INTRODUCTION:

“One of our infielders, Player X, seems to be struggling in the field. He’s got a great arm, but he’s made a few errors this season and is failing to get to some balls. Could you look into this and identify any problem areas that we can target with drills?”

Potential Approaches:

Investigate potential reasons for fielding errors can be analyzed by:

1. Investigate external factors (out of players control) such as errors by inning, average ball velocity, batter handiness average, flyball error average and groundball error average.
   * 1. Example: If the fielder generates errors from right-handed batter, then coaching staff can focus on left field errors.
2. Investigate Internal factors (players controlled) such as zone tracking, jump analysis, inside edge fielding, distance from ball landing, game conditions and fielding vs throwing errors.
   1. Depending on if the errors occur from fielding or throwing.
   2. The coaching staff can simulate the distance from where the ball lands and difficulty of the plays that result in errors
      1. Example: If the player misses routine plays, then he may not be a consistent defender.
   3. The staff can simulate game conditions and what zones the player generate more errors
      1. Example: If the player struggles in game on turf, then staff may simulate that condition
   4. Jump analysis
      1. Example: If the player has an average line to ball and reaction, time then he may have a slow first step or burst.

With these two different metrics, you can get a holistic approach as to what drills a specific player may need depending on their position, factors the player can control and factors that the player cannot control.

Data:

The data used would come from analyzing play by play data from the entire season using baseball reference or mlb.com (example Javier Baez)

External Factors:

|  |  |
| --- | --- |
| Errors by inning | What innings on average does a player generate errors |
| Average ball velocity | Average speed of ball after a hit when an error occurs |
| Batter handiness average | What hand is a batter using on average when an error occurs |
| Flyball error average | Flyball errors / total errors |
| Groundball error average | Groundball errors/ total errors |

Internal Factors:

|  |  |
| --- | --- |
| Zone tracking including depth and angle | Only attribute errors that occur in the player zone on average |
| Jump analysis | Measure the reaction time, burst, and route to ball against the position average |
| Inside edge fielding | Measure the difficulty of each play and what level of difficulty results in errors |
| Distance from ball landing | Average distance from target when error occurs |
| Fielding versus throwing error | What type of errors does the player commit |
| Game conditions when an error occurs | When do errors occur at night, day, on turf, on grass, … etc |

Known issues:

* Many of the internal factors are difficult to measure manually and would require a camara to measure distance from ball landing
* Defensive play calling can impact the zone tracking, such as team shifting, for a certain batter due to his homerun strength, etc.
* Zone tracking can be done with a camera, but it is also captured in the fielding advanced stats
* Jump analysis consist of 3 different metrics
* Inside edge fielding only considers plays with 90% or less catch probability

Methodology:

First, I would begin my analysis by considering all league position fielding averages to compare league average versus player X average. This will provide a clear picture of elite, average, and poor players at the position. I would evaluate the external factors to identify the type of errors, situational errors, and speed of the error.

This will provide a clear picture of the when, where, and how player X generates errors on the field. Next, I would conduct our potential approaches by (1) identifying flyball error % versus groundball errors %, (2) identifying the innings where player X generates the most errors (innings 1-3, innings 4-6, inning 7-9) and (3) batter handiness and ball velocity when an error occurs for player X.

Subsequently, I would evaluate the internal factors which would provide the trainer or staff to identify physical and mental attributes that player X must work on to improve. The internal factors consist of identifying (1) player positioning, (2) types of errors the player can control, (3) game condition preparation, (4) distance from ball landing, (5) play difficulty and (6) player reaction time, burst and path to ball. The internal evaluation of the player individual attributes assists the staff, so they can compare player X to other players in his position and have a baseline of progress from start to finish.

External factors combined with the internal factors provides the coaching or training staff a way to recreate specific in-game situations but with a specific ball landing distance and play difficulty. It also evaluates player X’s angles and measure’s reaction time, burst, and line to ball which can be compared to other players at the position.

By utilizing these metrics, I believe we can better identify player X’s weakness in-game situations, analyze player X’s reaction to in-game situations, which will lead us to a determination of drills for player X to improve on off the field. The hypothesis is that by identifying these very specific errors, player X will be able to decrease their percentage of errors to improve the team’s overall opportunity during the season.

Resources:

<https://www.baseball-reference.com/players/b/baezja01.shtml> - Example player Javier Baez

<https://www.baseballthinkfactory.org/primate_studies/discussion/lichtman_2003-03-14_0/> - Example types of errors, used to give me clarity on how to solve the problem

<https://www.baseball-reference.com/players/b/baezja01-field.shtml> - Example of fielding data and advanced fielding data for reference

<https://baseballsavant.mlb.com/jump> - Example of how to measure reaction, first step and lien to ball for reference

<https://www.fangraphs.com/players/javier-baez/12979/stats#fielding> – Example of play difficulty for reference