



COLUMBIA
UNIVERSITY



COLUMBIA X US ROWING

US ROWING

Findings and Recommendations

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Agenda

- Current State
- Review Current Data
- Data Analysis Results
- Data collection - Athletes and Coaches
- Proposed Dashboards
- Next Steps
- Conclusion

Quantifying the Mental Preparedness of an Athlete

- “It is in the whites of their eyes” is garnered through a coaches intuition and expertise. We want to supplement that with analytical tools
- Hypothesis - Mentally and emotionally well-balanced athletes lead to faster rowing times

Current State

US Rowing has engaged Columbia University students through the Capstone program to assist in understanding the current state of their analytic capabilities and strategizing methods for increasing transparency into athletic performance

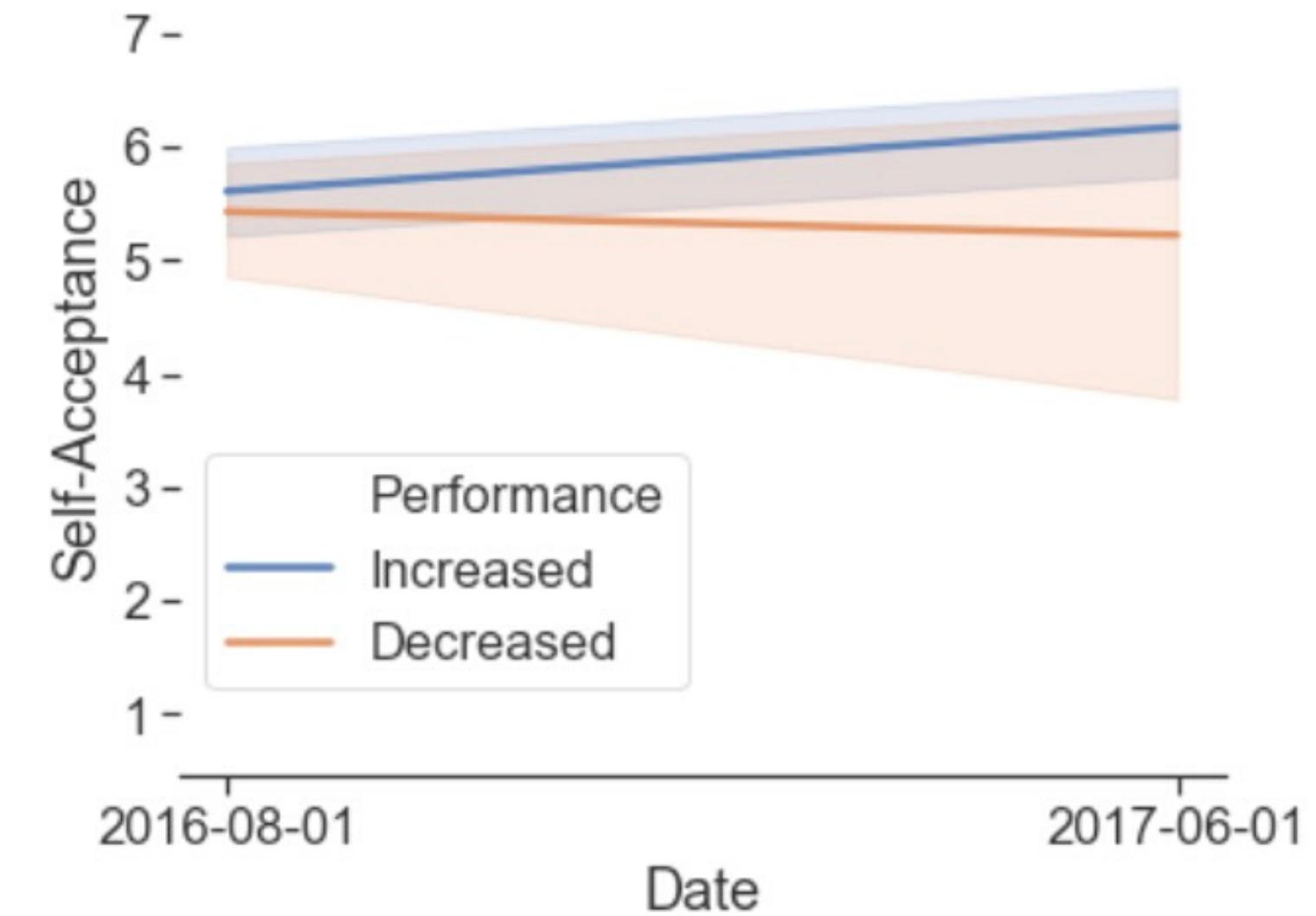
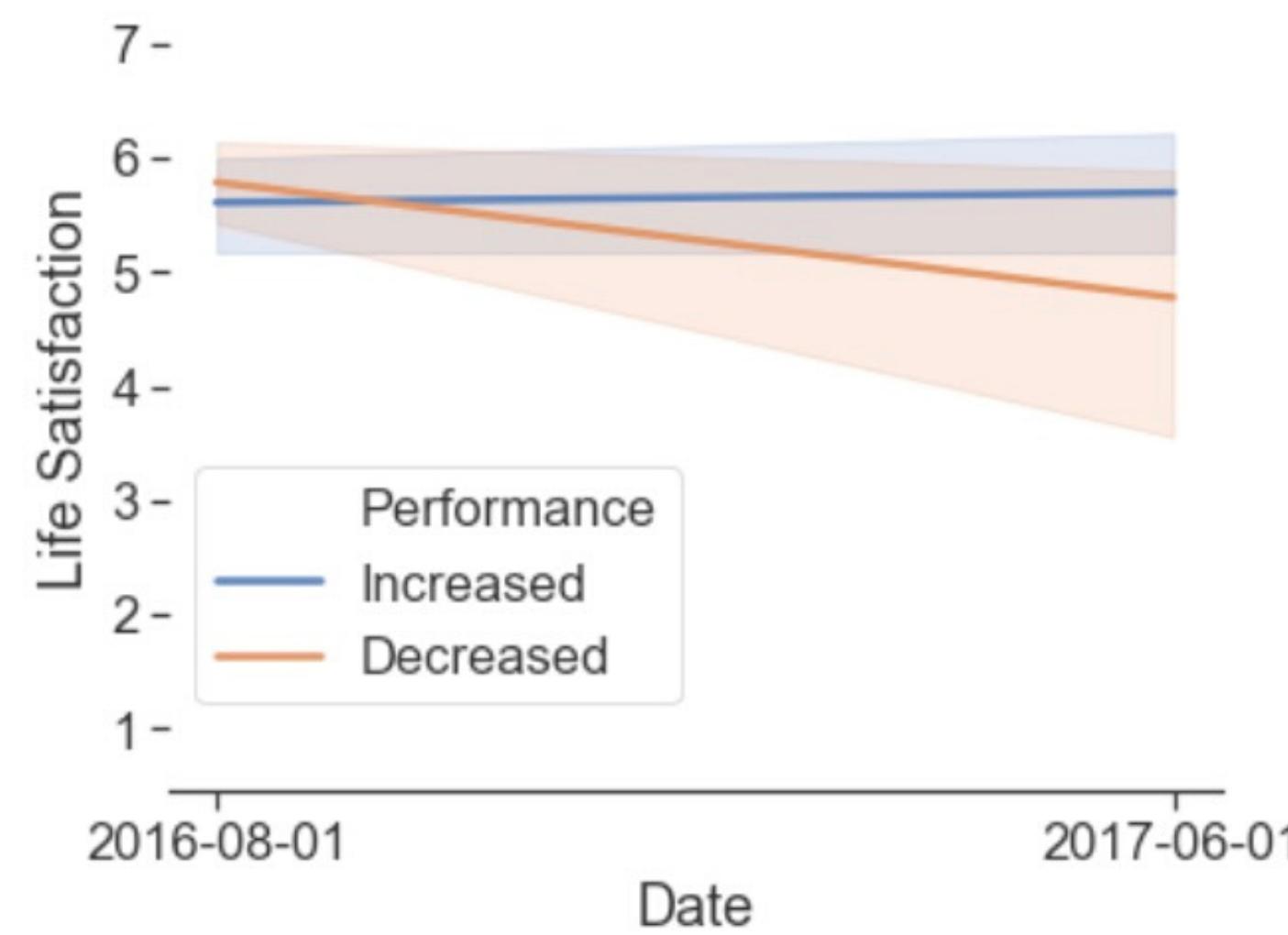
VISION

1. Create a framework to allow for seamless Data Collection -> Display -> Analytics -> Decision process
2. Using improved data collection for more robust analysis in future
3. Propose avenues for enhancing data management framework for Rowing Teams

LIMITATION

1. Lack of data to capture an athlete's mental/emotional state and well-being
2. Difficult to link performance data to non-performance data (nutrition, biometrics, etc.)

Athletic Performance, Life Satisfaction and Self-Acceptance



SURVEY FORMAT AND LIMITATIONS

- Overcomplicated questioning
- Taxing/burdensome surveys
- Survey only applies by the end of season

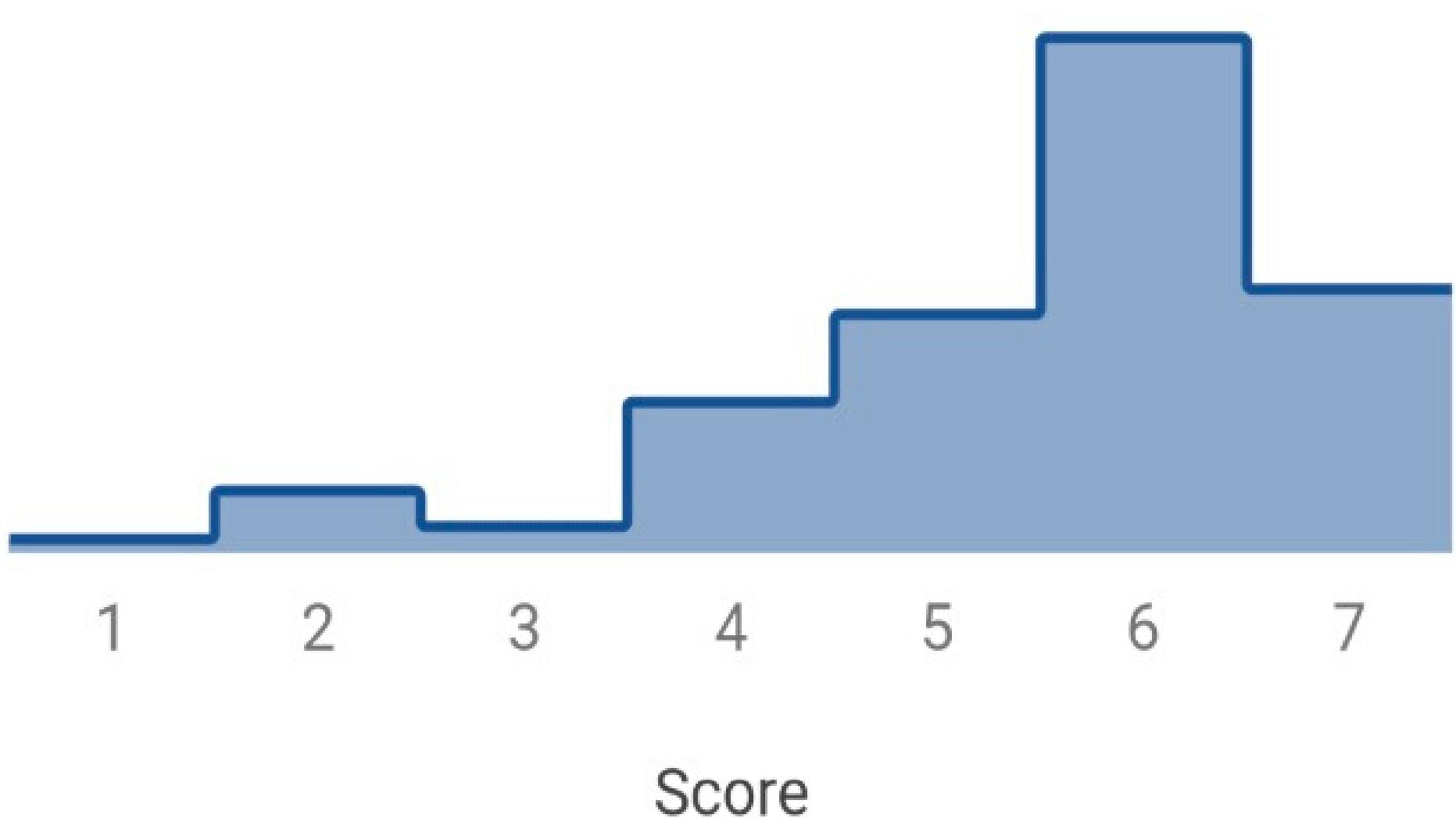
9. Please rate the level of your sense of purpose in life. Individual with a high sense of purpose sees their life has having meaning, they work to make a positive difference in the world, and often feel connected to ideas or social movements larger than themselves. Such individuals have a sense that they know what their life is about. Individuals low in this quality often question if there is a larger purpose, do not feel their life makes sense, and attribute no higher meaning or value to life other than the fulfillment of a series of tasks.

Very low in sense of purpose	Low in sense of purpose	Somewhat low in sense of purpose	Neutral or sometimes high and sometimes low in sense of purpose	Somewhat high in sense of purpose	High in sense of purpose	Very high in sense of purpose
1	2	3	4	5	6	7

SURVEY RESULTS

- Skewed responses to wellness questions
- Lack physical health data metrics

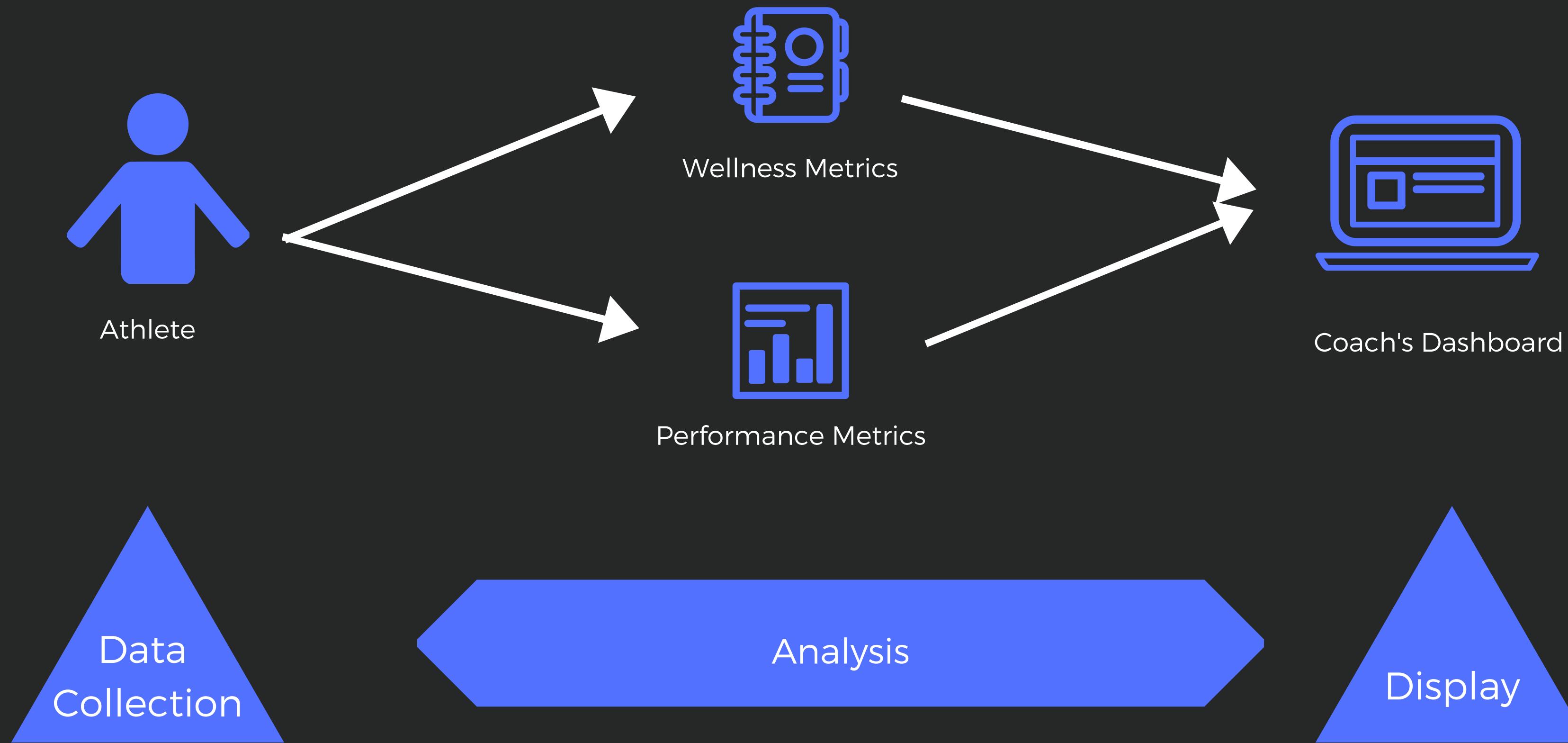
Life Satisfaction Score Distribution

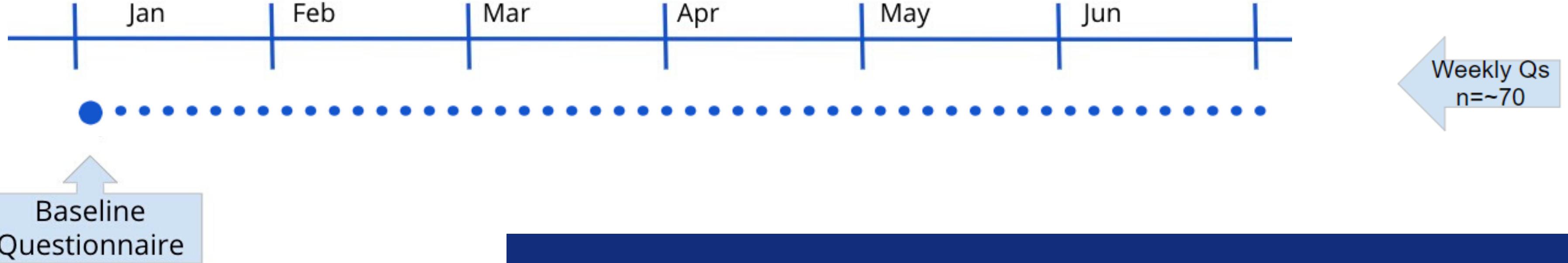


Data Analysis Takeaways

- Room for further analysis
 - Correlations found but not significant
- Questionnaire redesign
 - Age/ experience inclusive
- Timing of surveying
 - Adding bi-monthly tests
- Less taxing evaluation
 - implement easy to use / high compliance tests
- Combine with physical metrics
 - Integration of drawing correlation between the two

High Level Flow





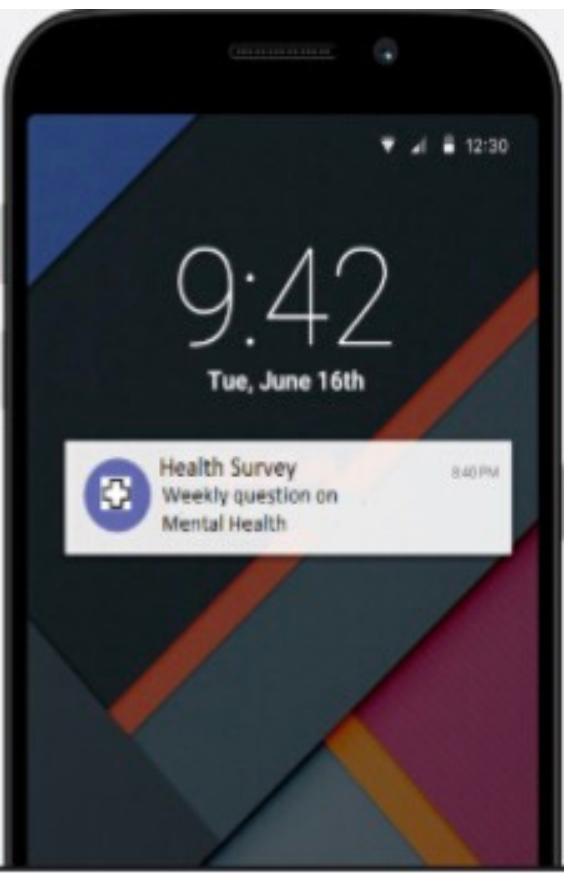
Data Collection - Wellbeing

Timing:

- Questions asked by monthly
- Would like to have phone notification or email alert

Length of data capture:

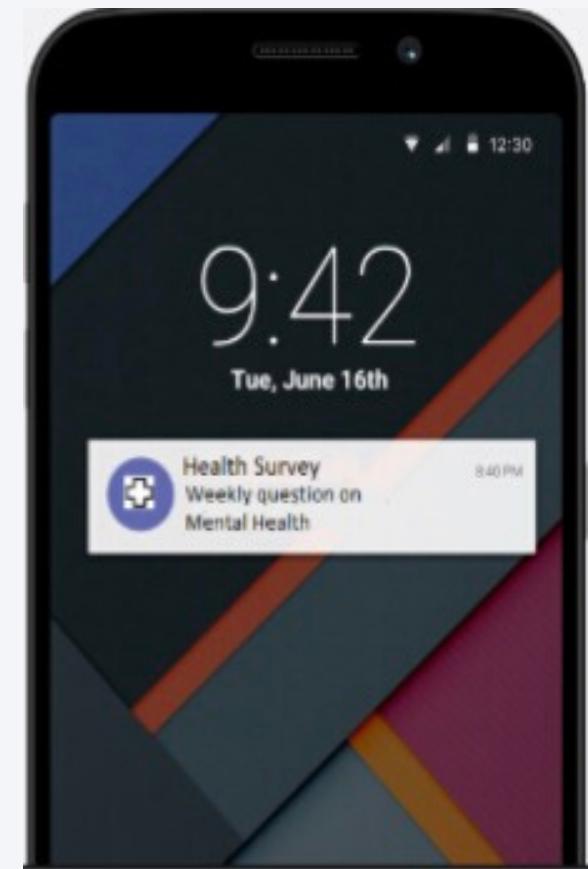
- 20 weeks
- Columbia - Start of Spring 2020 (Jan) to last regatta
- US Rowing January to Tokyo Olympics (June/July)



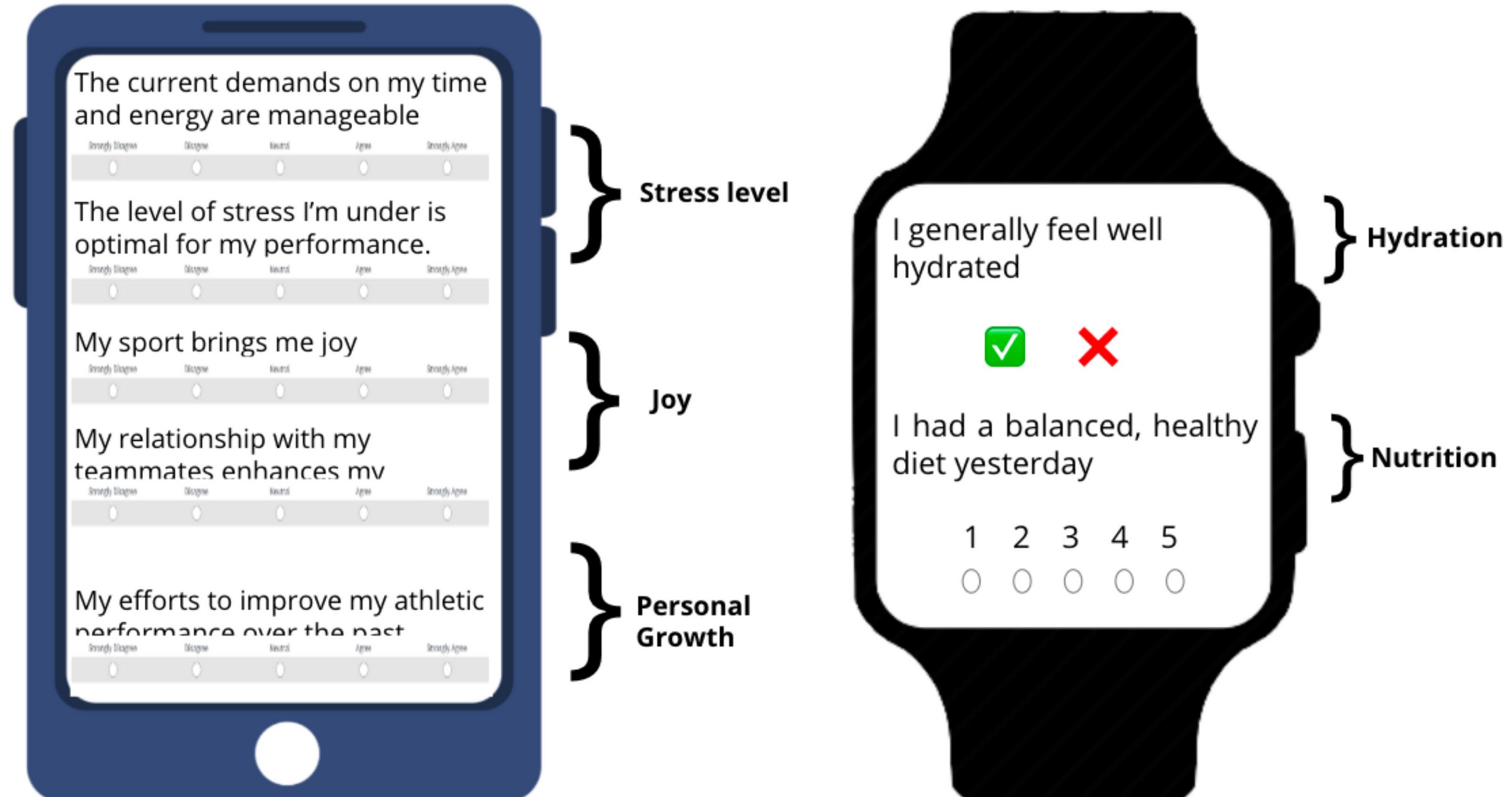
Data Collection - Wellbeing

Question Types :

- Key categories in which questions will be asked:
 - Stress, Joy, Personal Growth, Nutrition/ Hydration
- Categories are rotating
- Athletes do not address the category on the same day
- Weekly spread to avoid attrition and test training

A screenshot of a Google Form titled "Health Survey". The form features a large blue header with a stylized "C" logo. Below the title, there is a question: "Are you under control of your emotions and can moderate extreme, non-productive tendencies in reacting to them?". Underneath the question is a horizontal rating scale from 1 to 10, with each number accompanied by a colored square: 1 (red), 2 (orange), 3 (yellow), 4 (light green), 5 (medium green), 6 (dark green), 7 (blue-green), 8 (blue), 9 (light blue), and 10 (medium blue). There is also a text input field labeled "Comments (for personal analysis only):" with a placeholder "Your answer". At the bottom of the form are two buttons: "BACK" and "SUBMIT". A small note at the very bottom says "Never submit passwords through Google Forms."

Data Collection - Mental Health Survey Proposal



PHYSICAL METRICS DATA COLLECTION



ROWING DATA

on-land

WEIGHT ROOM



NUTRITION

collected simultaneously with mental metrics



NUTRITION



HYDRATION

collected simultaneously with mental metrics



Choose Test Type and Date - Athlete John Smith

Type of Test *

Rowing Test

Weight Room Test

Mental Health Survey

Test Date *

Date

11/03/2019

NEXT

Never submit passwords through Google Forms.



US Rowing Athlete Input

Rowing Test

Test Type

2k

Max

1'

6k

60'

RPE - how do you feel physically and mentally right now?

1 2 3 4 5 6 7 8 9 10

Worst condition Peak Condition

SRPE - how difficult was this training session?

1 2 3 4 5 6 7 8 9 10

Very easy Most Difficult

DATA COLLECTION - ATHLETE INTERFACE

Manual or automatic input of results of rowing tests on land

The athlete will input:

RPE (how they are feeling)

SRPE (the exertion level of the session).

Optional manual input

results (split time and watts)

usually done by coaches

Common Variables:

- Name
- Date
- Test Type (alongside number value for multiple tests)

RPE and SRPE Data for personalized correlation to rowing performance.

- **Common variables:**

- Name, Date, and Test type.

- **Inputted Variables**

- RPE/ SRPE
- Performance (coaches)

- **RPE and SRPE data for analytical purposes by future students or analysts.**

The screenshot shows a Google Form titled "Choose Test Type and Date - Athlete John Smith". The form includes fields for "Type of Test" (radio buttons for Rowing Test, Weight Room Test, and Mental Health Survey, with "Weight Room Test" selected), "Test Date" (date input field showing "11/03/2019"), and a "NEXT" button. To the right of the main form is a sidebar titled "Weight Room" containing a list of test types with radio buttons. A blue arrow points from the "Weight Room Test" label in the sidebar to the corresponding radio button in the main form. The sidebar also includes sections for "RPE" and "SRPE" with their respective input fields, and buttons for "BACK", "Submit", and "Man. Inv".

Weight Room Test Type *

- Front Squat
- Speed b. Squat
- Squat with Chain Pause
- Squat with Chain No Pause
- Squat
- Speed 1/2 Squat
- Hang Clean
- Full Clean
- Clean
- RDL
- None

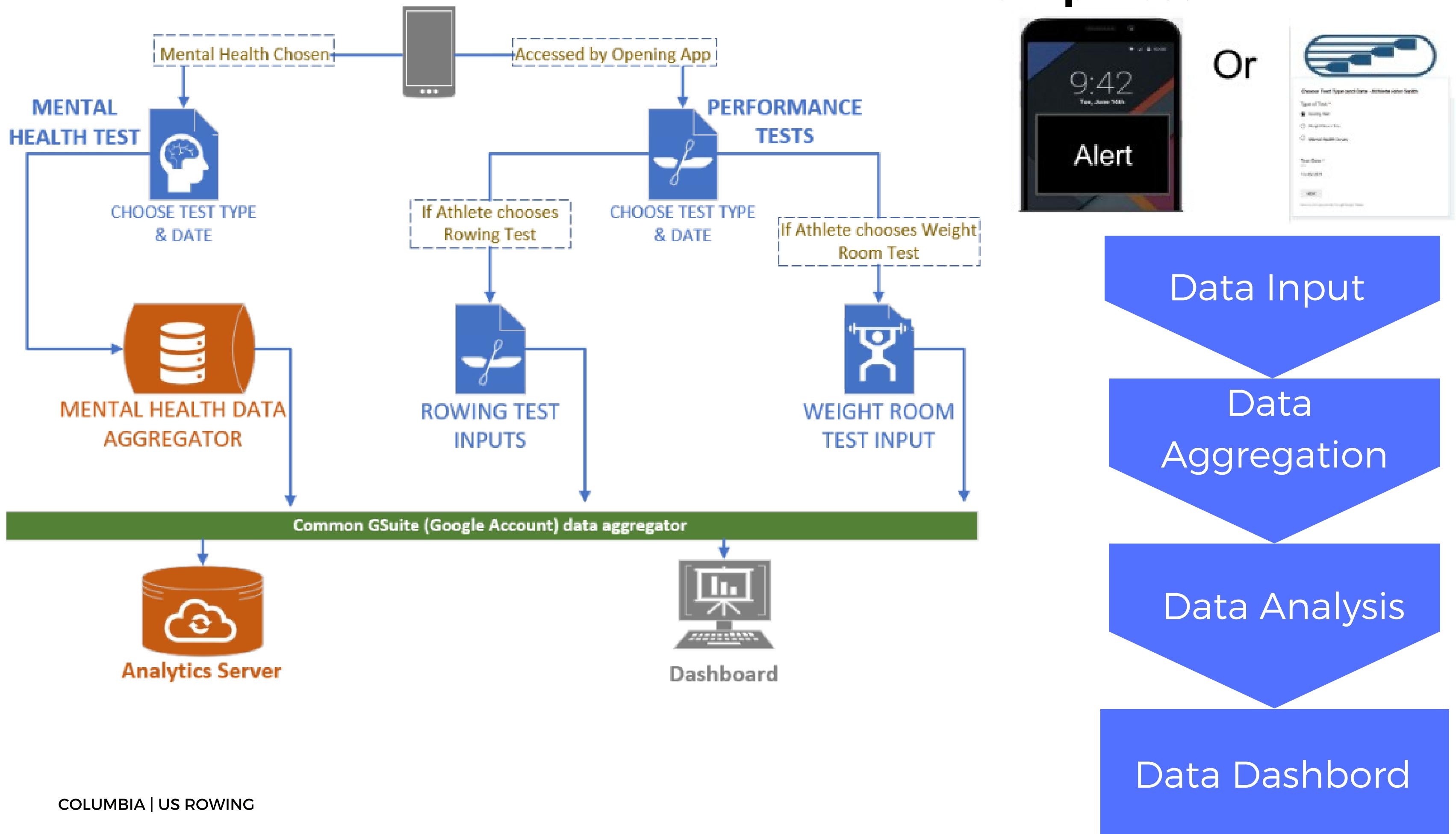
RPE

SRPE

Never submit passwords through Google Forms.

DATA COLLECTION - WEIGHT ROOM METRICS

Simplified:



DATA COLLECTION - COACHES INTERFACE

Common Variables:

- Athlete name
- Date of test
- Test type



Data Collection
Form to record rowing data for the US Lightweight Men's Four team.

* Required

Athlete Name *

Robin Prendes
 Tyler Nase
 Anthony Fahden

Test Date *

mm/dd/yyyy

Type of Test *

Rowing test
 Weight Room Test

NEXT

Never submit passwords through Google Forms.

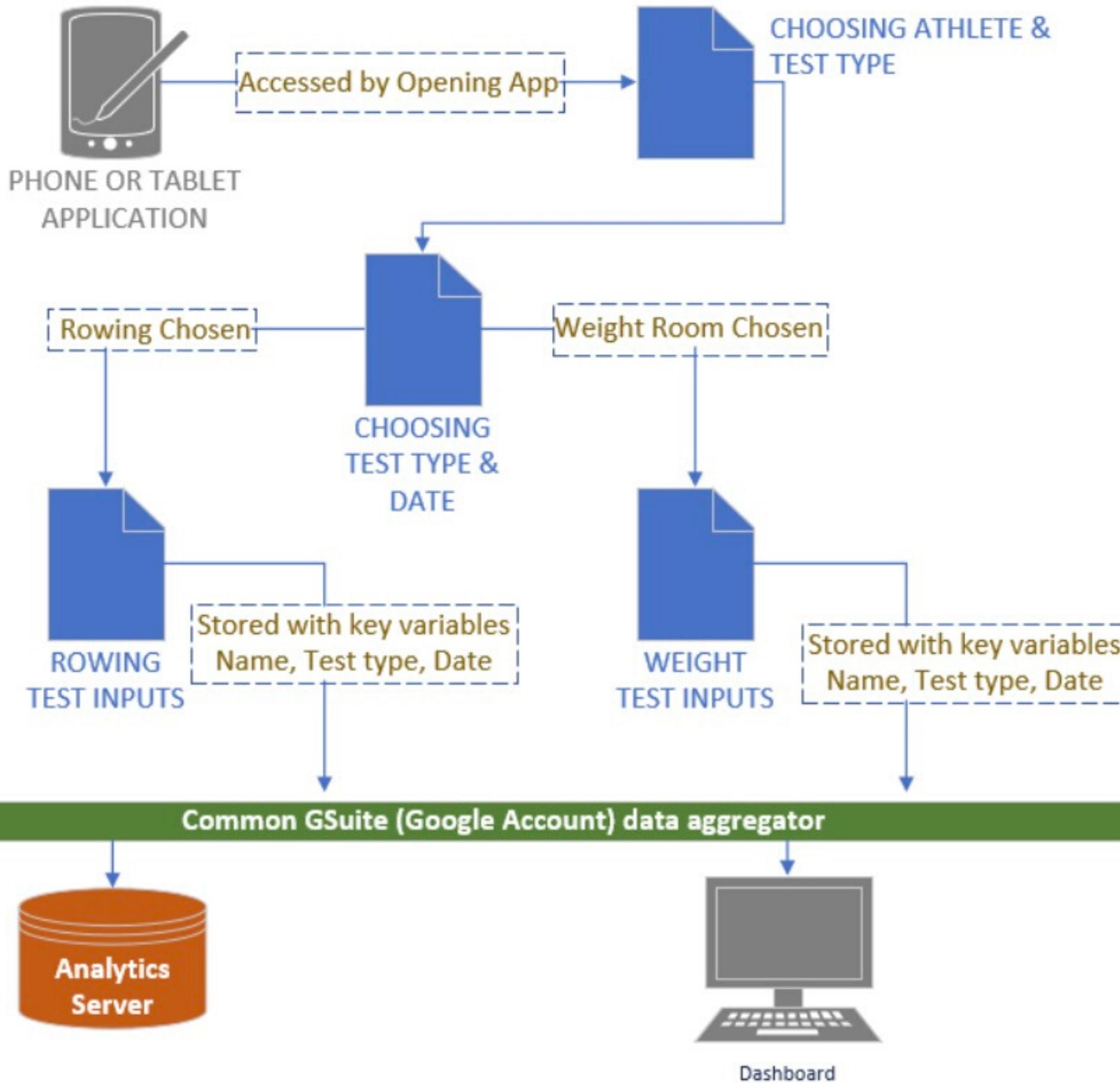
Rowing Test

Test inputs:
Split/ Split goal
Watt/ Watt goal

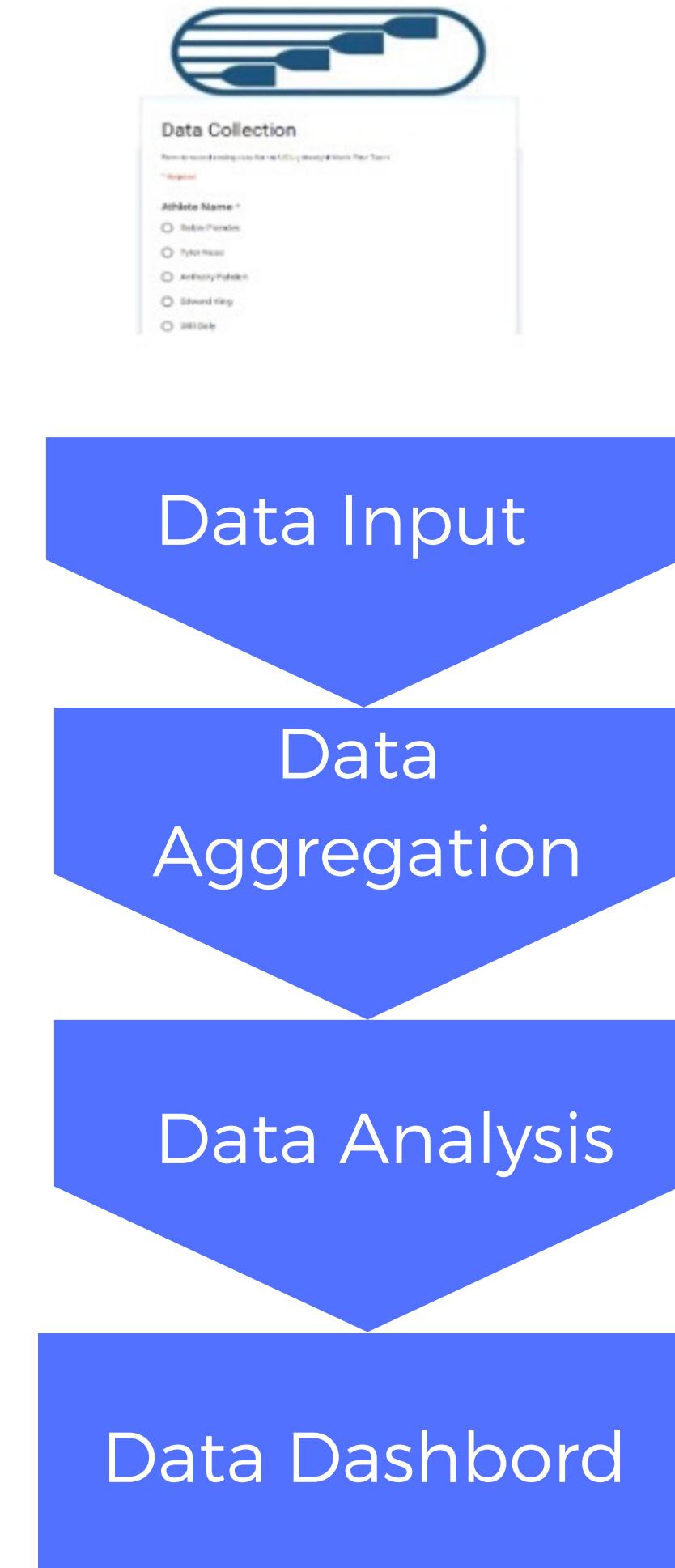
Weight Room Test

Test inputs:
Set/ Reps/ Kg
Watt reached/ Watt goal

Coach Interface Workflow



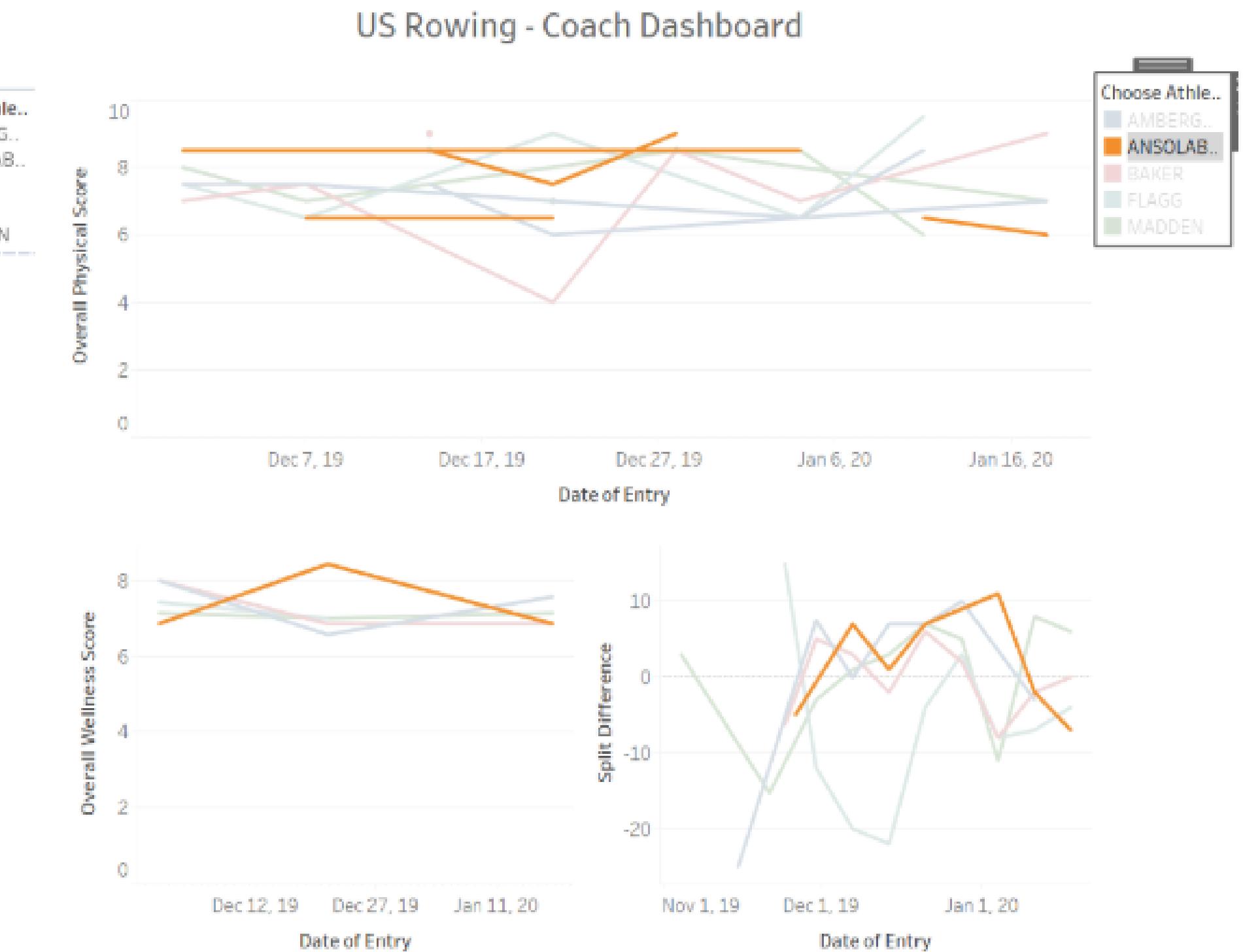
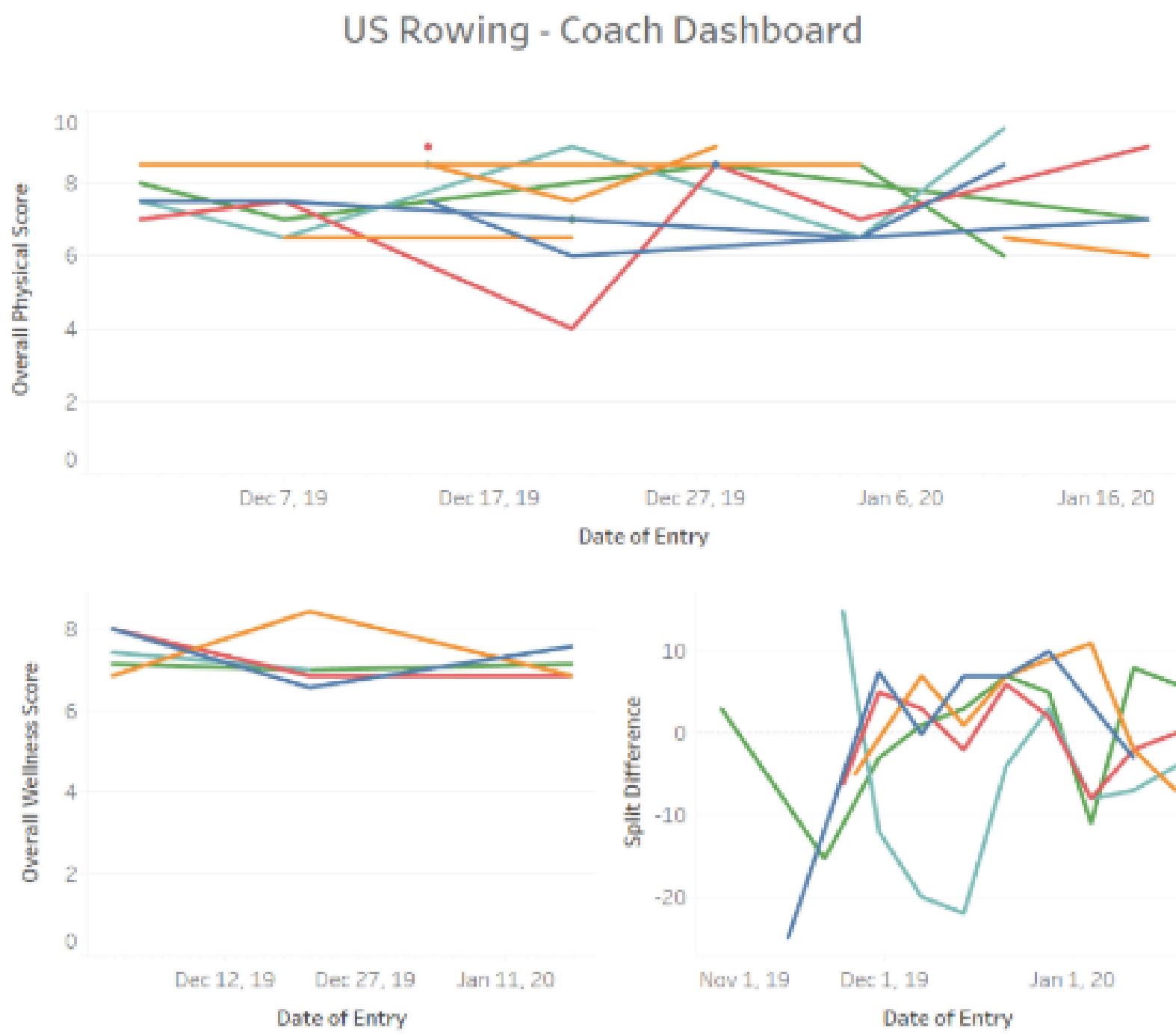
Simplified:



Analysis and Display - Coach's View

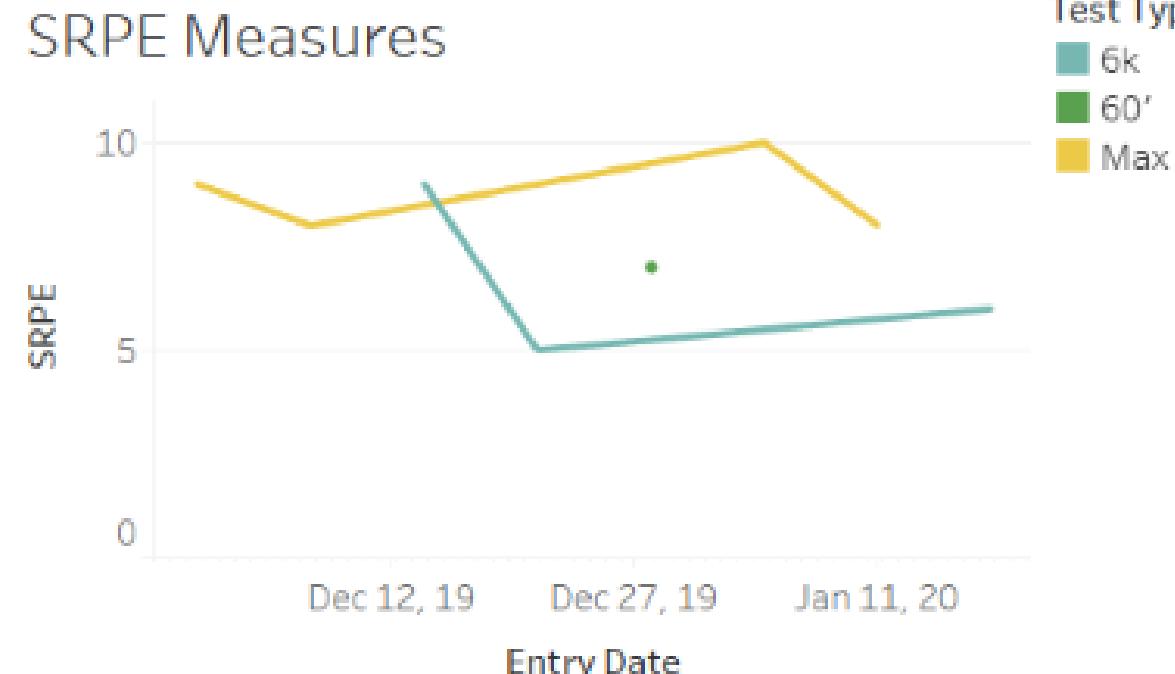
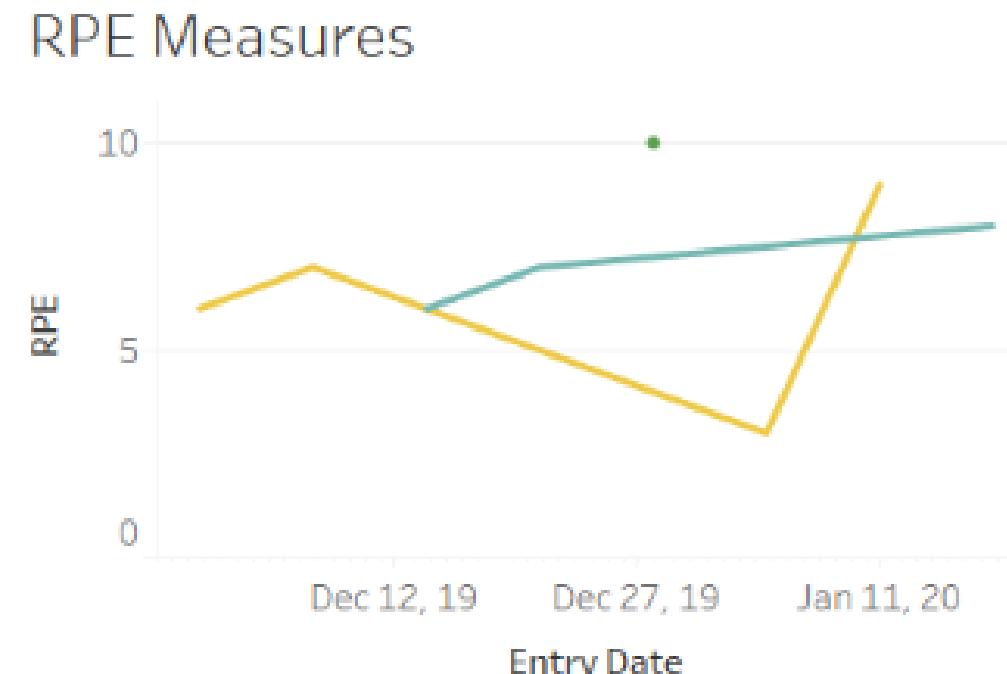
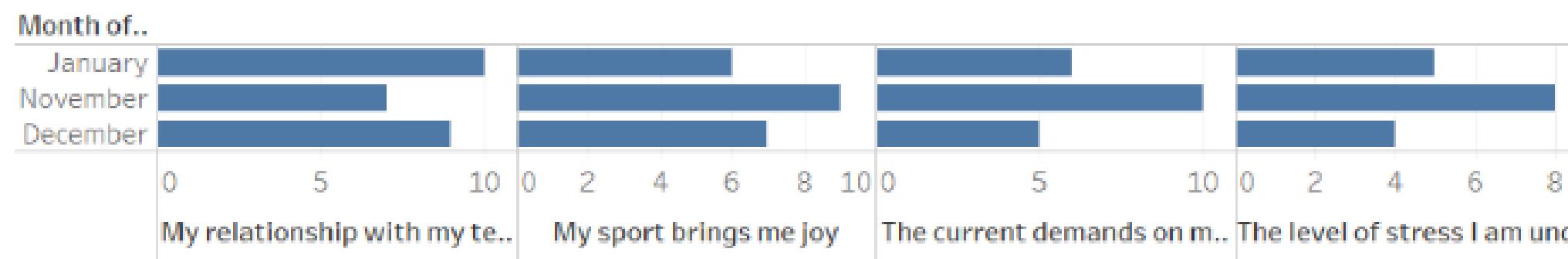
- In our proposed dashboard, athlete metrics would be at a summarized level
- This would protect against detailed, sensitive information being seen by coaching staffs
- Coaches would be able to track how athletes are doing physically and wellness wise, throughout different testing periods
- Coaches would also have the ability to drill down and select a particular athlete to see how they have performed

Analysis and Display - Coach's View



Analysis and Display - Athlete's View

US Rowing - Amberger's Dashboard



- We are also proposing a more detailed dashboard available to athletes
- This dashboard would give athletes full control over viewing all of their data for a given testing period
- Athletes would also have the ability to view metrics by date and comments added by the athlete

CURRENT LIMITATIONS

Next Areas of Focus:

- Encryption / authentication: Current model relies on Google forms
- Data Warehouse: Best to utilize a system that stores all athlete data in a centralized place
- Dashboard: Will be delivered
- Notification and user engagement: In the current iteration, we do not have a way to automate sending of notifications to athletes.

Recommendations:



kubernetes





Next Steps

2020 Spring Plan

- Have athletes use the wellness survey
- Input results from athlete and coach, for each workout or session
- By the end of US Rowing and Columbia Rowing seasons (end of July & May-31, respectively), the data gathered through the season can be used for greater analysis by the summertime capstone program

Strategic View:

- Investigate the use of wearables such as whoop, to capture more details health based data, which can be integrated into the dashboard
- Utilize data to perform more effective trend analysis between well-being & exertion response and performance from weight or rowing sessions
- Continue improving the user experience for coaches and athletes for delivering insight

CONCLUSION

- A limited correlation between performance and high mental health was found, however we have determined this is due to the collection methods for the mental health metrics
- To solve for this, the team is proposing applying a more concise athlete survey to capture mental wellness metrics
- To fully appreciate the effectiveness of this new survey, the team is proposing a well controlled study
- We have created a framework for data collection, aggregation and output, for a dashboard or further analysis
- We hope that our recommendations will improve the process of Data Collection -> Analysis -> Display -> Decision

Q&A

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