Frustration and Personal Motivation

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Motivation

Life is full of failures

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- Exams, academic research, job search, entrepreneurship, political endeavours...

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Reactions to failures are important

- Grit and success (Duckworth & Quinn, 2009)
- Dynamic choice under risk/uncertainty
- **Important for**: Finance, contract theory, labour economics, political economics etc...

Reactions to negative outcomes: not so stylised facts

Heterogeneous effects on future investment

(Heath 1995), (Shiev et al. 2006), (Malmendier and Nagel 2011), (Andrade & Iyer 2009), (Augenblick 2016), (Guiso et al. 2018),(Weigel 2018), (Nielsen 2019), (Dalmia & Filiz-Ozbay 2021), (Negrini, Riedl & Wibral 2022)

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Standard economic explanations

Δ Belief Δ Wealth Δ Experience (Learning-by-doing)

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This contribution's approach

- Failures: **Events where you get less than expected**.

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- These events trigger many emotions:
  - Anger (Berkowitz 1989, Aina et al. 2020),
  - Sadness (Crossman et. al 2009),
  - Helplessness (Wortman et al. 1975, Klinger 1975),
  - Guilt and fear (Hareli et al. 2005).

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  - Guilt and fear (Hareli et al. 2005).
- **Event Based Approach**: I use **frustration** as an umbrella term.

This contribution's approach

Impact of emotions on utility LR

Failures trigger negative emotions:

- **Frustration creates *"a pang of disutility"***.

Frustration triggers appraisal tendencies (Lerner 2001):

- **Influences the preference for choices at hand**.

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Emotions are dynamic processes

Two novel principles in economics:

- **Frustration accumulates**: ↑ when new frustrating events, decays with time (Heylen 2015, Wälde 2018).
- **Success brings emotional relief** (Goldberg et al., 1999; Han et al., 2007).

Overview of the presentation

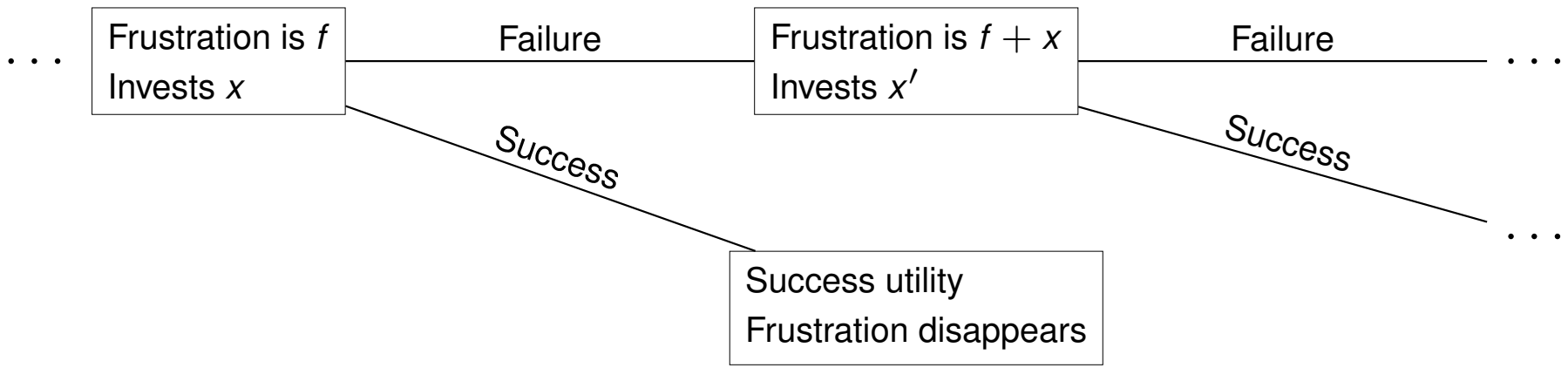
Part 1: Theory

- Quick preview of the theoretical machinery: the case of appraisal tendencies and frustration.

Part 2: Empirics

- Frustration's effect on pitchers in Major League Baseball.

Gist of the framework



Appraisal effects and emotional cost: the model

Agent invests resource x_t in a project at cost $c(x_t)$. Success is given by a Poisson law of mean π. The agent incurs an emotional cost of $v(f)$

Success π

- Success utility $u(x_t, f_t)$.
- Appraisal effect of frustration: $u_{xf} \lesseqgtr 0$.
- All future utilities equal 0.

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- Frustration changes:

$$\dot{f}_t = x_t - \delta f_t$$

$$\delta \in (0, 1)$$

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Expected Utility

$$U(x_t, f_t) = \pi \cdot u(x_t, f_t) - v(f_t) - c(x_t)$$

Inter-temporal decision problem

$$V(f_0) = \max_{x_t} \int_0^{\infty} e^{-(\rho+\pi)t} U(x_t, f_t) dt$$

$$\dot{f}_t = x_t - \delta f_t$$

f_0 given

Proposition 1

Proposition

- *An increase in f leads to an increase (decrease) in investment provision x if and only if* $\Omega_A^* < (>) 0$,
- *The system exhibits saddle path stability as long as* $\Omega_A^* > -\delta(r+\delta)$.

$$\Omega_A^* = \frac{1}{U_{xx}^*}(U_{ff}^* + (\pi + \rho + 2\delta)U_{xf}^*)$$

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Empirics

- Major League Baseball pitch-by-pitch data for 2010-2019,
- 2132 pitchers,
- More than 7 200 000 observations (pitches) after cleaning,
- Detailed information about pitcher, batter, game, team, type of pitch, pitch speed, trajectory etc..

Empirics

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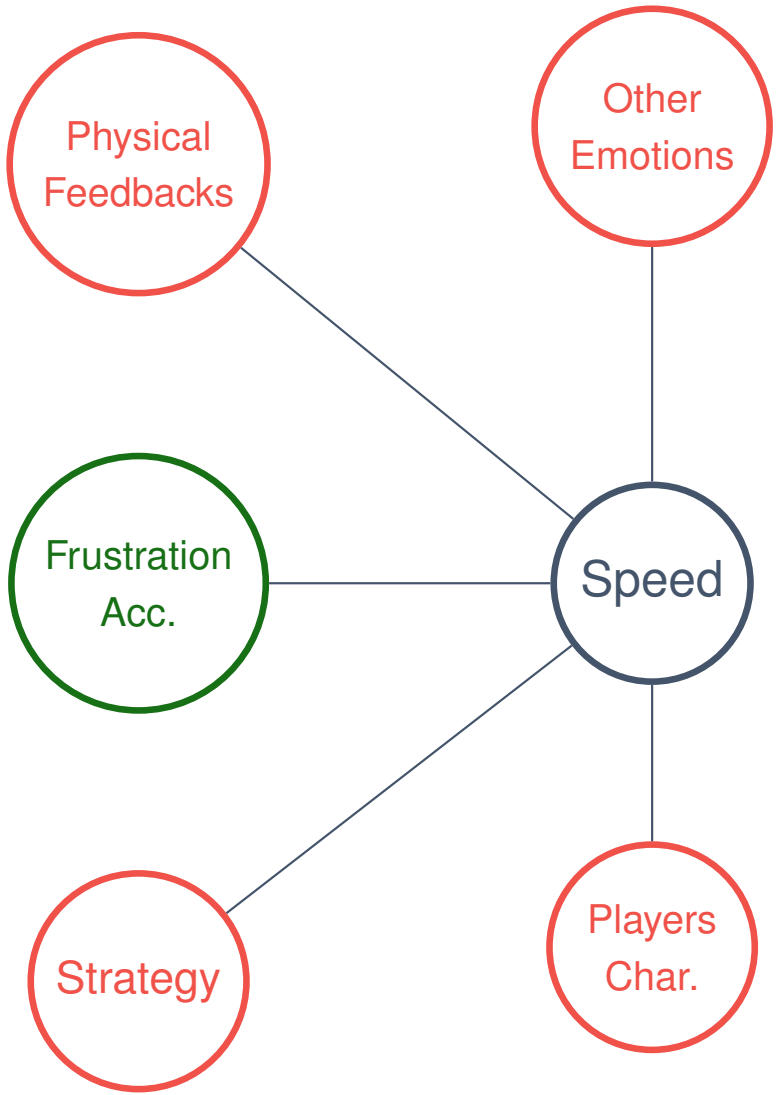
- Pitchers should have an optimal speed for each type of pitch.
- What is the effect of frustration on pitches' speed?

Empirics

- **Hypothesis 1**: Frustration affects the speed of pitches.
- **Hypothesis 2**: Frustration has a temporal effect

Possible confounders



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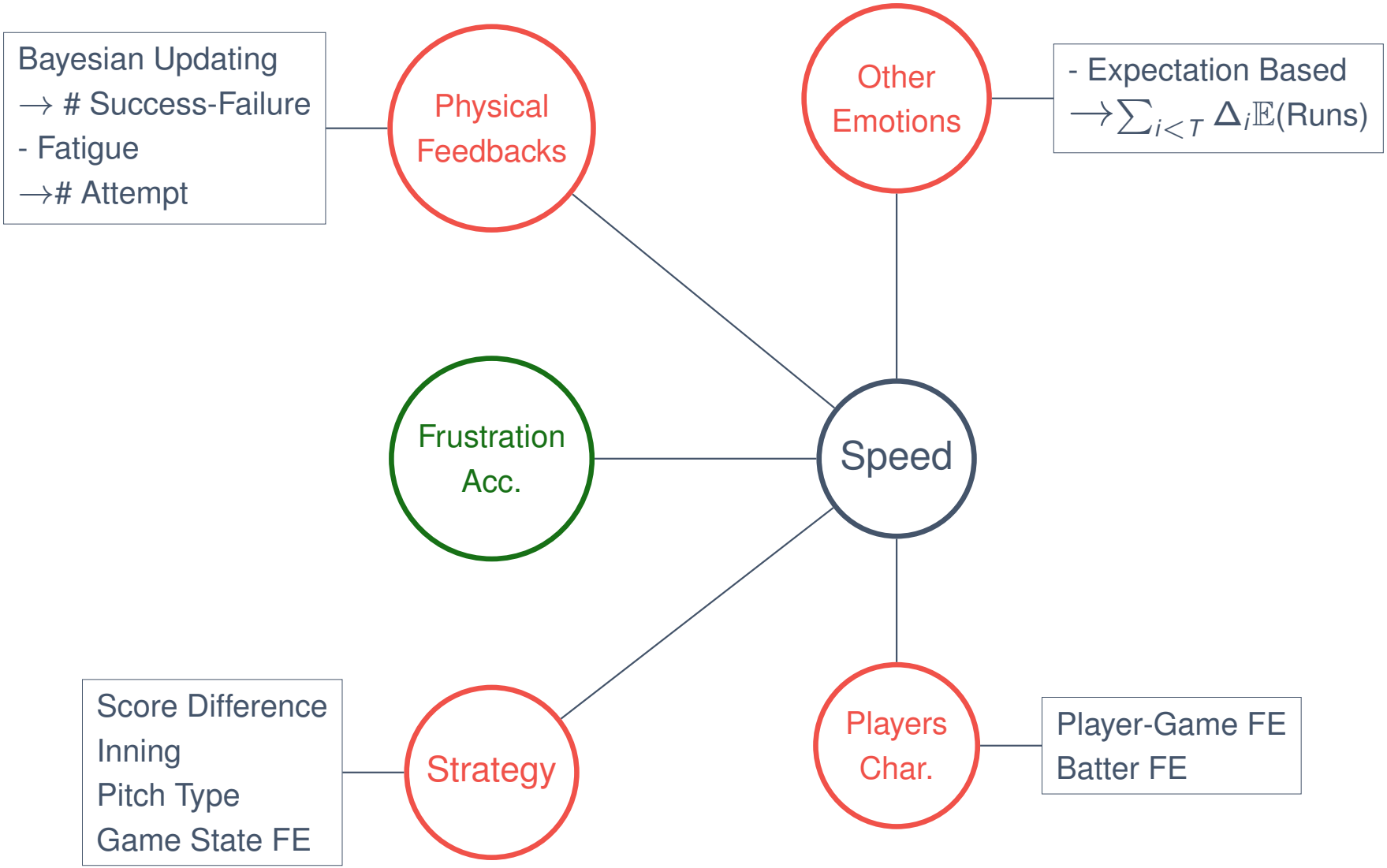
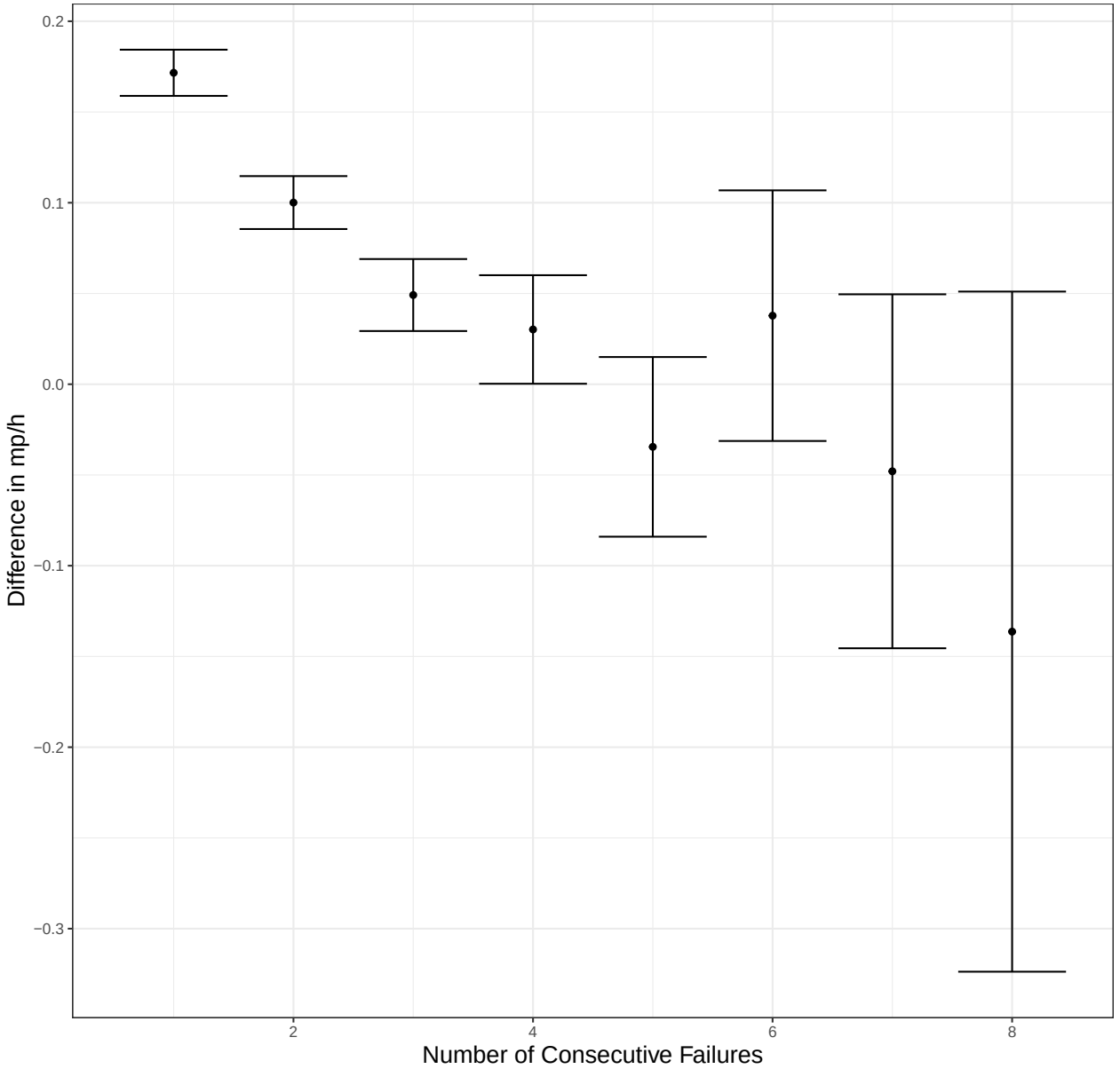


Definition of Failure & Frustration

- **Failure**: any pitch outcome that increases the expected number of runs (points) the other team can do.
- **Frustration** :
  - increases by the difference in $\mathbb{E}$(Runs) before and after the pitch **in case of failure**,
  - goes to 0 if no failure during the previous pitch.

Temporal Effect of Frustration



Conclusion

Today

Characterise the trade-off frustration create on investment:

- Emotional cost $\downarrow$,
- Appraisal tendencies $\downarrow$ / $\uparrow$.

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Empirics with Major League Baseball Data:

- Show frustration increases the speed of pitches,
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Empirics with Major League Baseball Data:

- Show frustration increases the speed of pitches,
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Any remarks or papers to read: clstr@protonmail.com.

Appendix: Effect of speed on success probability

Release Speed	$1.87 \cdot 10^{-3***}$	$1.87 \cdot 10^{-3***}$
	$(3.00 \cdot 10^{-4})$	$(1.07 \cdot 10^{-4})$
$\sum$ Failures	$1.87 \cdot 10^{-2***}$	$1.87 \cdot 10^{-2***}$
	$(5.84 \cdot 10^{-4})$	$(1.90 \cdot 10^{-4})$
$\sum$ Successes	$-1.74 \cdot 10^{-2***}$	$-1.74 \cdot 10^{-2***}$
	$(5.14 \cdot 10^{-4})$	$(1.70 \cdot 10^{-4})$
Attempt	$6.35 \cdot 10^{-3***}$	$6.35 \cdot 10^{-3***}$
	$(8.69 \cdot 10^{-5})$	$(5.67 \cdot 10^{-5})$
Δ Exp.	$-1.23 \cdot 10^{-2***}$	$-1.23 \cdot 10^{-2***}$
	$(6.95 \cdot 10^{-4})$	$(5.70 \cdot 10^{-4})$
Δ Score	$-4.25 \cdot 10^{-3***}$	$-4.25 \cdot 10^{-3***}$
	$(2.46 \cdot 10^{-4})$	$(2.38 \cdot 10^{-4})$
Cluster	Pitcher level	Game level
Num. obs.	7230669	7230669
Adj. R^2	0.03	0.03
Pitcher Type FE	$\times$	$\times$
Game State	$\times$	$\times$
Player$\times$ Game FE	$\times$	$\times$
Batter FE	$\times$	$\times$
Inning FE	$\times$	$\times$

Life is full of failures

- More than 50 % of European businesses failed before their fifth birthday (Eurostat 2012).
- Product market failure: 35-45% (Boulding 1997).
- QJE acceptance rate: 3% (DellaVigna and Card 2013)

Back

Literature review

Emotion

- **What might be:** Regret (Loomes et al. 1982), Disappointment (Gul 1991), Anxiety (Caplin et al. 2001), Craving (Laibson 2001), Reference Dependent loss aversion (Köszegi & Rabin, 2009).
- **What is:** Stress (Wälde 2018)

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Building blocks of the model

- Visceral factors (Loewenstein 1996)

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Building blocks of the model

- Visceral factors (Loewenstein 1996)
- Frustration, aggression and anger: (Battigalli, Dufwenberg & Smith, 2019)

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