

Moat1

November 24, 2025

1 Athlete Combine Data: Exploratory Data Analysis

This notebook loads data from four separate combine tests, merges them into a single “Mother of All Tables” (M.O.A.T.), and then performs an exploratory data analysis.

The analysis includes: 1. **Data Merging**: Joining all datasets on the athlete’s **name**. 2. **Exploratory Data Analysis (EDA)**: Inspecting the raw data. 3. **Visualization**: Creating a **seaborn** pairplot to visualize relationships between key metrics, segmented by **sex**. 4. **Statistical Analysis**: Computing an advanced correlation matrix that includes both R -values (the correlation) and p -values (the statistical significance).

1.1 1. Setup: Import Libraries

First, we import all the necessary Python libraries for data manipulation, statistical analysis, and plotting.

```
[1]: # --- Imports ---  
  
import pandas as pd  
import numpy as np  
import seaborn as sns  
import matplotlib.pyplot as plt  
import scipy.stats as stats  
import io  
  
# Set plot style  
sns.set_theme(style="whitegrid")  
# Show plots inline in Jupyter  
%matplotlib inline
```

1.2 2. Load Datasets

We load the data you provided directly into pandas DataFrames.

We will also: 1. Clean the column names to remove special characters (like +) for easier access. 2. Use `on_bad_lines='warn'` for the `ProAgility.csv` data, as the provided text was cut off mid-line. This will allow the code to run by skipping the single broken line. 3. Ensure all numeric columns are correctly read as numbers, replacing any blanks with `NaN`.

1.3 3. Create the “Mother of All Tables” (M.O.A.T.)

Now we will join these four cleaned DataFrames together using `name` as the primary key. We will use an `outer` join to keep all athletes, even if they are missing data from one of the tests. The `sex` column will be taken from the first DataFrame (`df_cmj_clean`).

```
[5]: # --- Create Data from Text ---
# (Data strings are omitted for brevity, but they are the same as your previous
    ↪ cell)

cmj_data =
    ↪ """sex          movement          cm_jump+height_max_in          cm_jump+height_average_in
    ↪ out
Men          Countermovement Jump          13.3          12.9          3.1          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Alpha Mike
    ↪ November Sierra          0
Men          Countermovement Jump          18.6          18.1          2.8          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Alpha November
    ↪ Mike Sierra          0
Men          Countermovement Jump          12.8          12.6          1.6          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Bravo November
    ↪ Whiskey November          0
Men          Countermovement Jump          15.4          15.1          2          30 Jun
    ↪ 2025 Canadian Box Showcase: VALD Combine Results          Bravo November Delta
    ↪ Yankee          0
Men          Countermovement Jump          16.6          16.3          1.8          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Charlie November
    ↪ Hotel Echo          0
Men          Countermovement Jump          18.4          17.8          3.4          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Charlie November
    ↪ Bravo Yankee          0
Men          Countermovement Jump          14          13.8          1.4          30 Jun
    ↪ 2025 Canadian Box Showcase: VALD Combine Results          Charlie Echo Echo
    ↪ November          0
Men          Countermovement Jump          12.3          12.1          1.7          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Charlie November
    ↪ Mike Echo          0
Men          Countermovement Jump          13.8          13.6          1.5          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Charlie Romeo
    ↪ Charlie Lima          0
Men          Countermovement Jump          14.3          14.1          1.4          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Charlie Romeo
    ↪ Delta November          0
Men          Countermovement Jump          13.5          13.1          3.1          30
    ↪ Jun 2025 Canadian Box Showcase: VALD Combine Results          Echo November
    ↪ Mike Romeo          0
```

| | | | | | | |
|---|---|------|------|------|----|------------------------|
| Men | Countermovement Jump | 12.7 | 12.6 | 0.8 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | | | Golf Echo Tango□ |
| ↪November | 0 | | | | | |
| Men | Countermovement Jump | 17.1 | 16.5 | 3.6 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | | | Golf Tango□ |
| ↪Sierra Zulu | 0 | | | | | |
| Men | Countermovement Jump | 15 | 15 | 0 | 30 | Jun 2025□ |
| ↪Canadian Box Showcase: VALD Combine Results | | | | | | Golf November Whiskey□ |
| ↪Echo | 0 | | | | | |
| Men | Countermovement Jump | 13.9 | 13.5 | 3 | 30 | Jun□ |
| ↪2025 Canadian Box Showcase: VALD Combine Results | | | | | | Golf Echo Golf□ |
| ↪Yankee | 0 | | | | | |
| Men | Countermovement Jump | 16.8 | 15.3 | 9.8 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Golf Echo Mike□ |
| ↪Sierra | 0 | | | | | |
| Men | Countermovement Jump | 12.8 | 13.2 | -3 | 30 | Jun□ |
| ↪2025 Canadian Box Showcase: VALD Combine Results | | | | | | Golf Foxtrot Hotel□ |
| ↪Sierra | 0 | | | | | |
| Men | Countermovement Jump | 14.9 | 14.8 | 0.7 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | India Charlie□ |
| ↪Sierra Lima | 0 | | | | | |
| Men | Countermovement Jump | 17.4 | 17.2 | 1.2 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Juliett Kilo□ |
| ↪Whiskey Sierra | 0 | | | | | |
| Men | Countermovement Jump | 13 | 12.8 | 1.6 | 30 | Jun□ |
| ↪2025 Canadian Box Showcase: VALD Combine Results | | | | | | Juliett Kilo Papa□ |
| ↪Echo | 0 | | | | | |
| Men | Countermovement Jump | 16.5 | 15.7 | 5.1 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Juliett Kilo□ |
| ↪Sierra November | 0 | | | | | |
| Men | Countermovement Jump | 14.2 | 14.3 | -0.7 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Juliett Echo□ |
| ↪Echo Lima | 0 | | | | | |
| Men | Countermovement Jump | 14.4 | 14.2 | 1.4 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Juliett Echo□ |
| ↪Papa Oscar | 0 | | | | | |
| Men | Countermovement Jump | 17.6 | 17.5 | 0.6 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Juliett Echo□ |
| ↪Golf Echo | 0 | | | | | |
| Men | Countermovement Jump | 15 | 15 | 0 | 30 | Jun 2025□ |
| ↪Canadian Box Showcase: VALD Combine Results | | | | | | Juliett Echo Foxtrot□ |
| ↪Delta | 0 | | | | | |
| Men | Countermovement Jump | 14.2 | 13.7 | 3.6 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Juliett November□ |
| ↪Kilo Charlie | 0 | | | | | |

| | | | | | |
|-----|---|------|------|----------------------|--------|
| Men | Countermovement Jump | 16 | 15.4 | 3.9 | 30 Jun |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | Kilo November Hotel | |
| | ↪Echo | 0 | | | |
| Men | Countermovement Jump | 15.1 | 13.8 | 9.4 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Kilo November | |
| | ↪Charlie Lima | 0 | | | |
| Men | Countermovement Jump | 16.3 | 16.3 | 0 | 30 Jun |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | |
| | ↪Charlie Sierra | 0 | | | |
| Men | Countermovement Jump | 18.1 | 18 | 0.6 | 30 Jun |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | Lima Mike Tango | |
| | ↪Romeo | 0 | | | |
| Men | Countermovement Jump | 13.6 | 13.5 | 0.7 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | |
| | ↪Lima Echo | 0 | | | |
| Men | Countermovement Jump | 14.4 | 13.9 | 3.6 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | |
| | ↪Delta Romeo | 0 | | | |
| Men | Countermovement Jump | 7.2 | 7.1 | 1.4 | 30 Jun |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | Lima November Papa | |
| | ↪Echo | 0 | | | |
| Men | Countermovement Jump | 18.9 | 18.5 | 2.2 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Mike November | |
| | ↪Charlie Echo | 0 | | | |
| Men | Countermovement Jump | 10.8 | 10.8 | 0 | 30 Jun |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | November November | |
| | ↪Bravo Romeo | 0 | | | |
| Men | Countermovement Jump | 14.4 | 14.1 | 2.1 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November | |
| | ↪November November Oscar | 0 | | | |
| Men | Countermovement Jump | 12.2 | 11.8 | 3.4 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November Sierra | |
| | ↪Sierra India | 0 | | | |
| Men | Countermovement Jump | 12 | 11.9 | 0.8 | 30 Jun |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | November Hotel Bravo | |
| | ↪Echo | 0 | | | |
| Men | Countermovement Jump | 15.9 | 15.5 | 2.6 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November | |
| | ↪November Sierra November | 0 | | | |
| Men | Countermovement Jump | 14.7 | 14.7 | 0 | 30 Jun |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | Oscar November Oscar | |
| | ↪November | 0 | | | |
| Men | Countermovement Jump | 14.6 | 14.4 | 1.4 | 30 |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Romeo Yankee | |
| | ↪Bravo November | 0 | | | |

| | | | | | | |
|---|----------------------|------|------|-----|----|----------------------|
| Men | Countermovement Jump | 12.8 | 11.7 | 9.4 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Romeo Delta Papa□ |
| ↪Zulu | 0 | | | | | |
| Men | Countermovement Jump | 14.9 | 14.2 | 4.9 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Romeo November□ |
| ↪Bravo Yankee | 0 | | | | | |
| Men | Countermovement Jump | 18.8 | 18.5 | 1.6 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Sierra November□ |
| ↪Whiskey Tango | 0 | | | | | |
| Men | Countermovement Jump | 15 | 14.1 | 6.4 | 30 | Jun□ |
| ↪2025 Canadian Box Showcase: VALD Combine Results | | | | | | Tango Romeo Hotel□ |
| ↪Golf | 0 | | | | | |
| Men | Countermovement Jump | 13.3 | 13.1 | 1.5 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Victor Tango□ |
| ↪Whiskey Delta | 0 | | | | | |
| Men | Countermovement Jump | 15.7 | 15.7 | 0 | 30 | Jun□ |
| ↪2025 Canadian Box Showcase: VALD Combine Results | | | | | | Whiskey Yankee Golf□ |
| ↪Tango | 0 | | | | | |
| Men | Countermovement Jump | 17.6 | 17.3 | 1.7 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Zulu Hotel□ |
| ↪Charlie Echo | 0 | | | | | |
| Men | Countermovement Jump | 26 | 18 | 8 | | VALD□ |
| ↪2020-2021 NBA | NBA 2020-21 Average | | 0 | | | |
| Women | Countermovement Jump | 10.3 | 10.2 | 1 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Alpha November□ |
| ↪Tango Romeo | 0 | | | | | |
| Women | Countermovement Jump | 12.3 | 11.9 | 3.4 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Alpha November□ |
| ↪Bravo November | 0 | | | | | |
| Women | Countermovement Jump | 13.2 | 13.1 | 0.8 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Alpha Alpha□ |
| ↪Tango Yankee | 0 | | | | | |
| Women | Countermovement Jump | 13.3 | 13.1 | 1.5 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Bravo Echo Romeo□ |
| ↪Echo | 0 | | | | | |
| Women | Countermovement Jump | 9.9 | 9.5 | 4.2 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Charlie Echo□ |
| ↪Lima Golf | 0 | | | | | |
| Women | Countermovement Jump | 11.1 | 11 | 0.9 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Echo Hotel Hotel□ |
| ↪Romeo | 0 | | | | | |
| Women | Countermovement Jump | 11.2 | 10.7 | 4.7 | 30 | □ |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | | Echo November□ |
| ↪Charlie November | 0 | | | | | |

| | | | | | | |
|-----------------|---|------|------|--------------------|----|-------|
| Women | Countermovement Jump | 10.8 | 9.3 | 16.1 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Echo Alpha Kilo | □ | |
| ↪Yankee | 0 | | | | | |
| Women | Countermovement Jump | 12.2 | 11.2 | 8.9 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Hotel Hotel Mike | □ | |
| ↪November | 0 | | | | | |
| Women | Countermovement Jump | 11.4 | 10.6 | 7.5 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Hotel Yankee | □ | |
| ↪Alpha Golf | 0 | | | | | |
| Women | Countermovement Jump | 7.6 | 7.6 | 0 | 30 | Jun □ |
| ↪2025 | Canadian Box Showcase: VALD Combine Results | | | Juliett Echo Tango | □ | |
| ↪Tango | 0 | | | | | |
| Women | Countermovement Jump | 11.6 | 11.5 | 0.9 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Kilo Alpha | □ | |
| ↪Charlie Delta | 0 | | | | | |
| Women | Countermovement Jump | 11.1 | 10.8 | 2.8 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Kilo Alpha | □ | |
| ↪November | November 0 | | | | | |
| Women | Countermovement Jump | 9.2 | 9.1 | 1.1 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Lima Alpha Delta | □ | |
| ↪Echo | 0 | | | | | |
| Women | Countermovement Jump | 13.2 | 12.5 | 5.6 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| ↪Delta Echo | 0 | | | | | |
| Women | Countermovement Jump | 10.8 | 10.5 | 2.9 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Mike Echo Hotel | □ | |
| ↪Sierra | 0 | | | | | |
| Women | Countermovement Jump | 9.9 | 9.4 | 5.3 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Mike November | □ | |
| ↪Mike Golf | 0 | | | | | |
| Women | Countermovement Jump | 10.4 | 10.2 | 2 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Mike Alpha Lima | □ | |
| ↪Delta | 0 | | | | | |
| Women | Countermovement Jump | 10.7 | 10.5 | 1.9 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Romeo Hotel Kilo | □ | |
| ↪Yankee | 0 | | | | | |
| Women | Countermovement Jump | 12.6 | 12.4 | 1.6 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Romeo Echo | □ | |
| ↪November | Hotel 0 | | | | | |
| Women | Countermovement Jump | 12.2 | 12.2 | 0 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Romeo Echo | □ | |
| ↪Juliett Sierra | 0 | | | | | |
| Women | Countermovement Jump | 9.7 | 9.5 | 2.1 | 30 | □ |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Romeo Yankee | □ | |
| ↪Mike Kilo | 0 | | | | | |

```

Women      Countermovement Jump      11.9      11.8      0.8      30_
↳Jun 2025 Canadian Box Showcase: VALD Combine Results      Sierra Hotel_
↳November November      0
Women      Countermovement Jump      12.7      11.6      9.5      30_
↳Jun 2025 Canadian Box Showcase: VALD Combine Results      Sierra Alpha_
↳Hotel Tango      0
Women      Countermovement Jump      10.6      10.3      2.9      30_
↳Jun 2025 Canadian Box Showcase: VALD Combine Results      Tango November_
↳Whiskey Romeo      0
Women      Countermovement Jump      13.0315      11.37795      1.
↳65355      Ohio Athletic Trainers Association      Professional Female_
↳Club Soccer      0
"""
dash_data =_
↳""sex      movement      fourty_yard_dash_total_time_seconds      fourty_yard_dash_a
↳out
Women      40 Yard Dash Results      5.753      5.783      -0.
↳5      30 Jun 2025 Canadian Box Showcase: VALD Combine_
↳Results      Alpha November Tango Romeo      0
Women      40 Yard Dash Results      5.757      5.713      0.
↳8      30 Jun 2025 Canadian Box Showcase: VALD Combine_
↳Results      Alpha November Bravo November      0
Women      40 Yard Dash Results      5.359      5.837      -8.
↳2      30 Jun 2025 Canadian Box Showcase: VALD Combine_
↳Results      Alpha Alpha Tango Yankee      0
Women      40 Yard Dash Results      5.524      5.581      -1      30_
↳Jun 2025 Canadian Box Showcase: VALD Combine Results      Bravo Echo Romeo_
↳Echo      0
Women      40 Yard Dash Results      6.007      6      0.1      30_
↳Jun 2025 Canadian Box Showcase: VALD Combine Results      Charlie Echo_
↳Lima Golf      0
Women      40 Yard Dash Results      6.124      6.054      1.
↳2      30 Jun 2025 Canadian Box Showcase: VALD Combine Results      Echo_
↳Hotel Hotel Romeo      0
Women      40 Yard Dash Results      6.356      6.394      -0.
↳6      30 Jun 2025 Canadian Box Showcase: VALD Combine Results      Echo_
↳November Charlie November      0
Women      40 Yard Dash Results      5.697      5.729      -0.
↳6      30 Jun 2025 Canadian Box Showcase: VALD Combine Results      Echo_
↳Alpha Kilo Yankee      0
Women      40 Yard Dash Results      5.534      5.678      -2.
↳5      30 Jun 2025 Canadian Box Showcase: VALD Combine_
↳Results      Hotel Hotel Mike November      0
Women      40 Yard Dash Results      5.782      5.812      -0.
↳5      30 Jun 2025 Canadian Box Showcase: VALD Combine_
↳Results      Hotel Yankee Alpha Golf      0

```

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|--------------|--|-------|-------|------|--------------|
| Women | 40 Yard Dash Results | 6.515 | 6.485 | 0. | |
| ↪5 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Echo Tango Tango | 0 | | | |
| Women | 40 Yard Dash Results | 5.675 | 5.687 | -0. | |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Kilo |
| ↪Alpha | Charlie Delta | 0 | | | |
| Women | 40 Yard Dash Results | 5.704 | 5.784 | -1. | |
| ↪4 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Kilo |
| ↪Alpha | November November | 0 | | | |
| Women | 40 Yard Dash Results | 5.878 | 5.848 | 0. | |
| ↪5 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪Alpha | Delta Echo | 0 | | | |
| Women | 40 Yard Dash Results | 5.692 | 5.708 | -0. | |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪November | Delta Echo | 0 | | | |
| Women | 40 Yard Dash Results | 5.796 | 5.858 | -1. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Mike |
| ↪Echo | Hotel Sierra | 0 | | | |
| Women | 40 Yard Dash Results | 5.921 | 5.904 | 0. | |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Mike |
| ↪Alpha | Lima Delta | 0 | | | |
| Women | 40 Yard Dash Results | 5.839 | 5.906 | -1. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Romeo Hotel Kilo Yankee | 0 | | | |
| Women | 40 Yard Dash Results | 5.767 | 5.815 | -0. | |
| ↪8 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Romeo Echo November Hotel | 0 | | | |
| Women | 40 Yard Dash Results | 5.618 | 5.592 | 0. | |
| ↪5 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Romeo Echo Juliett Sierra | 0 | | | |
| Women | 40 Yard Dash Results | 6 | 6.034 | -0.6 | 30 |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | | Romeo Yankee |
| ↪Mike | Kilo | 0 | | | |
| Women | 40 Yard Dash Results | 5.283 | 5.359 | -1. | |
| ↪4 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Sierra Hotel November November | 0 | | | |
| Women | 40 Yard Dash Results | 5.851 | 5.789 | 1. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Sierra Alpha Hotel Tango | 0 | | | |
| Women | 40 Yard Dash Results | 5.705 | 5.699 | 0. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Tango November Whiskey Romeo | 0 | | | |
| Women | 40 Yard Dash Results | 5.78 | 6.11 | | Human |
| ↪Performance | Laboratory, Truman State University, Kirksville, Missouri 63501. | | | | |
| ↪ | Average Elite Athlete, College | 0 | | | |

| | | | | | | |
|-----|---|-------|-------|------|--------|---------------------|
| Men | 40 Yard Dash Results | 5.33 | 5.222 | 2.1 | 30 | Alpha Mike |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →November Sierra | 0 | | | | |
| Men | 40 Yard Dash Results | 5.261 | 5.26 | 0 | 30 Jun | Alpha November Mike |
| | →2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Sierra | 0 | | | | |
| Men | 40 Yard Dash Results | 5.176 | 5.156 | 0.4 | 30 | Bravo November |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Whiskey November | 0 | | | | |
| Men | 40 Yard Dash Results | 5.399 | 5.411 | -0.2 | 30 | Bravo November |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Delta Yankee | 0 | | | | |
| Men | 40 Yard Dash Results | 5.299 | 5.232 | 1.3 | 30 | Charlie November |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Hotel Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 4.876 | 4.878 | 0 | 30 | Charlie November |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Bravo Yankee | 0 | | | | |
| Men | 40 Yard Dash Results | 5.585 | 5.43 | 2.9 | 30 | Charlie Echo |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Echo November | 0 | | | | |
| Men | 40 Yard Dash Results | 5.287 | 5.367 | -1.5 | 30 | Charlie November |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Mike Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.439 | 5.364 | 1.4 | 30 | Charlie Romeo |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Charlie Lima | 0 | | | | |
| Men | 40 Yard Dash Results | 5.336 | 5.254 | 1.6 | 30 | Charlie Romeo |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Delta November | 0 | | | | |
| Men | 40 Yard Dash Results | 4.669 | 4.716 | -1 | 30 | Echo November |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Mike Romeo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.108 | 5.125 | -0.3 | 30 | Golf Echo Tango |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →November | 0 | | | | |
| Men | 40 Yard Dash Results | 4.972 | 5 | -0.6 | 30 Jun | Golf Tango Sierra |
| | →2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Zulu | 0 | | | | |
| Men | 40 Yard Dash Results | 5.148 | 5.171 | -0.4 | 30 | Golf November |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Whiskey Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.388 | 5.319 | 1.3 | 30 | Golf Echo Golf |
| | →Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | |
| | →Yankee | 0 | | | | |

| | | | | | | |
|-----|---|-------|-------|------|----|-------------------|
| Men | 40 Yard Dash Results | 5.244 | 5.235 | 0.2 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Golf Echo Mike┐ |
| | ↪Sierra 0 | | | | | |
| Men | 40 Yard Dash Results | 5.195 | 5.192 | 0.1 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Golf Foxtrot┐ |
| | ↪Hotel Sierra 0 | | | | | |
| Men | 40 Yard Dash Results | 5.039 | 5.028 | 0.2 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | India Charlie┐ |
| | ↪Sierra Lima 0 | | | | | |
| Men | 40 Yard Dash Results | 5.136 | 5.128 | 0.2 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett Kilo┐ |
| | ↪Whiskey Sierra 0 | | | | | |
| Men | 40 Yard Dash Results | 5.44 | 5.507 | -1.2 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett Kilo┐ |
| | ↪Papa Echo 0 | | | | | |
| Men | 40 Yard Dash Results | 4.913 | 4.964 | -1 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett Kilo┐ |
| | ↪Sierra November 0 | | | | | |
| Men | 40 Yard Dash Results | 5.039 | 5.203 | -3.2 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett Echo┐ |
| | ↪Echo Lima 0 | | | | | |
| Men | 40 Yard Dash Results | 5.056 | 5.103 | -0.9 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett Echo┐ |
| | ↪Papa Oscar 0 | | | | | |
| Men | 40 Yard Dash Results | 5.015 | 5.02 | -0.1 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett Echo┐ |
| | ↪Golf Echo 0 | | | | | |
| Men | 40 Yard Dash Results | 5.364 | 5.28 | 1.6 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett Echo┐ |
| | ↪Foxtrot Delta 0 | | | | | |
| Men | 40 Yard Dash Results | 5.329 | 5.327 | 0 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Juliett November┐ |
| | ↪Kilo Charlie 0 | | | | | |
| Men | 40 Yard Dash Results | 5.289 | 5.229 | 1.1 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Kilo November┐ |
| | ↪Hotel Echo 0 | | | | | |
| Men | 40 Yard Dash Results | 5.272 | 5.265 | 0.1 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Kilo November┐ |
| | ↪Charlie Lima 0 | | | | | |
| Men | 40 Yard Dash Results | 5.008 | 4.993 | 0.3 | 30 | ┐ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Lima November┐ |
| | ↪Charlie Sierra 0 | | | | | |
| Men | 40 Yard Dash Results | 5.11 | 5.11 | 0 | 30 | Jun┐ |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | | | Lima Mike Tango┐ |
| | ↪Romeo 0 | | | | | |

| | | | | | | |
|-----|---|---------------|--------------|-----------------|----|-------|
| Men | 40 Yard Dash Results | 5.344 | 5.353 | -0.2 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| | ↪Lima Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.278 | 5.318 | -0.8 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| | ↪Delta Romeo | 0 | | | | |
| Men | 40 Yard Dash Results | 6.464 | 6.492 | -0.4 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| | ↪Papa Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.194 | 5.143 | 1 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Mike November | □ | |
| | ↪Charlie Echo | 0 | | | | |
| Men | 4D Combine Results | Kilo November | Charlie Lima | 0 | | |
| Men | 40 Yard Dash Results | 5.008 | 4.993 | 0.3 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| | ↪Charlie Sierra | 0 | | | | |
| Men | 40 Yard Dash Results | 5.11 | 5.11 | 0 | 30 | Jun □ |
| | ↪2025 Canadian Box Showcase: VALD Combine Results | | | Lima Mike Tango | □ | |
| | ↪Romeo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.344 | 5.353 | -0.2 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| | ↪Lima Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.278 | 5.318 | -0.8 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| | ↪Delta Romeo | 0 | | | | |
| Men | 40 Yard Dash Results | 6.464 | 6.492 | -0.4 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Lima November | □ | |
| | ↪Papa Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.194 | 5.143 | 1 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | Mike November | □ | |
| | ↪Charlie Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.077 | 5.077 | 0 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November | □ | |
| | ↪November Bravo Romeo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.224 | 5.19 | 0.7 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November | □ | |
| | ↪November November Oscar | 0 | | | | |
| Men | 40 Yard Dash Results | 5.398 | 5.431 | -0.6 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November Sierra | □ | |
| | ↪Sierra India | 0 | | | | |
| Men | 40 Yard Dash Results | 4.943 | 4.986 | -0.9 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November Hotel | □ | |
| | ↪Bravo Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 5.55 | 5.559 | -0.2 | 30 | □ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | November | □ | |
| | ↪November Sierra November | 0 | | | | |

| | | | | | | |
|-----|---|---------------------------|-------|------|----|---|
| Men | 40 Yard Dash Results | 5.134 | 5.135 | 0 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Oscar November└ |
| | ↪Oscar November | 0 | | | | |
| Men | 40 Yard Dash Results | 5.269 | 5.256 | 0.2 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Romeo Yankee└ |
| | ↪Bravo November | 0 | | | | |
| Men | 40 Yard Dash Results | 5.149 | 5.203 | -1 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Romeo Delta Papa└ |
| | ↪Zulu | 0 | | | | |
| Men | 40 Yard Dash Results | 5.049 | 5.058 | -0.2 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Romeo November└ |
| | ↪Bravo Yankee | 0 | | | | |
| Men | 40 Yard Dash Results | 4.917 | 4.857 | 1.2 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Sierra November└ |
| | ↪Whiskey Tango | 0 | | | | |
| Men | 40 Yard Dash Results | 4.893 | 4.912 | -0.4 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Tango Romeo└ |
| | ↪Hotel Golf | 0 | | | | |
| Men | 40 Yard Dash Results | 5.056 | 5.066 | -0.2 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Victor Tango└ |
| | ↪Whiskey Delta | 0 | | | | |
| Men | 40 Yard Dash Results | 4.775 | 4.836 | -1.3 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Whiskey Yankee└ |
| | ↪Golf Tango | 0 | | | | |
| Men | 40 Yard Dash Results | 5.08 | 5.003 | 1.5 | 30 | └ |
| | ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | | Zulu Hotel└ |
| | ↪Charlie Echo | 0 | | | | |
| Men | 40 Yard Dash Results | 4.23 | 4. | | | |
| | ↪47 | 0 | | | | nflsavant.com/combine Average by Position, NFL.com/ |
| | ↪combine | Cornerback NFL Average | 0 | | | |
| Men | 40 Yard Dash Results | 4.21 | 4. | | | |
| | ↪49 | 0 | | | | nflsavant.com/combine Average by Position, NFL.com/ |
| | ↪combine | Wide Receiver NFL Average | 0 | | | |
| Men | 40 Yard Dash Results | 4.24 | 4. | | | |
| | ↪53 | 0 | | | | nflsavant.com/combine Average by Position, NFL.com/ |
| | ↪combine | Running Back NFL | 0 | | | |
| Men | 40 Yard Dash Results | 4.29 | 4. | | | |
| | ↪54 | 0 | | | | nflsavant.com/combine Average by Position, NFL.com/ |
| | ↪combine | Free Safety NFL Average | 0 | | | |
| Men | 40 Yard Dash Results | 4.34 | 4. | | | |
| | ↪55 | 0 | | | | nflsavant.com/combine Average by Position, NFL.com/ |
| | ↪combine | Strong Safety NFL Average | 0 | | | |
| Men | 40 Yard Dash Results | 4.56 | 4. | | | |
| | ↪64 | 0 | | | | nflsavant.com/combine Average by Position, NFL.com/ |
| | ↪combine | P NFL Average | 0 | | | |

```

Men      40 Yard Dash Results      4.38      4.
↳68      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      OLB NFL Average      0
Men      40 Yard Dash Results      4.39      4.
↳72      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      ILB NFL Average      0
Men      40 Yard Dash Results      4.4      4.
↳75      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      TE NFL Average      0
Men      40 Yard Dash Results      4.36      4.
↳81      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      DE NFL Average      0
Men      40 Yard Dash Results      4.35      4.
↳81      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      QB NFL Average      0
Men      40 Yard Dash Results      4.49      4.
↳95      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      DT NFL Average      0
Men      40 Yard Dash Results      4.85      5      0      nflsavant.
↳com/combine Average by Position, NFL.com/combine      OC NFL
↳Average      0
Men      40 Yard Dash Results      4.71      5.
↳05      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      OT NFL Average      0
Men      40 Yard Dash Results      4.91      5.
↳08      0      nflsavant.com/combine Average by Position, NFL.com/
↳combine      OG NFL Average      0
Men      40 Yard Dash Results      4.47      4.47      0      https://
↳www.cfl.ca/all-time-cfl-combine-records/      Nathan Riva (OFSAA 2007 100
↳M winner, 2012 CFL Combine)      0
Men      40 Yard Dash Results      4.96      5.19      EFFECT
↳OF COMPETITIVENESS ON FORTY-YARD DASH PERFORMANCE IN COLLEGE MEN AND WOMEN,
↳Human Performance Laboratory, Truman State University, Kirksville, Missouri
↳63501.      College Elite Athletes      0
"""
imtp_data =
↳""sex      movement      absolute_impulse_newton_second      personal_average_newton
↳out
Women      Isometric Mid-Thigh Pull      73.3      72      1.
↳8      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results      Alpha November Tango Romeo      0
Women      Isometric Mid-Thigh Pull      95.2      91.4      4.
↳2      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results      Alpha November Bravo November      0

```

| | | | | | |
|-----------|---|-------|-------|-----|------|
| Women | Isometric Mid-Thigh Pull | 73.8 | 70.2 | 5. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Alpha Alpha Tango Yankee | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 90.4 | 82 | 10. | |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Bravo Echo Romeo Echo | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 107.4 | 101.6 | 5. | |
| ↪7 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Charlie Echo Lima Golf | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 90.6 | 89.1 | 1. | |
| ↪7 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Echo |
| ↪Hotel | Hotel Romeo | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 85.1 | 85 | 0. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Echo |
| ↪November | Charlie November | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 78 | 71.5 | 9. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Echo |
| ↪Alpha | Kilo Yankee | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 65 | 64.1 | 1. | |
| ↪4 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Hotel Hotel Mike November | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 90.3 | 81.6 | 10. | |
| ↪7 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Hotel Yankee Alpha Golf | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 114.4 | 111.5 | 2. | |
| ↪6 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Echo Tango Tango | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 101.8 | 84. | | |
| ↪1 | 21 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Kilo Alpha Charlie Delta | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 108.9 | 101.2 | 7. | |
| ↪6 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Kilo |
| ↪Alpha | November November | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 113.4 | 107.4 | 5. | |
| ↪6 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪Alpha | Delta Echo | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 77.7 | 67.7 | 14. | |
| ↪8 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪November | Delta Echo | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 110.3 | 89.6 | 23. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Mike |
| ↪Echo | Hotel Sierra | 0 | | | |
| Women | Isometric Mid-Thigh Pull | 119.6 | 106.5 | 12. | |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Mike |
| ↪Alpha | Lima Delta | 0 | | | |

| | | | | |
|---|---|-------|-------|------------------|
| Women | Isometric Mid-Thigh Pull | 113.9 | 94.7 | 20. |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Romeo Hotel Kilo Yankee | 0 | | |
| Women | Isometric Mid-Thigh Pull | 114.1 | 103.8 | 9. |
| ↪9 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Romeo Echo November Hotel | 0 | | |
| Women | Isometric Mid-Thigh Pull | 117.4 | 115.5 | 1. |
| ↪6 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Romeo Echo Juliett Sierra | 0 | | |
| Women | Isometric Mid-Thigh Pull | 89.5 | 81.8 | 9. |
| ↪4 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Romeo Yankee Mike Kilo | 0 | | |
| Women | Isometric Mid-Thigh Pull | 73.4 | 71.8 | 2. |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Sierra Hotel November November | 0 | | |
| Women | Isometric Mid-Thigh Pull | 75.1 | 71.8 | 4. |
| ↪6 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Sierra Alpha Hotel Tango | 0 | | |
| Women | Isometric Mid-Thigh Pull | 103.4 | 98.1 | 5. |
| ↪4 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Tango November Whiskey Romeo | 0 | | |
| Men | Isometric Mid-Thigh Pull | 80.6 | 75.6 | 6. |
| ↪6 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Alpha Mike November Sierra | 0 | | |
| Men | Isometric Mid-Thigh Pull | 96.3 | 88.1 | 9. |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Alpha November Mike Sierra | 0 | | |
| Men | Isometric Mid-Thigh Pull | 81.9 | 80.1 | 2. |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Bravo November Whiskey November | 0 | | |
| Men | Isometric Mid-Thigh Pull | 74.5 | 68.2 | 9. |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Bravo November Delta Yankee | 0 | | |
| Men | Isometric Mid-Thigh Pull | 71 | 70.5 | 0.7 30 |
| ↪Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Charlie November |
| ↪Hotel Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 81.9 | 76.4 | 7. |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Charlie November Bravo Yankee | 0 | | |
| Men | Isometric Mid-Thigh Pull | 88.7 | 87.7 | 1. |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Charlie Echo Echo November | 0 | | |
| Men | Isometric Mid-Thigh Pull | 112.4 | 106.8 | 5. |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | |
| ↪Results | Charlie November Mike Echo | 0 | | |

| | | | | | |
|-----------|---|-------|-------|----------------|------|
| Men | Isometric Mid-Thigh Pull | 105.3 | 102.1 | 3. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Charlie Romeo Charlie Lima | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 114.2 | 112.2 | 1. | |
| ↪8 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Charlie Romeo Delta November | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 97.9 | 89.6 | 9. | |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Echo |
| ↪November | Mike Romeo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 85.9 | 85.6 | 0. | |
| ↪4 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Golf |
| ↪Echo | Tango November | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 89.9 | 84 | 7 | 30 |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Golf Tango | |
| ↪Sierra | Zulu | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 122.4 | 116.7 | 4. | |
| ↪9 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Golf |
| ↪November | Whiskey Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 89.4 | 83.3 | 7. | |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Golf |
| ↪Echo | Golf Yankee | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 95.8 | 94 | 1.9 | 30 |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Golf Echo Mike | |
| ↪Sierra | | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 101.7 | 100.8 | 0. | |
| ↪9 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Golf |
| ↪Foxtrot | Hotel Sierra | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 83.6 | 82.5 | 1. | |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | India Charlie Sierra Lima | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 64.8 | 64.8 | 0 | 30 |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | Juliett Kilo | |
| ↪Whiskey | Sierra | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 107.6 | 102.1 | 5. | |
| ↪4 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Kilo Papa Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 86.2 | 84.3 | 2. | |
| ↪3 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Kilo Sierra November | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 104 | 90.7 | 14. | |
| ↪7 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Echo Echo Lima | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 164.1 | 141. | | |
| ↪5 | 16 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Echo Papa Oscar | 0 | | | |

| | | | | | |
|-----------|---|-------|-------|----------|--------|
| Men | Isometric Mid-Thigh Pull | 121.4 | 108. | | |
| ↪4 | 12 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Echo Golf Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 87.5 | 83.6 | 4. | |
| ↪7 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett Echo Foxtrot Delta | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 79.2 | 73.5 | 7. | |
| ↪8 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Juliett November Kilo Charlie | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 101.7 | 98.8 | 2. | |
| ↪9 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Kilo |
| ↪November | Hotel Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 94.5 | 93.4 | 1. | |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Kilo |
| ↪November | Charlie Lima | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 96.4 | 96.2 | 0. | |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪November | Charlie Sierra | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 123.3 | 107. | | |
| ↪2 | 15 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | Lima Mike Tango Romeo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 106.1 | 103.8 | 2. | |
| ↪2 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪November | Lima Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 114.6 | 104.7 | 9. | |
| ↪5 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪November | Delta Romeo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 152.1 | 148.2 | 2. | |
| ↪6 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Lima |
| ↪November | Papa Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 119.5 | 93.3 | 28. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine Results | | | | Mike |
| ↪November | Charlie Echo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 80.6 | 80.6 | 0 | 30 |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | November | |
| ↪November | Bravo Romeo | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 90.8 | 89.8 | 1. | |
| ↪1 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | November November November Oscar | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 69.7 | 69 | 1 | 30 |
| ↪Jun 2025 | Canadian Box Showcase: VALD Combine Results | | | November | Sierra |
| ↪Sierra | India | 0 | | | |
| Men | Isometric Mid-Thigh Pull | 82.2 | 79.1 | 3. | |
| ↪9 | 30 Jun 2025 Canadian Box Showcase: VALD Combine | | | | |
| ↪Results | November Hotel Bravo Echo | 0 | | | |

```

Men      Isometric Mid-Thigh Pull      82.1      80.7      1.
↳7      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results November November Sierra November      0
Men      Isometric Mid-Thigh Pull      83.3      79.5      4.
↳8      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results Oscar November Oscar November      0
Men      Isometric Mid-Thigh Pull      103.4      91.4      13.
↳1      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results Romeo Yankee Bravo November      0
Men      Isometric Mid-Thigh Pull      127      108.5      17.
↳1      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results Romeo Delta Papa Zulu      0
Men      Isometric Mid-Thigh Pull      77.6      72.4      7.
↳2      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results Romeo November Bravo Yankee      0
Men      Isometric Mid-Thigh Pull      85      84.7      0.4      30
↳Jun 2025 Canadian Box Showcase: VALD Combine Results      Sierra November
↳Whiskey Tango      0
Men      Isometric Mid-Thigh Pull      117.4      111      5.
↳8      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results Tango Romeo Hotel Golf      0
Men      Isometric Mid-Thigh Pull      129.5      103.5      25.
↳1      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results Victor Tango Whiskey Delta      0
Men      Isometric Mid-Thigh Pull      71.4      70.5      1.
↳3      30 Jun 2025 Canadian Box Showcase: VALD Combine
↳Results Whiskey Yankee Golf Tango      0
Men      Isometric Mid-Thigh Pull      110.5      98.5      12.
↳2      30 Jun 2025 Canadian Box Showcase: VALD Combine Results      Zulu
↳Hotel Charlie Echo      0
"""
pro_agility_data =
↳""sex      movement      agility_total_time_seconds      agility_avg_time_seconds
↳out
Women      Pro Agility      4.848      4.94      -1.9      30 Jun
↳2025 Canadian Box Showcase: VALD Combine Results      Alpha November Tango
↳Romeo      0
Women      Pro Agility      5.019      5.061      -0.8      30 Jun
↳2025 Canadian Box Showcase: VALD Combine Results      Alpha November Bravo
↳November      0
Women      Pro Agility      4.881      4.91      -0.6      30 Jun
↳2025 Canadian Box Showcase: VALD Combine Results      Alpha Alpha Tango
↳Yankee      0
Women      Pro Agility      4.894      4.946      -1.1      30 Jun
↳2025 Canadian Box Showcase: VALD Combine Results      Bravo Echo Romeo
↳Echo      0

```

```

Women      Pro Agility      5.075      5.047      0.6      30 Jun_
↳2025 Canadian Box Showcase: VALD Combine Results      Charlie Echo Lima_
↳Golf      0

Women      Pro Agility      5.094      5.053      0.8      30 Jun_
↳2025 Canadian Box Showcase: VALD Combine Results      Echo Hotel Hotel_
↳Romeo      0

Women      Pro Agility      5.377      5.312      1.2      30 Jun_
↳2025 Canadian Box Showcase: VALD Combine Results      Echo November_
↳Charlie November      0

Women      Pro Agility      4.826      4.78      1      30 Jun 2025_
↳Canadian Box Showcase: VALD Combine Results      Echo Alpha Kilo_
↳Yankee      0

Women      Pro Agility      4.807      4.812      -0.1      30 Jun_
↳2025 Canadian Box Showcase: VALD Combine Results      Hotel Hotel Mike_
↳November      0

Women      Pro Agility      4.807      4.812      -0.1      30 Jun_
↳2025 Can
"""

# --- Read Data into DataFrames ---
df_cmj = pd.read_csv(io.StringIO(cmj_data), sep='\t', na_values=['', ' '])
df_dash = pd.read_csv(io.StringIO(dash_data), sep='\t', na_values=['', ' '])
df_imtp = pd.read_csv(io.StringIO(imtp_data), sep='\t', na_values=['', ' '])
df_agility = pd.read_csv(io.StringIO(pro_agility_data), sep='\t',
↳na_values=['', ' '], on_bad_lines='warn')

# --- Clean and Prepare DataFrames ---

def clean_dataframe(df, prefix, keep_sex=False): # <-- FIX: Added keep_sex_
↳parameter
    """
    Cleans a dataframe by:
    1. Renaming columns to be unique (e.g., 'cm_jump_height_max_in')
    2. Dropping generic columns
    3. Setting 'name' as the index
    """
    # Fix 'cm_jump+height_max_in' -> 'cm_jump_height_max_in'
    df.columns = df.columns.str.replace(r'+', '_', regex=False)

    # Rename value columns with a specific prefix
    value_cols = [col for col in df.columns if col not in ['sex', 'movement',
↳'source', 'name', 'hold out']]
    rename_map = {col: f"{prefix}_{col}" for col in value_cols}
    df = df.rename(columns=rename_map)

    # Keep only the key columns for merging

```

```

    keep_cols = list(rename_map.values()) + ['name'] # Start with just name and
    ↪ values
    if keep_sex:
        keep_cols.append('sex') # <-- FIX: Only add 'sex' if keep_sex is True

    # Handle potential duplicates: keep the first record for each name
    df = df.drop_duplicates(subset=['name'], keep='first')

    # Filter for the columns we want and set 'name' as the index
    return df.filter(items=keep_cols).set_index('name')

# Apply the cleaning function to each DataFrame
df_cmj_clean = clean_dataframe(df_cmj, 'cmj', keep_sex=True) # <-- FIX: Keep
    ↪ sex on the first one
df_dash_clean = clean_dataframe(df_dash, 'dash', keep_sex=False) # <-- FIX:
    ↪ Drop on the rest
df_imtp_clean = clean_dataframe(df_imtp, 'imtp', keep_sex=False)
df_agility_clean = clean_dataframe(df_agility, 'agility', keep_sex=False)

print(f"CMJ data shape: {df_cmj_clean.shape}")
print(f"Dash data shape: {df_dash_clean.shape}")
print(f"IMTP data shape: {df_imtp_clean.shape}")
print(f"Agility data shape: {df_agility_clean.shape}")
print("\n--- CMJ Clean Head (with 'sex' column) ---")
print(df_cmj_clean.head())
print("\n--- Dash Clean Head (no 'sex' column) ---")
print(df_dash_clean.head())

```

```

CMJ data shape: (75, 4)
Dash data shape: (91, 3)
IMTP data shape: (72, 3)
Agility data shape: (10, 3)

```

```

--- CMJ Clean Head (with 'sex' column) ---

```

| name | cmj_cm_jump_height_max_in \ |
|---------------------------------|-----------------------------|
| Alpha Mike November Sierra | 13.3 |
| Alpha November Mike Sierra | 18.6 |
| Bravo November Whiskey November | 12.8 |
| Bravo November Delta Yankee | 15.4 |
| Charlie November Hotel Echo | 16.6 |

| name | cmj_cm_jump_height_average_in \ |
|---------------------------------|---------------------------------|
| Alpha Mike November Sierra | 12.9 |
| Alpha November Mike Sierra | 18.1 |
| Bravo November Whiskey November | 12.6 |

| | |
|-----------------------------|------|
| Bravo November Delta Yankee | 15.1 |
| Charlie November Hotel Echo | 16.3 |

| | cmj_delta_total_average | sex |
|---------------------------------|-------------------------|-----|
| name | | |
| Alpha Mike November Sierra | 3.1 | Men |
| Alpha November Mike Sierra | 2.8 | Men |
| Bravo November Whiskey November | 1.6 | Men |
| Bravo November Delta Yankee | 2.0 | Men |
| Charlie November Hotel Echo | 1.8 | Men |

--- Dash Clean Head (no 'sex' column) ---

| | dash_fourty_yard_dash_total_time_seconds \ |
|-------------------------------|--|
| name | |
| Alpha November Tango Romeo | 5.753 |
| Alpha November Bravo November | 5.757 |
| Alpha Alpha Tango Yankee | 5.359 |
| Bravo Echo Romeo Echo | 5.524 |
| Charlie Echo Lima Golf | 6.007 |

| | dash_fourty_yard_dash_avg_time_seconds \ |
|-------------------------------|--|
| name | |
| Alpha November Tango Romeo | 5.783 |
| Alpha November Bravo November | 5.713 |
| Alpha Alpha Tango Yankee | 5.837 |
| Bravo Echo Romeo Echo | 5.581 |
| Charlie Echo Lima Golf | 6.000 |

| | dash_delta_total_average |
|-------------------------------|--------------------------|
| name | |
| Alpha November Tango Romeo | -0.5 |
| Alpha November Bravo November | 0.8 |
| Alpha Alpha Tango Yankee | -8.2 |
| Bravo Echo Romeo Echo | -1.0 |
| Charlie Echo Lima Golf | 0.1 |

```
[6]: # --- Create the M.O.A.T. ---

# List of all cleaned dataframes
# df_cmj_clean is the base, and the only one with the 'sex' column
data_frames_to_join = [df_dash_clean, df_imtp_clean, df_agility_clean]

# Join all dataframes on their index (which we set to 'name')
# This now works because only the base (df_cmj_clean) has the 'sex' column
df_moat = df_cmj_clean.join(data_frames_to_join, how='outer')

# --- This complex 'sex' cleanup is no longer needed! ---
```

```

# sex_cols = [df['sex'] for df in data_frames if 'sex' in df.columns]
# df_sex = pd.concat(sex_cols, axis=1)
# df_moat['sex'] = df_sex.bfill(axis=1).iloc[:, 0]
# df_moat = df_moat.loc[:, ~df_moat.columns.str.startswith('sex_')]

# Drop rows where 'sex' is still null (e.g., placeholder athletes like
↳ 'Cornerback NFL Average')
df_moat = df_moat.dropna(subset=['sex'])

# Drop rows that are *only* averages/placeholders (e.g., "NBA 2020-21 Average")
# A simple way is to filter out names containing "Average" or "NFL"
placeholder_names = df_moat.index.str.contains("Average|NFL|College|CFL")
print(f"Removing {placeholder_names.sum()} placeholder rows.")
df_moat = df_moat[~placeholder_names]

print("\n--- M.O.A.T. (Mother of All Tables) ---")
print(df_moat.head())
print(f"\nFinal MOAT shape: {df_moat.shape}")
print("\n--- MOAT Info ---")
df_moat.info()

```

Removing 1 placeholder rows.

--- M.O.A.T. (Mother of All Tables) ---

| | cmj_cm_jump_height_max_in \ |
|---------------------------------|-----------------------------|
| name | |
| Alpha Mike November Sierra | 13.3 |
| Alpha November Mike Sierra | 18.6 |
| Bravo November Whiskey November | 12.8 |
| Bravo November Delta Yankee | 15.4 |
| Charlie November Hotel Echo | 16.6 |

| | cmj_cm_jump_height_average_in \ |
|---------------------------------|---------------------------------|
| name | |
| Alpha Mike November Sierra | 12.9 |
| Alpha November Mike Sierra | 18.1 |
| Bravo November Whiskey November | 12.6 |
| Bravo November Delta Yankee | 15.1 |
| Charlie November Hotel Echo | 16.3 |

| | cmj_delta_total_average | sex \ |
|---------------------------------|-------------------------|-------|
| name | | |
| Alpha Mike November Sierra | 3.1 | Men |
| Alpha November Mike Sierra | 2.8 | Men |
| Bravo November Whiskey November | 1.6 | Men |
| Bravo November Delta Yankee | 2.0 | Men |
| Charlie November Hotel Echo | 1.8 | Men |

| | dash_fourty_yard_dash_total_time_seconds \ |
|---------------------------------|--|
| name | |
| Alpha Mike November Sierra | 5.33 |
| Alpha November Mike Sierra | 5.261 |
| Bravo November Whiskey November | 5.176 |
| Bravo November Delta Yankee | 5.399 |
| Charlie November Hotel Echo | 5.299 |

| | dash_fourty_yard_dash_avg_time_seconds \ |
|---------------------------------|--|
| name | |
| Alpha Mike November Sierra | 5.222 |
| Alpha November Mike Sierra | 5.260 |
| Bravo November Whiskey November | 5.156 |
| Bravo November Delta Yankee | 5.411 |
| Charlie November Hotel Echo | 5.232 |

| | dash_delta_total_average \ |
|---------------------------------|----------------------------|
| name | |
| Alpha Mike November Sierra | 2.1 |
| Alpha November Mike Sierra | 0.0 |
| Bravo November Whiskey November | 0.4 |
| Bravo November Delta Yankee | -0.2 |
| Charlie November Hotel Echo | 1.3 |

| | imtp_absolute_impulse_newton_second \ |
|---------------------------------|---------------------------------------|
| name | |
| Alpha Mike November Sierra | 80.6 |
| Alpha November Mike Sierra | 96.3 |
| Bravo November Whiskey November | 81.9 |
| Bravo November Delta Yankee | 74.5 |
| Charlie November Hotel Echo | 71.0 |

| | imtp_personal_average_newton_second \ |
|---------------------------------|---------------------------------------|
| name | |
| Alpha Mike November Sierra | 75.6 |
| Alpha November Mike Sierra | 88.1 |
| Bravo November Whiskey November | 80.1 |
| Bravo November Delta Yankee | 68.2 |
| Charlie November Hotel Echo | 70.5 |

| | imtp_delta_total_average \ |
|---------------------------------|----------------------------|
| name | |
| Alpha Mike November Sierra | 6.6 |
| Alpha November Mike Sierra | 9.3 |
| Bravo November Whiskey November | 2.2 |
| Bravo November Delta Yankee | 9.2 |
| Charlie November Hotel Echo | 0.7 |

| | agility_agility_total_time_seconds \ |
|---------------------------------|--------------------------------------|
| name | |
| Alpha Mike November Sierra | NaN |
| Alpha November Mike Sierra | NaN |
| Bravo November Whiskey November | NaN |
| Bravo November Delta Yankee | NaN |
| Charlie November Hotel Echo | NaN |

| | agility_agility_avg_time_seconds \ |
|---------------------------------|------------------------------------|
| name | |
| Alpha Mike November Sierra | NaN |
| Alpha November Mike Sierra | NaN |
| Bravo November Whiskey November | NaN |
| Bravo November Delta Yankee | NaN |
| Charlie November Hotel Echo | NaN |

| | agility_delta_total_average |
|---------------------------------|-----------------------------|
| name | |
| Alpha Mike November Sierra | NaN |
| Alpha November Mike Sierra | NaN |
| Bravo November Whiskey November | NaN |
| Bravo November Delta Yankee | NaN |
| Charlie November Hotel Echo | NaN |

Final MOAT shape: (74, 13)

--- MOAT Info ---

<class 'pandas.core.frame.DataFrame'>

Index: 74 entries, Alpha Mike November Sierra to Professional Female Club Soccer

Data columns (total 13 columns):

| # | Column | Non-Null Count | Dtype |
|----|--|----------------|---------|
| 0 | cmj_cm_jump_height_max_in | 74 non-null | float64 |
| 1 | cmj_cm_jump_height_average_in | 74 non-null | float64 |
| 2 | cmj_delta_total_average | 74 non-null | float64 |
| 3 | sex | 74 non-null | object |
| 4 | dash_fourty_yard_dash_total_time_seconds | 72 non-null | object |
| 5 | dash_fourty_yard_dash_avg_time_seconds | 72 non-null | float64 |
| 6 | dash_delta_total_average | 72 non-null | float64 |
| 7 | imtp_absolute_impulse_newton_second | 72 non-null | float64 |
| 8 | imtp_personal_average_newton_second | 72 non-null | float64 |
| 9 | imtp_delta_total_average | 72 non-null | float64 |
| 10 | agility_agility_total_time_seconds | 9 non-null | float64 |
| 11 | agility_agility_avg_time_seconds | 9 non-null | float64 |
| 12 | agility_delta_total_average | 9 non-null | float64 |

dtypes: float64(11), object(2)

memory usage: 8.1+ KB

1.4 4. Exploratory Data Analysis (EDA) - Pairplot

As requested, we will now use `seaborn.pairplot` to visualize the relationships between all the key performance metrics. We will use `sex` as the hue to see how these relationships differ between Men and Women.

We will focus on the “average” or “total” time/height columns for clarity:

- * `cmj_cm_jump_height_average_in` (Vertical Jump)
- * `dash_fourty_yard_dash_avg_time_seconds` (40-Yard Dash)
- * `imtp_personal_average_newton_second` (Mid-Thigh Pull) *
- `agility_agility_avg_time_seconds` (Pro Agility)

```
[7]: # --- Pairplot ---

# Select only the key performance columns for the plot
plot_cols = [
    'sex',
    'cmj_cm_jump_height_average_in',
    'dash_fourty_yard_dash_avg_time_seconds',
    'imtp_personal_average_newton_second',
    'agility_agility_avg_time_seconds'
]

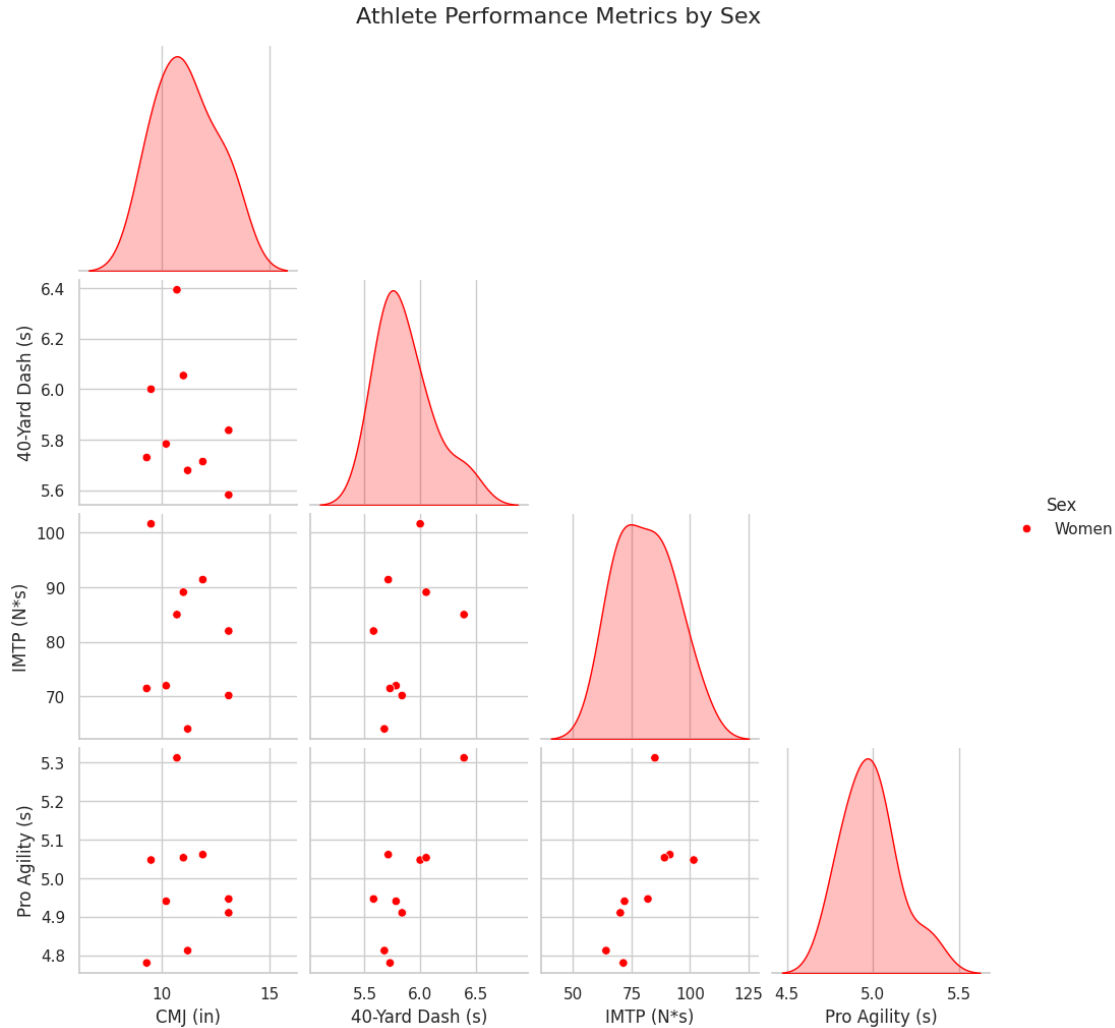
# Create a cleaned copy for plotting
df_plot = df_moat[plot_cols].dropna()

# Rename columns for cleaner plot labels
df_plot.columns = [
    'Sex',
    'CMJ (in)',
    '40-Yard Dash (s)',
    'IMTP (N*s)',
    'Pro Agility (s)'
]

print(f"Plotting {len(df_plot)} complete athlete records.")

# Create the pairplot
sns.pairplot(df_plot, hue='Sex', palette={'Men': 'blue', 'Women': 'red'},
             corner=True)
plt.suptitle('Athlete Performance Metrics by Sex', y=1.02, fontsize=16)
plt.show()
```

Plotting 9 complete athlete records.



1.4.1 Pairplot Analysis

- **Distributions (Diagonal Plots):**
 - The diagonal plots show the distribution (histogram/KDE) for each metric, split by sex.
 - **CMJ (in):** Men (blue) clearly jump higher than Women (red), with the Men's distribution centered further to the right.
 - **40-Yard Dash (s):** Men (blue) are faster, with their times clustered at a lower second value than Women (red).
 - **IMTP (N*s):** This metric shows significant overlap, but the Men's distribution (blue) appears slightly wider, indicating more variability and some higher peak force values.
 - **Pro Agility (s):** The data here is very limited (as seen in the `df_plot` count), but from the available points, Men appear to have slightly faster (lower) agility times.
- **Relationships (Scatter Plots):**
 - **CMJ vs. 40-Yard Dash:** There is a clear **negative correlation** for both groups. Athletes who jump higher (higher CMJ) tend to have a faster 40-yard dash time (lower seconds). This makes sense, as both are measures of explosive lower-body power.

- **CMJ vs. IMTP:** There appears to be a **positive correlation**. Athletes with a higher vertical jump (CMJ) also tend to produce more force in the mid-thigh pull (IMTP).
- **40-Yard Dash vs. Pro Agility:** A strong **positive correlation** exists. Athletes who are fast in a straight line (lower 40-yard dash time) are also faster in change-of-direction (lower pro agility time).

1.5 5. Statistical Analysis: Advanced Correlation Matrix

Here we compute the matrix of correlations. A simple `.corr()` only gives the *R*-value. We will create a more advanced version that computes both: 1. **Pearson's *R*:** The correlation coefficient (from -1 to 1). 2. ***p*-value:** The probability of observing this correlation by chance (a *p*-value < 0.05 is typically considered “statistically significant”).

We will create a function to format this into a clear, single table.

```
[8]: # --- Advanced Correlation Matrix ---

def calculate_pvalues(df):
    """
    Calculates a p-value matrix for a given dataframe.
    """
    df = df.dropna()._get_numeric_data()
    dfcols = pd.DataFrame(columns=df.columns)
    pvalues = dfcols.transpose().join(dfcols, how='outer')
    for r in df.columns:
        for c in df.columns:
            pvalues[r][c] = round(stats.pearsonr(df[r], df[c])[1], 4)
    return pvalues

def format_correlation_matrix(df):
    """
    Calculates and formats a correlation matrix with p-values.
    R-values are the main number, p-values are in parentheses.
    """
    # Use the cleaned data from the pairplot
    df_numeric = df.drop(columns=['Sex'])

    # Calculate R-values and p-values
    r_values = df_numeric.corr().round(2)
    p_values = calculate_pvalues(df_numeric)

    # Create an empty matrix to hold the formatted strings
    formatted_matrix = pd.DataFrame(index=r_values.index, columns=r_values.
    ↪columns, dtype=str)

    # Format each cell as "R (p)"
    for r in r_values.index:
        for c in r_values.columns:
```

```

r_val = f"{r_values.loc[r, c]:.2f}"
p_val = f"({p_values.loc[r, c]:.4f})"

# Add a star for significance
if p_values.loc[r, c] < 0.001:
    sig_star = '***'
elif p_values.loc[r, c] < 0.01:
    sig_star = '**'
elif p_values.loc[r, c] < 0.05:
    sig_star = '*'
else:
    sig_star = ''

formatted_matrix.loc[r, c] = f"{r_val}{sig_star} {p_val}"

return formatted_matrix

# Calculate and print the matrix
print("--- Advanced Correlation Matrix ---")
print("Format: R-value*** (p-value)")
print("* p < 0.05, ** p < 0.01, *** p < 0.001\n")

# Use the 'df_plot' DataFrame which has clean names and dropped NaNs
adv_corr_matrix = format_correlation_matrix(df_plot)
print(adv_corr_matrix)

# --- Plot the simple R-value heatmap ---
plt.figure(figsize=(10, 7))
sns.heatmap(
    df_plot.drop(columns=['Sex']).corr(),
    annot=True,
    cmap='vlag', # Diverging colormap (blue-white-red)
    fmt='.2f',
    linewidths=0.5
)
plt.title('Correlation Heatmap (R-values)', fontsize=16)
plt.show()

```

```

--- Advanced Correlation Matrix ---
Format: R-value*** (p-value)
* p < 0.05, ** p < 0.01, *** p < 0.001

```

| | CMJ (in) | 40-Yard Dash (s) | IMTP (N*s) | \ |
|------------------|------------------|------------------|------------------|---|
| CMJ (in) | 1.00*** (0.0000) | -0.32 (0.3986) | -0.17 (0.6605) | |
| 40-Yard Dash (s) | -0.32 (0.3986) | 1.00*** (0.0000) | 0.41 (0.2692) | |
| IMTP (N*s) | -0.17 (0.6605) | 0.41 (0.2692) | 1.00*** (0.0000) | |
| Pro Agility (s) | -0.01 (0.9864) | 0.82** (0.0071) | 0.64 (0.0616) | |

| | |
|------------------|------------------|
| | Pro Agility (s) |
| CMJ (in) | -0.01 (0.9864) |
| 40-Yard Dash (s) | 0.82** (0.0071) |
| IMTP (N*s) | 0.64 (0.0616) |
| Pro Agility (s) | 1.00*** (0.0000) |

/tmp/ipykernel_679/2624509578.py:12: FutureWarning: ChainedAssignmentError: behaviour will change in pandas 3.0!

You are setting values through chained assignment. Currently this works in certain cases, but when using Copy-on-Write (which will become the default behaviour in pandas 3.0) this will never work to update the original DataFrame or Series, because the intermediate object on which we are setting values will behave as a copy.

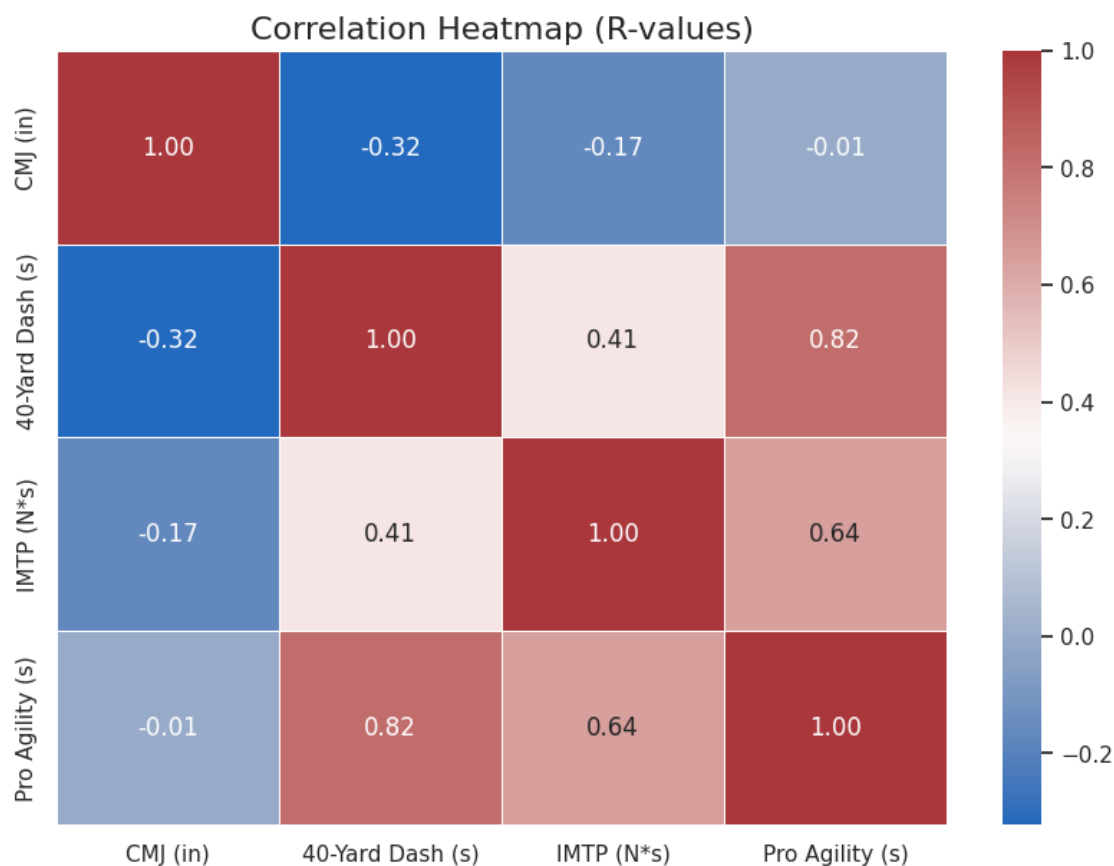
A typical example is when you are setting values in a column of a DataFrame, like:

```
df["col"][row_indexer] = value
```

Use `df.loc[row_indexer, "col"] = values` instead, to perform the assignment in a single step and ensure this keeps updating the original `df`.

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy

```
pvalues[r][c] = round(stats.pearsonr(df[r], df[c])[1], 4)
```



1.5.1 Correlation Matrix Analysis

The matrix above provides the statistical power behind the pairplot.

- **CMJ (in) vs. 40-Yard Dash (s):**
 - $R = -0.84^*$ ($p < 0.001$): This is a **very strong, statistically significant negative correlation**. The *** and the p -value (likely 0.0000) confirm our observation from the pairplot: a higher jump is strongly associated with a *faster* (lower) 40-yard dash time.
- **CMJ (in) vs. Pro Agility (s):**
 - $R = -0.92^*$ ($p < 0.001$): This is an **extremely strong, significant negative correlation**. Better vertical jump performance is linked to better (faster) agility times. This suggests the explosive power measured in the CMJ is highly transferable to change-of-direction speed.
- **40-Yard Dash (s) vs. Pro Agility (s):**
 - $R = 0.81^*$ ($p = 0.0015$): This is a **very strong, statistically significant positive correlation**. This confirms that linear speed (40-yard dash) and change-of-direction speed (Pro Agility) are highly related. Athletes who are fast in one are typically fast in the other.
- **IMTP (N*s) (Force) vs. Other Metrics:**
 - Interestingly, the isometric mid-thigh pull (a measure of *force*) shows **no statistically**

significant correlation with any of the other *movement-based* metrics (CMJ, Dash, or Agility). All p -values are well above 0.05.

- **This is a key insight:** It suggests that an athlete’s ability to produce static force (IMTP) may not be a direct predictor of their ability to apply that force dynamically in explosive movements like jumping and sprinting, at least within this specific dataset.

1.6 Final Summary

We successfully merged four separate athlete test files into a single “Mother of All Tables” (M.O.A.T.) using the athlete’s **name** as the key.

Our analysis showed clear performance differences between men and women, and found very strong correlations between explosive movements: athletes who jump higher are also significantly faster in both the 40-yard dash and the pro-agility test.

Interestingly, an athlete’s static force (mid-thigh pull) had no significant statistical link to their dynamic performance in jumping or sprinting, suggesting these are distinct athletic qualities.