best Dead-Lift by Age

Faceted by Equipment



Dead-Lift Leaders

Table 7: Top 3 Lifters by Weight Class

WeightClass	Name	BestDeadliftKg	BodyweightKg	Sex	p4p	Age	Equipment
270-315	Jared Viazanko	320.00	285.00	M	3.03	25.0	Raw
225-270	Timothy Edwards	255.00	226.70	M	2.87	58.0	Raw
225-270	Mitchell Garcia	262.50	239.00	M	2.72	32.0	Raw
225-270	Travis Roberson	327.50	230.80	M	3.78	27.0	Wraps
180-225	Stephanie	172.50	185.00	F	2.43	29.0	Raw
	Aliimatafitafi						
180-225	Jammie Muniz	177.50	188.80	F	2.17	28.0	Raw
180-225	Jiselle Olivarez	185.00	183.10	F	2.95	18.5	Raw
180-225	Adam Stephens	350.00	184.84	M	4.73	27.0	Raw
180-225	Brandis Dew	365.00	188.20	M	5.22	31.0	Wraps
180-225	Nick Cook #3	400.00	186.00	M	5.47	25.0	Wraps
135-180	Britney Baker	260.00	137.30	F	4.57	27.0	Raw
135-180	Kasey Croy	260.00	144.79	F	4.45	29.0	Wraps
135-180	Dina Hakeai	270.00	173.20	F	3.75	27.5	Raw
135-180	Chuck Fought	408.23	137.21	M	8.83	21.5	Multi-ply
135-180	Bryan Hartsel	410.00	170.80	M	6.06	30.0	Raw
135-180	Dylan Hellriegel	410.00	153.30	M	7.21	22.0	Wraps

WeightClass	Name	BestDeadliftKg	BodyweightKg	Sex	p4p	Age	Equipment
90-135	Alla Khotimchenko	267.50	90.00	F	7.33	34.5	Single-ply
90-135	Natalie Laalaai	272.50	131.70	F	4.86	26.5	Raw
90-135	Tamara Walcott	290.00	132.38	F	5.55	35.0	Raw
90-135	Fernando Arias	427.50	133.00	M	8.10	27.0	Wraps
90-135	Bryan Duncan	427.50	98.80	M	9.74	22.0	Raw
90-135	Danny Grigsby Jr	450.00	121.60	M	8.43	29.0	Raw
90-135	Daniel Kitchen	165.00	111.50	Mx	2.89	22.5	Raw
90-135	Oskar Marchock	195.00	111.00	Mx	4.21	49.0	Raw
90-135	Angel Flores #1	200.00	92.42	Mx	5.41	21.5	Raw
45-90	A. Gray	275.00	48.00	F	12.81	8.5	Raw
45-90	Denise Herber	280.00	69.20	F	9.65	28.0	Wraps
45-90	K. Hayes	282.50	52.00	F	15.14	14.5	Single-ply
45-90	Joel Janssen	380.00	83.90	M	10.61	31.0	Wraps
45-90	Terry Long	392.50	78.45	M	12.75	21.5	Single-ply
45-90	Liam Newell	402.50	82.60	M	10.02	18.0	Raw
45-90	Brett Richmond	152.50	81.50	Mx	4.26	32.0	Raw
45-90	Blake Desormeaux	157.50	78.60	Mx	4.36	31.5	Raw
45-90	Ryan Frankland	160.00	85.40	Mx	4.27	35.0	Raw
0-45	C. Sharp	192.78	44.00	F	10.57	16.5	Single-ply
0-45	Wei-Ling Chen	195.00	43.52	F	11.49	20.0	Single-ply
0-45	N. Baker	252.50	44.00	F	12.90	41.0	Multi-ply
0-45	Zachary Mann	242.50	29.50	M	19.15	11.5	Raw
0-45	Landon Kaiser	255.00	40.78	M	15.20	30.5	Raw
0-45	Jordan Walters	280.00	40.82	M	17.94	12.0	Raw

Table 8: Top 3 Lifters by Age Class

AgeClass	Name	BestDeadliftKg	BodyweightKg	Sex	p4p	Age	Equipment
0-9	Elena Moshnikova	130.00	59.40	F	4.67	9.0	Raw
0-9	Emily Cooper	145.00	28.70	F	11.15	8.5	Raw
0-9	A. Gray	275.00	48.00	F	12.81	8.5	Raw
0-9	Larry Butler	255.00	100.00	M	6.70	9.5	Single-ply

AgeClass	Name	BestDeadliftKg	BodyweightKg	Sex	p4p	Age	Equipment
0-9	Ryan Elliot	277.50	99.10	M	6.86	9.0	Single-ply
0-9	Joe O'Brien	285.76	90.00	M	8.32	9.5	Single-ply
10-15	Evgenia Kolodko	225.00	80.40	F	7.31	14.5	Single-ply
10-15	A. Alfred	226.80	82.50	F	7.01	14.5	Raw
10-15	K. Hayes	282.50	52.00	F	15.14	14.5	Single-ply
10-15	Seth Dasuki	340.00	72.50	M	10.83	13.5	Raw
10-15	Artem Ulanov	350.00	66.60	M	12.24	14.0	Wraps
10-15	Max Shethar	365.00	92.90	M	9.90	14.0	Raw
16-20	Daniella Melo	246.00	83.79	F	7.32	19.0	Raw
16-20	B. Patrick	254.01	82.50	F	7.12	16.5	Raw
16-20	T. Frederick	260.82	80.00	F	7.91	16.5	Single-ply
16-20	Luke Richardson #1	385.00	125.00	M	8.08	19.0	Raw
16-20	Liam Newell	402.50	82.60	M	10.02	18.0	Raw
16-20	Theo Maddox	410.00	120.00	M	8.44	17.0	Raw
16-20	Ashton Meaux	92.50	61.00	Mx	3.28	16.0	Raw
16-20	Adam Henson #2	120.00	81.70	Mx	3.49	17.0	Raw
21-30	Dina Hakeai	270.00	173.20	F	3.75	27.5	Raw
21-30	Natalie Laalaai	272.50	131.70	F	4.86	26.5	Raw
21-30	Denise Herber	280.00	69.20	F	9.65	28.0	Wraps
21-30	Fernando Arias	427.50	133.00	M	8.10	27.0	Wraps
21-30	Bryan Duncan	427.50	98.80	M	9.74	22.0	Raw
21-30	Danny Grigsby Jr	450.00	121.60	M	8.43	29.0	Raw
21-30	Emilia McConnell	140.00	87.00	Mx	4.02	24.5	Raw
21-30	Daniel Kitchen	165.00	111.50	Mx	2.89	22.5	Raw
21-30	Angel Flores #1	200.00	92.42	Mx	5.41	21.5	Raw
31-40	Alla Khotimchenko	267.50	90.00	F	7.33	34.5	Single-ply
31-40	Coral Blair	268.00	89.00	F	6.88	35.5	Multi-ply
31-40	Tamara Walcott	290.00	132.38	F	5.55	35.0	Raw
31-40	Bryan Hartsel	410.00	170.80	M	6.06	30.0	Raw
31-40	Justin Suplee	410.00	124.10	M	7.21	31.0	Raw
31-40	Aria Attia	415.04	123.92	M	7.75	31.0	Wraps
31-40	Willamina O'Keeffe	155.00	126.65	Mx	2.98	35.5	Raw
31-40	Blake Desormeaux	157.50	78.60	Mx	4.36	31.5	Raw
31-40	Ryan Frankland	160.00	85.40	Mx	4.27	35.0	Raw
41-50	Deb Widdis	237.50	72.67	F	8.84	45.5	Multi-ply

AgeClass	Name	BestDeadliftKg	BodyweightKg	Sex	p4p	Age	Equipment
41-50	Cheryl Clodfelter	242.67	90.00	F	6.90	46.0	Multi-ply
41-50	N. Baker	252.50	44.00	F	12.90	41.0	Multi-ply
41-50	Hifon Smith	376.48	117.90	M	8.46	44.0	Raw
41-50	Christian Mikysek	380.00	101.00	M	7.67	43.5	Multi-ply
41-50	Dmitriy Stroganov	380.00	104.80	M	8.73	42.5	Raw
41-50	Adrian Hyyrlainen-Trett	100.00	79.70	Mx	3.01	43.0	Raw
41-50	Oskar Marchock	195.00	111.00	Mx	4.21	49.0	Raw
51-60	Lapanda Mampikin	230.00	81.70	F	6.18	55.5	Raw
51-60	Collette Bates	240.00	98.52	F	5.50	50.0	Raw
51-60	Patricia Johnson	255.00	98.40	F	5.84	52.5	Raw
51-60	Henning Bach	335.00	147.40	M	5.61	54.0	Multi-ply
51-60	David Sewell	340.00	108.10	M	7.93	57.0	Raw
51-60	Don Demetrakeas	342.50	98.10	M	8.28	54.0	Raw
51-60	Ardel Thomas	110.00	91.10	Mx	2.39	58.0	Raw
61-70	Ruth Walker	175.00	51.60	F	8.48	63.5	Raw
61-70	Melissa Bales	177.50	67.50	F	6.78	66.0	Multi-ply
61-70	Amany Ahmed Rabea	180.00	66.50	F	6.05	60.0	Wraps
61-70	Tony Gelsthorpe	310.00	133.20	M	5.74	60.0	Raw
61-70	Greg Collins	314.79	81.90	M	10.53	60.5	Raw
61-70	Robert Coleman	327.50	62.50	M	13.28	60.0	Single-ply
71-80	Shelly Stettner	147.50	60.40	F	5.42	71.0	Raw
71-80	Judy Glenney	158.76	61.55	F	6.12	70.5	Raw
71-80	Barbara Haiden	175.00	80.50	F	5.96	71.0	Wraps
71-80	James Yeats	257.50	72.50	M	8.28	72.0	Raw
71-80	B. Amanzholov	270.00	81.20	M	8.53	71.5	Single-ply
71-80	Hal Mulholland	272.16	122.68	M	5.49	71.5	Raw
81+	Ruth Coak	97.50	57.29	F	3.10	80.0	Raw
81+	Gretchen Beers	97.50	55.00	F	3.23	81.0	Raw
81+	Natalie Attino	100.00	63.95	F	3.40	89.0	Raw
81+	Bryan McMaster	170.00	72.40	M	4.70	82.0	Raw
81+	Tito Bastianelli Sr	183.00	85.55	M	4.79	87.0	Raw
81+	Emil Alin	215.00	112.70	M	4.75	81.5	Raw

Conclusion

There is notable difference on age & Weight classes as they progress through more equipped lifts. However, it seems that equipment barely plays a role in this progression of strength. For example, the highest slope for increasing strength is seen in the Age-class group, specifically those who are between the ages of 10-20. This peak of strength is seen in the next age bracket, and lifters begin to have their strength diminish soon there-after. This trend seems to be consistent no-matter what class of equipment is used.

However for weight-classes, as lifters progress through their usage of equipment, there are two equipment classes (Multi-ply & unlimited) where this trend takes a more linear form. This although isn't convincing to say that there is a clear advantage to using equipment, especially when the top performers tend to not use as much equipment.

In conclusion, it seems that there is a notable difference on age & Weight classes as they progress throughout more equipped lifts, however, the dominant factor does NOT seem to be equipment.

Question 2

What is the difference of pound-for-pound strength versus total strength when looking at different weight classes? Why might this be?

Overview

This question looks to compare two different metrics of strength, and how weight plays a role in this. It is a common misconception that the heavier you are, the stronger you are. For the everyday person who does not lift, this rationale can make some sense. However, when properly trained, the human body has the potential to lift massive amounts of weight! This questions aims to see which different metrics of Strength (total & p4p), best represent their ability. This question also aims to see why might some of these causes be, and opens the door to research of unknown predictors that might play a role in Strength.

Graphs For these graphs, I'll just be using a regular `geom_smooth()` function to illustrate the trend amongst increasing weight classes across Total & p4p strength. I'll use the `gam` method once again, and give every Sex their own line/line-type. I'll also be manually creating "class-cages," for both the X & Y axis.

Data/Leaders Similar for question 1, I'll be showing the top 3 lifters for each Sex, in each Weight class per Strength Metric.

Pound 4 Pound

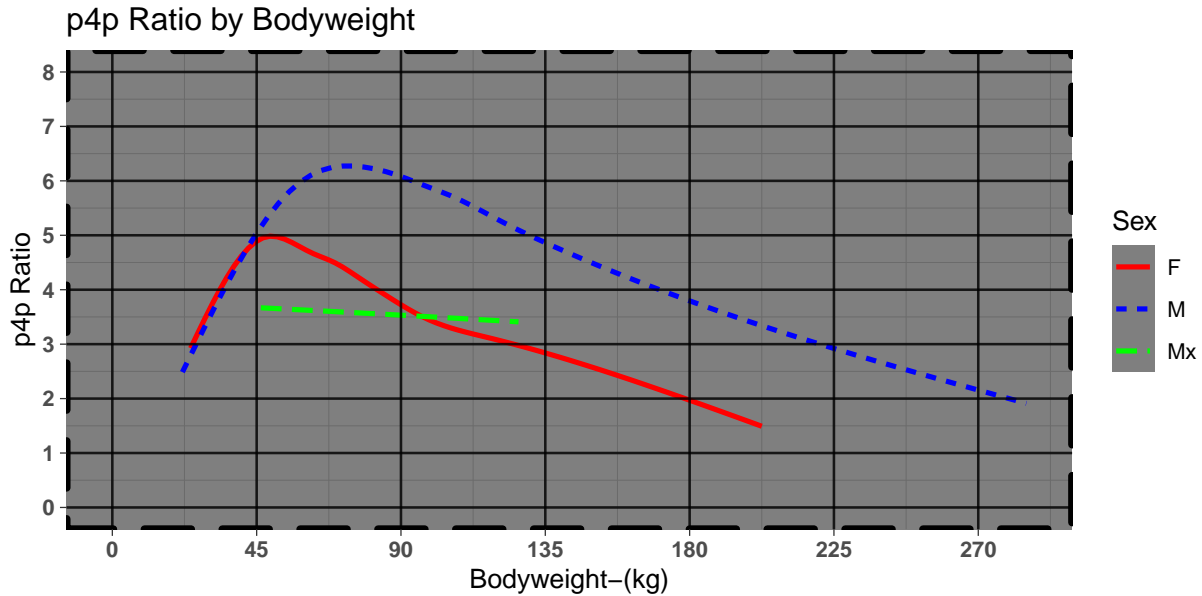


Table 9: Top 3 Lifters Overall

WeightClass	Name	p4p	BodyweightKg	Sex	Age	Equipment
270-315	Jared Viazanko	3.03	285.00	M	25.0	Raw
225-270	Cyrus Tucker	2.74	241.10	M	26.0	Wraps
225-270	Timothy Edwards	2.87	226.70	M	58.0	Raw
225-270	Travis Roberson	3.78	230.80	M	27.0	Wraps
180-225	Jammie Muniz	2.17	188.80	F	28.0	Raw
180-225	Stephanie Aliimatafitafi	2.43	185.00	F	29.0	Raw
180-225	Jiselle Olivarez	2.95	183.10	F	18.5	Raw
180-225	Brandis Dew	5.22	188.20	M	31.0	Wraps
180-225	Doug Allen #1	5.33	180.10	M	28.0	Raw
180-225	Nick Cook #3	5.47	186.00	M	25.0	Wraps
135-180	Kasey Croy	4.45	144.79	F	29.0	Wraps
135-180	Britney Baker	4.57	137.30	F	27.0	Raw
135-180	Lagi Marina AhSang	4.64	153.40	F	19.5	Raw
135-180	Craig Stutes	7.96	140.00	M	33.0	Multi-ply
135-180	Rodney Woodward	8.16	155.60	M	36.0	Multi-ply
135-180	Chuck Fought	8.83	137.21	M	21.5	Multi-ply
90-135	Cheryl Clodfelter	6.90	90.00	F	46.0	Multi-ply
90-135	Kiersten Scurlock	7.06	98.80	F	26.0	Wraps
90-135	Alla Khotimchenko	7.33	90.00	F	34.5	Single-ply
90-135	David Kemp #1	10.96	99.70	M	30.0	Wraps

WeightClass	Name	p4p	BodyweightKg	Sex	Age	Equipment
90-135	Hassan Zaid	10.98	91.10	M	27.0	Multi-ply
90-135	Jeremy Frey	11.23	107.73	M	30.0	Multi-ply
90-135	Tori Parry	3.18	97.50	Mx	31.5	Raw
90-135	Oskar Marchock	4.21	111.00	Mx	49.0	Raw
90-135	Angel Flores #1	5.41	92.42	Mx	21.5	Raw
45-90	I. Karpenko	11.85	55.70	F	22.5	Single-ply
45-90	A. Gray	12.81	48.00	F	8.5	Raw
45-90	K. Hayes	15.14	52.00	F	14.5	Single-ply
45-90	Jack Kenny	15.88	58.45	M	17.5	Raw
45-90	Benjamin Clarke	16.05	55.15	M	16.5	Raw
45-90	Joshua Lynch	16.05	58.10	M	16.5	Raw
45-90	Brett Richmond	4.26	81.50	Mx	32.0	Raw
45-90	Ryan Frankland	4.27	85.40	Mx	35.0	Raw
45-90	Blake Desormeaux	4.36	78.60	Mx	31.5	Raw
0-45	Wei-Ling Chen	11.49	43.52	F	20.0	Single-ply
0-45	N. Baker	12.90	44.00	F	41.0	Multi-ply
0-45	Ziphokonke Cele	16.11	18.00	F	18.0	Wraps
0-45	Mikhail Filippov	16.34	35.20	M	10.5	Single-ply
0-45	Jordan Walters	17.94	40.82	M	12.0	Raw
0-45	Zachary Mann	19.15	29.50	M	11.5	Raw

Total

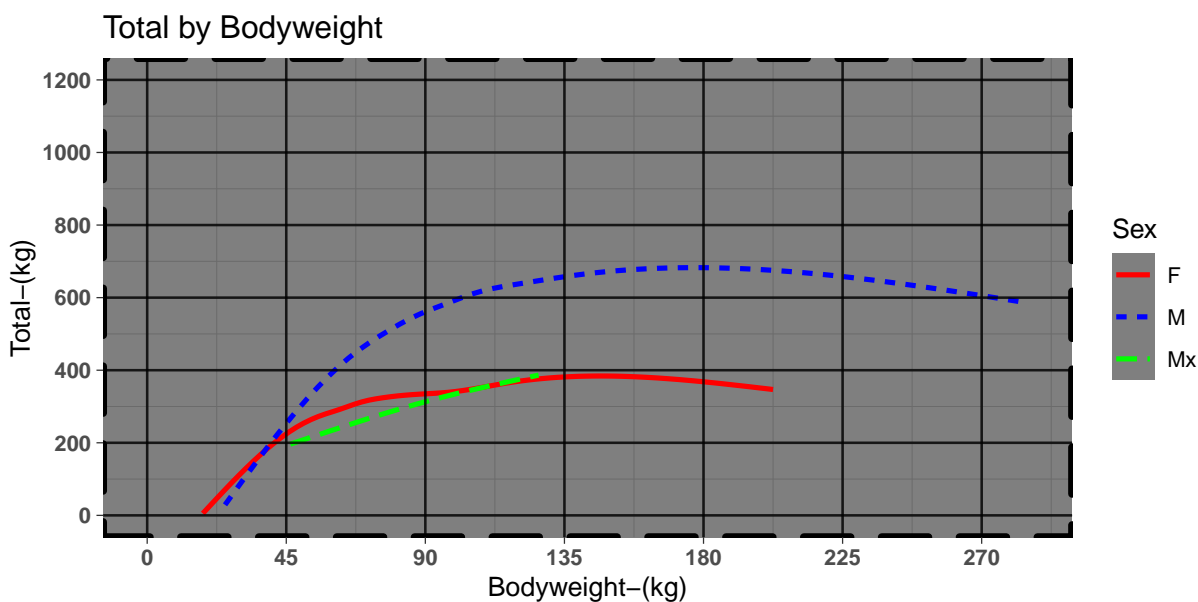


Table 10: Top 3 Lifters Overall

WeightClass	Name	TotalKg	BodyweightKg	Sex	p4p	Age	Equipment
270-315	Jared Viazanko	862.50	285.00	M	3.03	25.0	Raw
225-270	Timothy Edwards	650.00	226.70	M	2.87	58.0	Raw
225-270	Cyrus Tucker	660.00	241.10	M	2.74	26.0	Wraps
225-270	Travis Roberson	872.50	230.80	M	3.78	27.0	Wraps
180-225	Jammie Muniz	410.00	188.80	F	2.17	28.0	Raw
180-225	Stephanie Aliimatafitafi	450.00	185.00	F	2.43	29.0	Raw
180-225	Jiselle Olivarez	540.00	183.10	F	2.95	18.5	Raw
180-225	Doug Allen #1	960.00	180.10	M	5.33	28.0	Raw
180-225	Brandis Dew	982.50	188.20	M	5.22	31.0	Wraps
180-225	Nick Cook #3	1017.50	186.00	M	5.47	25.0	Wraps
135-180	Kasey Croy	645.00	144.79	F	4.45	29.0	Wraps
135-180	Dina Hakeai	650.00	173.20	F	3.75	27.5	Raw
135-180	Lagi Marina AhSang	712.50	153.40	F	4.64	19.5	Raw
135-180	Rodney Woodward Jr	1203.00	156.80	M	7.67	37.0	Multi-ply
135-180	Chuck Fought	1211.09	137.21	M	8.83	21.5	Multi-ply
135-180	Rodney Woodward	1270.01	155.60	M	8.16	36.0	Multi-ply
90-135	Kiersten Scurlock	697.50	98.80	F	7.06	26.0	Wraps
90-135	Kaycee Galitz	714.41	112.80	F	6.33	25.0	Raw
90-135	Tamara Walcott	735.00	132.38	F	5.55	35.0	Raw
90-135	Steve Acquaro	1136.25	128.37	M	8.85	22.5	Multi-ply
90-135	Derrick Bender	1190.68	116.85	M	10.19	35.0	Unlimited
90-135	Jeremy Frey	1210.00	107.73	M	11.23	30.0	Multi-ply
90-135	Willamina O’Keeffe	377.50	126.65	Mx	2.98	35.5	Raw
90-135	Oskar Marchock	467.50	111.00	Mx	4.21	49.0	Raw
90-135	Angel Flores #1	500.00	92.42	Mx	5.41	21.5	Raw
45-90	Hunter Henderson #1	715.00	82.40	F	8.68	27.0	Wraps
45-90	Taylor Ruder	760.00	74.20	F	10.24	29.5	Multi-ply
45-90	K. Hayes	787.50	52.00	F	15.14	14.5	Single-ply
45-90	Michael Johnston	1015.00	81.20	M	12.50	21.5	Raw
45-90	Cody Hairston	1020.00	88.18	M	11.57	21.5	Wraps
45-90	Mike Donovan	1031.92	80.20	M	12.87	29.5	Raw
45-90	Brett Richmond	347.50	81.50	Mx	4.26	32.0	Raw
45-90	Emilia McConnell	350.00	87.00	Mx	4.02	24.5	Raw
45-90	Ryan Frankland	365.00	85.40	Mx	4.27	35.0	Raw
0-45	Yekaterina Osipova	480.00	42.45	F	11.31	14.5	Single-ply
0-45	Wei-Ling Chen	500.00	43.52	F	11.49	20.0	Single-ply
0-45	N. Baker	567.50	44.00	F	12.90	41.0	Multi-ply
0-45	Landon Kaiser	620.00	40.78	M	15.20	30.5	Raw

WeightClass	Name	TotalKg	BodyweightKg	Sex	p4p	Age	Equipment
0-45	Valentin Muntyan	655.00	41.60	M	15.75	10.5	Single-ply
0-45	Jordan Walters	732.50	40.82	M	17.94	12.0	Raw

Conclusion

It seems that as we move to a lower-weight-class, the potential for greater p4p strength increases when looking at elite lifters. However, as we move to a higher-weight-class, p4p decreases, but total increases. While these Rate-Of-Change's are not proportional to one-another, they are somewhat perpendicular. This might be because strength doesn't correlate to Weight directly, moreover, what "type" of weight the lifter might have. A lifter with dense, muscular/skeletal composition on average, should be arguably stronger than one that consists of mostly adipose tissue. While these lifters can weigh the same, it is more likely for the lifter with the most **active** weight to lift more than the lifter with **passive** weight.

However, it is important to keep in mind that Weight is not a direct indicator of Strength. Sometimes too much weight can be detrimental to a lifter. An example of this are Powerlifting meets that give you points based on p4p, rather than total weight lifted. In some competitions, a lifter can be evaluated based on their p4p ratio, rather than their total. Too much weight in this type of lift can actually hinder the success of an aspiring power-lifter.