

UNDERSTANDING & DEALING WITH COMPLEX ADAPTIVE SYSTEMS

PARAS ANAND
HEAD OF EUROPEAN EQUITIES



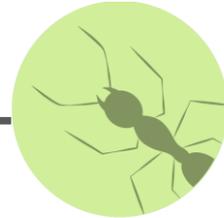
ANT COLONY



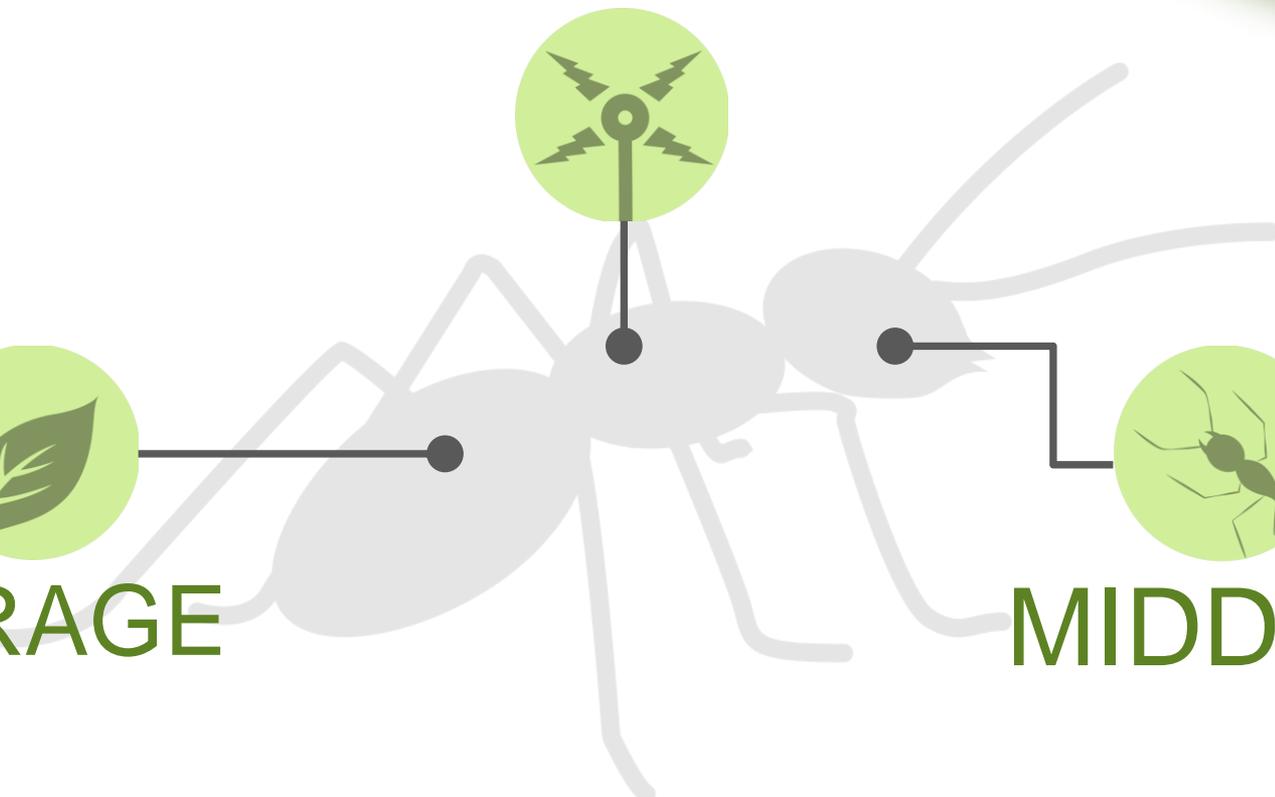
PATROL



FORAGE



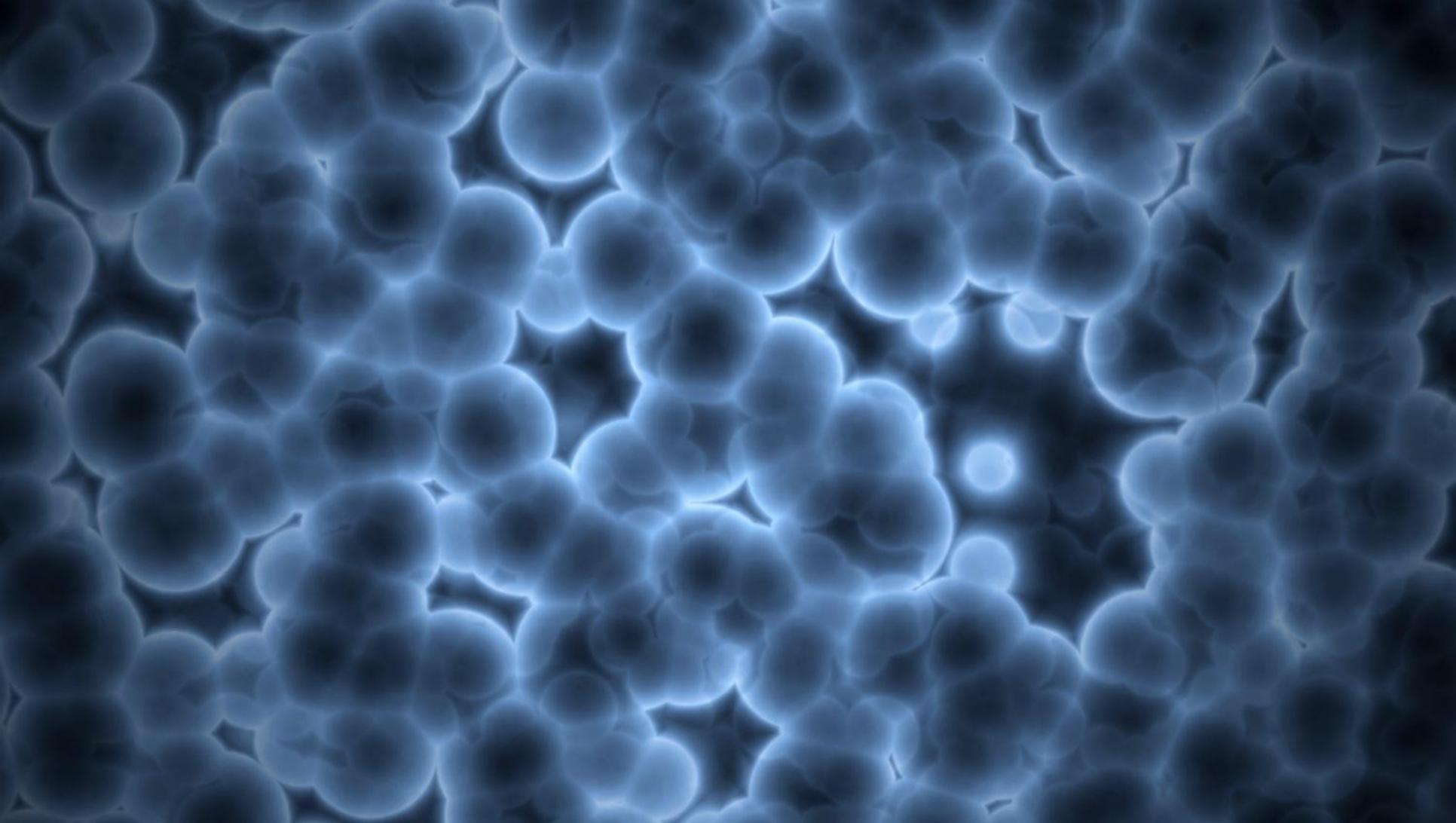
MIDDEN







COMPLEX ADAPTIVE SYSTEMS





75,00 17,00 93,00

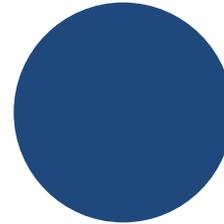
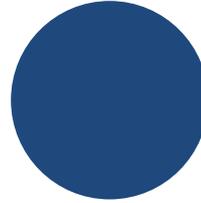
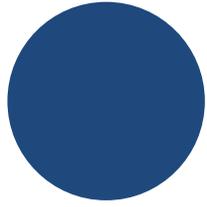
12,00 3,00
6,00 1,50
-0,54 0,01
-6,00
-12,00 -1,50

-12,5K 0,80 1,25
-15,0K 1,08
-17,5K 0,70 2,00
-20,0K 0,85
-21,6K 0,60 0,57
0,75

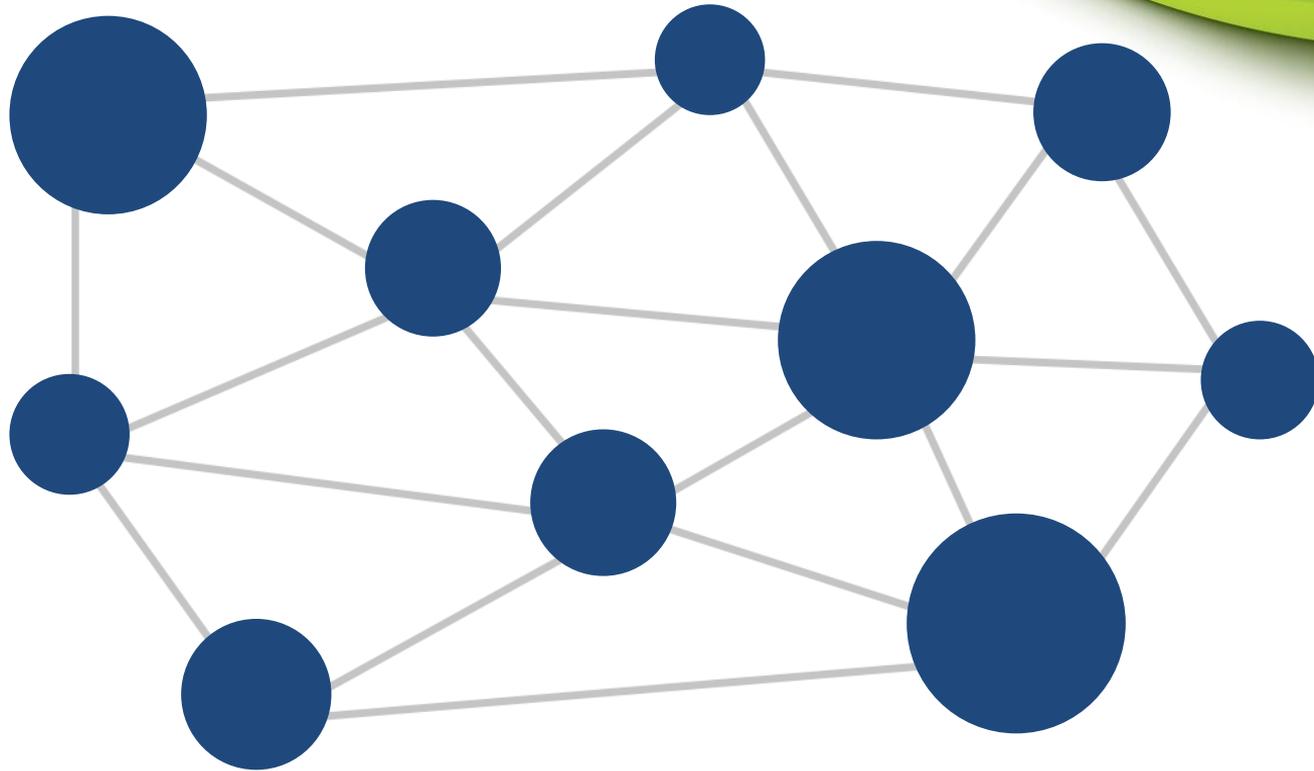
0,00 12,00
-20,00 6,00 1,60



INDIVIDUAL AGENTS



INTERACT



EMERGENCE



WHY IS IT IMPORTANT?

1. We deal with complex systems everyday
2. World is only getting more interconnected
3. We are poor at recognising and dealing with complexity

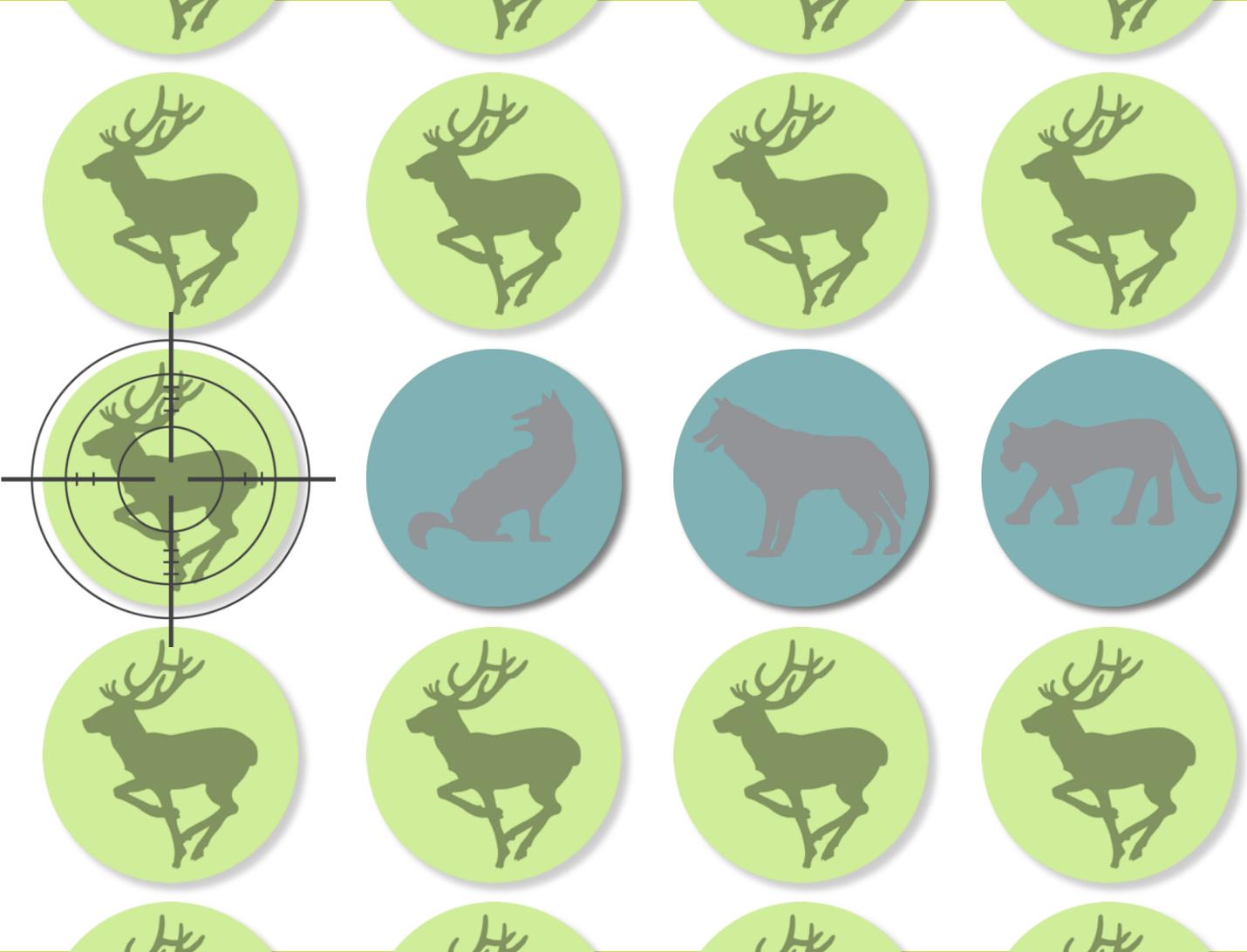


The background is a blurred landscape featuring a large, rounded mountain peak in the distance under a clear blue sky. The foreground consists of a green field with some trees and bushes, also out of focus.

YELLOWSTONE

NATIONAL PARK





CHALLENGES OF DEALING WITH COMPLEX SYSTEMS



INCORRECTLY
IDENTIFIED CAUSE &
EFFECT RELATIONSHIPS



PAINFUL
CONSEQUENCES





WORKAHOLIC

**LEISURE
& WORK**



**EQUITY
MARKETS**

**CONSUMPTION
& SAVINGS**



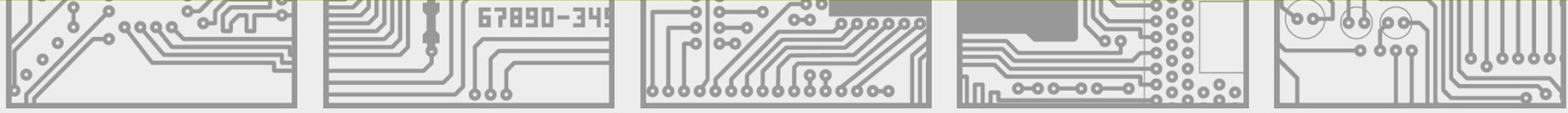
**LUXURY
GOODS**

**VALUE &
UTILITY**

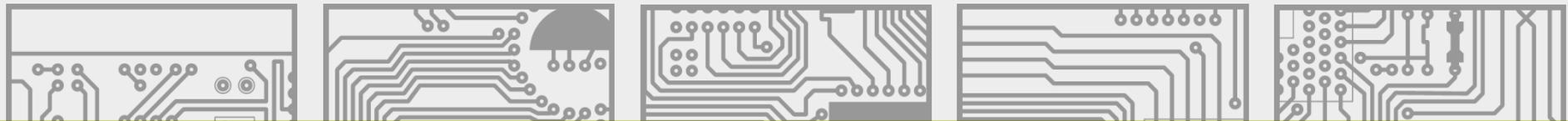


REVERSION TO THE MEAN





LEARN FROM
CALCULUS
AS WELL AS
STATISTICS



$$2x^2 + 4x - 4 = 0$$



$$2x^2 + 4x - 4 = 0$$

$$x^2 + 2x - 2 = 0$$



$$2x^2 + 4x - 4 = 0$$

$$x^2 + 2x - 2 = 0$$

$$x^2 + 2x = 2$$



$$2x^2 + 4x - 4 = 0$$

$$x^2 + 2x - 2 = 0$$

$$x^2 + 2x = 2$$

$$x^2 + 2x + 1 = 2 + 1$$



$$2x^2 + 4x - 4 = 0$$

$$x^2 + 2x - 2 = 0$$

$$x^2 + 2x = 2$$

$$x^2 + 2x + 1 = 2 + 1$$

$$(x + 1)^2 = 3$$



$$2x^2 + 4x - 4 = 0$$

$$x^2 + 2x - 2 = 0$$

$$x^2 + 2x = 2$$

$$x^2 + 2x + 1 = 2 + 1$$

$$(x + 1)^2 = 3$$

$$x + 1 = \pm \sqrt{3}$$



$$2x^2 + 4x - 4 = 0$$

$$x^2 + 2x - 2 = 0$$

$$x^2 + 2x = 2$$

$$x^2 + 2x + 1 = 2 + 1$$

$$(x + 1)^2 = 3$$

$$x + 1 = \pm \sqrt{3}$$

$$x = -1 \pm \sqrt{3}$$





PREPARE

CHECKLISTS

PREPARE CHECKLISTS

- Explicit checklists succeed where mental ones don't
- Our jobs today are heuristic rather than algorithmic
- Widely used in industries with very high failure costs
- Acknowledges 'environments' under which critical decisions are made





USE THE

OUTSIDE VIEW



TRIPLE CROWN



KENTUCKY
DERBY



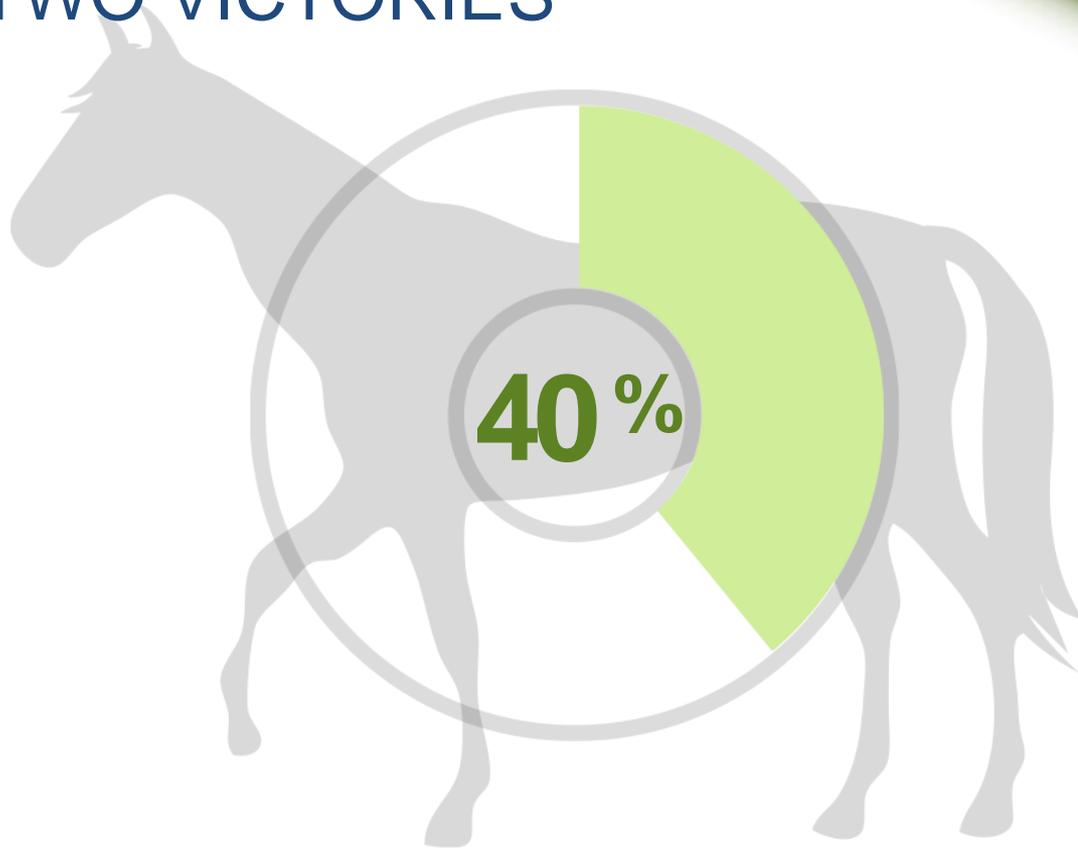
PREAKNESS
STAKES



BELMONT
STAKES



THIRD RACE WINNERS AFTER TWO VICTORIES



THIRD RACE WINNERS AFTER TWO VICTORIES

AFTER
1950

15%



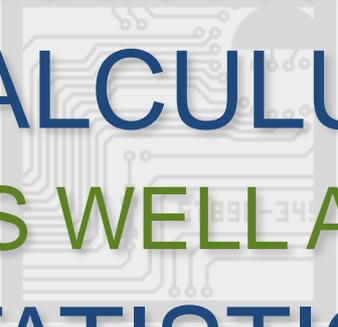


ACCEPT
MULTIPLE
OUTCOMES

ACCEPT MULTIPLE OUTCOMES

- Healthy discipline to anticipate several states of the world and how decisions may turn out
- Not in sync with our natural mental processes
- Think about multi-year business plans





LEARN FROM
CALCULUS
AS WELL AS
STATISTICS



PREPARE
CHECKLISTS



USE THE
OUTSIDE
VIEW



ACCEPT
MULTIPLE
OUTCOMES



SUMMARY

SUMMARY



- Recognising the relevance of complex adaptive systems is a valuable step in challenging received wisdom
- Our decision making requires approaches that acknowledge unintended consequences
- Proposed approaches are not exhaustive but are hopefully useful
- Each requires deliberation rather intuition

Important information



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