Game Biz

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What is Behavioral Economics?

Beyond Supply and Demand

Consider Coffee

- Most coffee shops all over the world will sell you coffee in one of three sizes-- small, medium, or large.

- The most popular size of coffee anywhere in the world is the **medium** size of coffee.

- But here's the thing: it *doesn't matter the amount of coffee* in the cup.
  - What happens if one removes the largest size, and replaced that with an even smaller size?
  - It turns out now the *new medium* cup of coffee will be the most popular cup of coffee.

- Why does this happen?

Share of coffee drinking consumers in the United States in 2020,
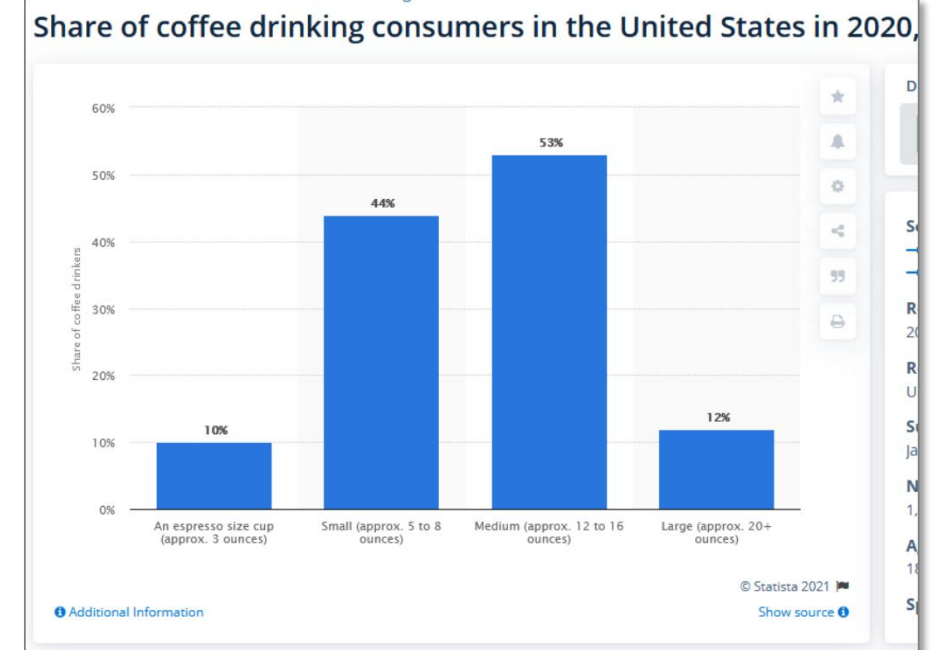
Consider Organ Donation

- Across the world, we observe countries where consent to donate organs vary wildly even between places with similar cultures.

- Consider the consent rate between Denmark and Sweden.

- Or Germany and Austria

- Why would that be the case?

sweden
85.9%

denmark
4.25%

austria
99.9%

germany
12%

How Brains Learn

- As we experience life, neurons organize in neocortical columns connected by chemical pathways that can remember previous experiences.

- These columns form **patterns** - our memories and learnings that can be accessed later on to speak, solve problems and make decisions.

- **The brain is a pattern-recognition machine.**

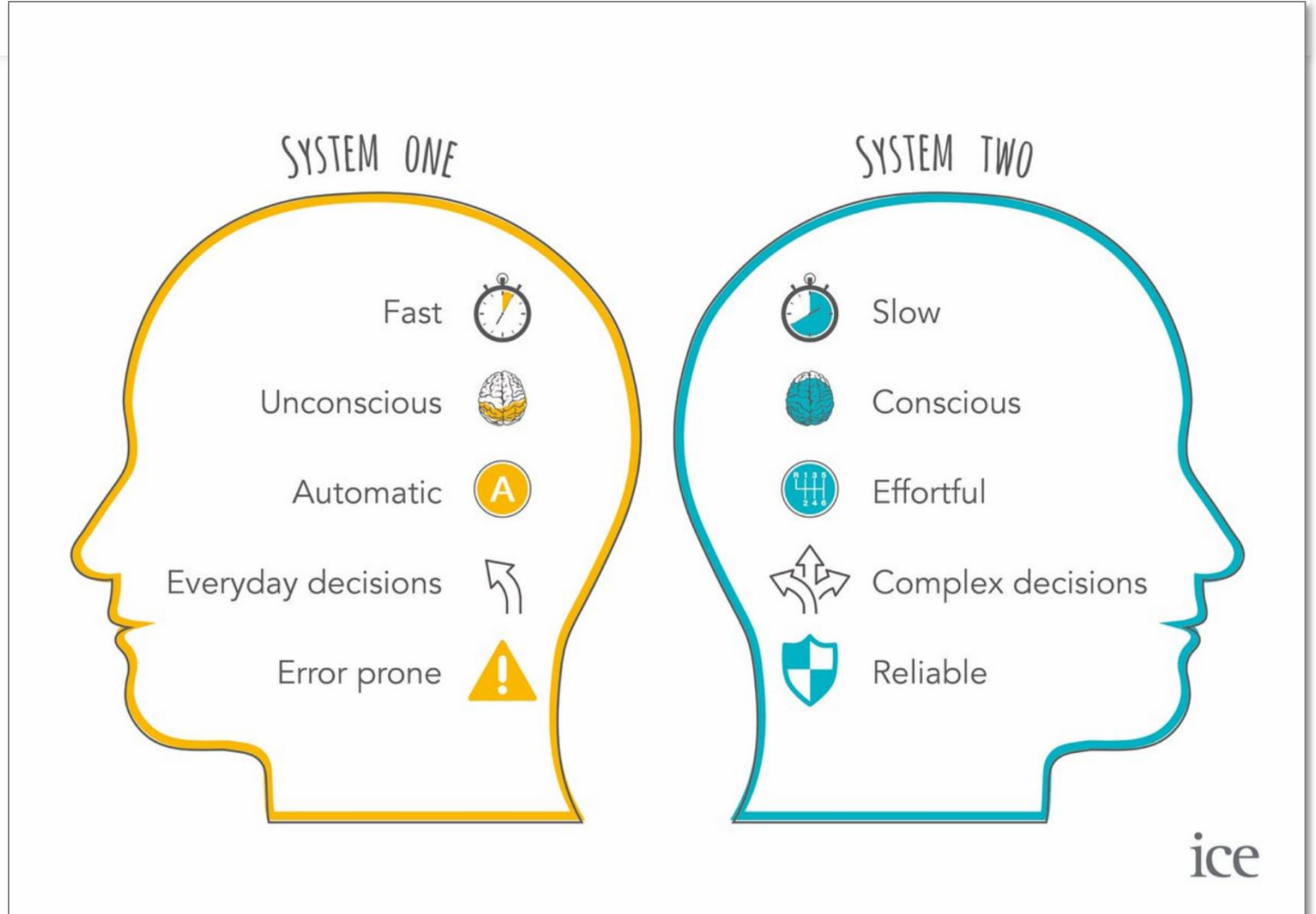- Everything we think, speak and do are patterns we learned before.
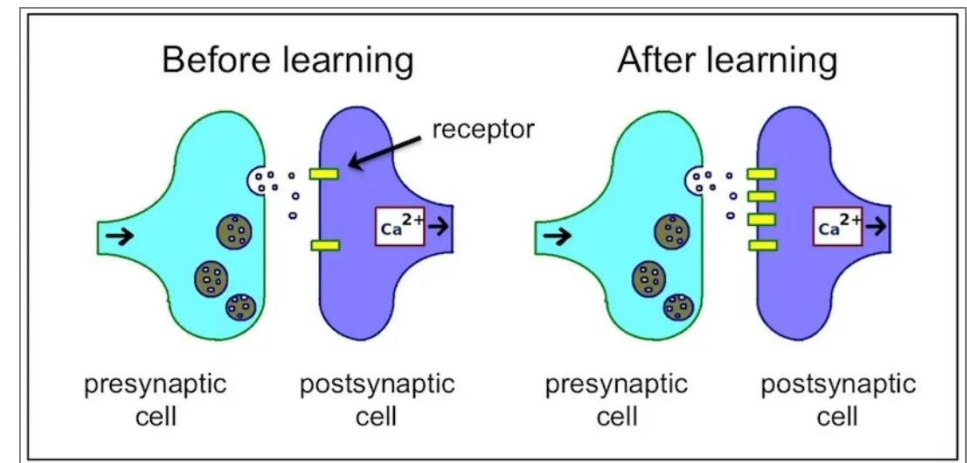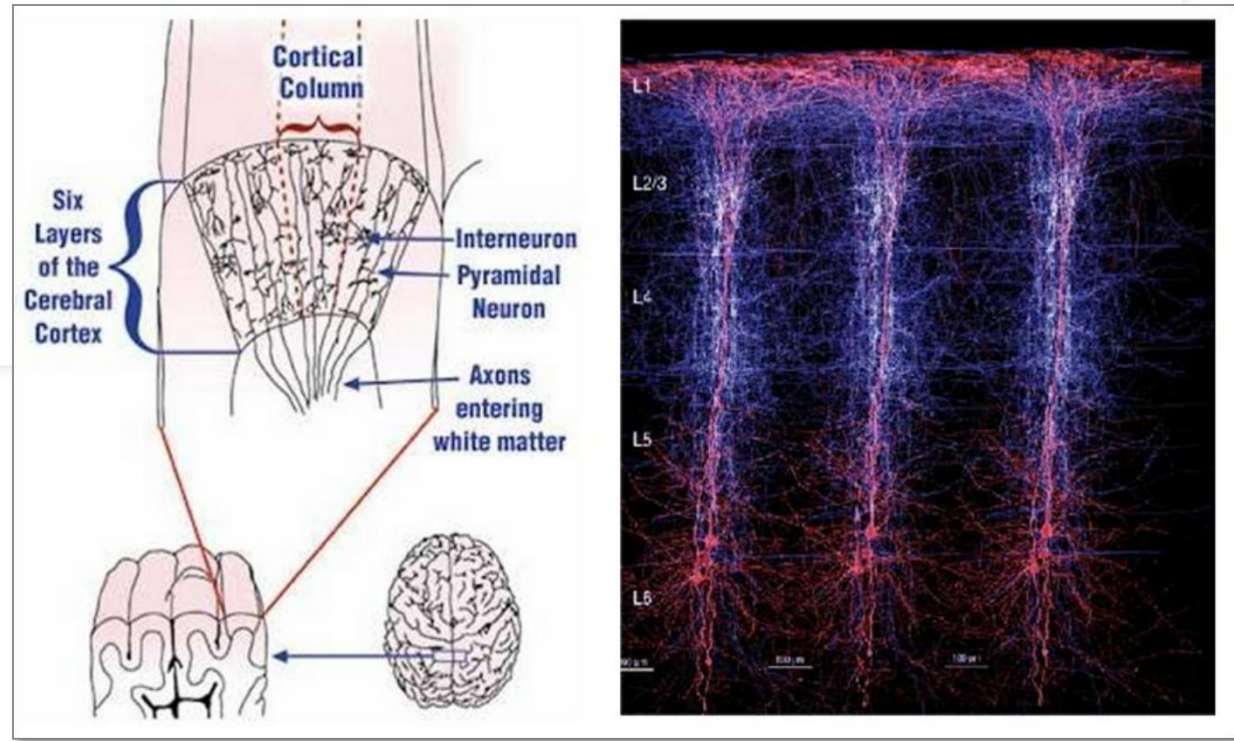
How Brains Think

- A brain learning topics of science will form new patterns and activate columns in specific regions.

- But the same chemical mechanism also apply to instinctive behaviors, such as feeling a hot cup.

- Instincts, however, are much more ingrained - cortical patterns that are genetically stablished.

- When the brain thinks, it consumes less energy accessing existing patterns than forming new ones.

  - **Instinct and previous learnings are faster than learning.**

  - Heuristics are more resource-efficient than compute. (Compare to real-time game AI vs. theorical AI.)
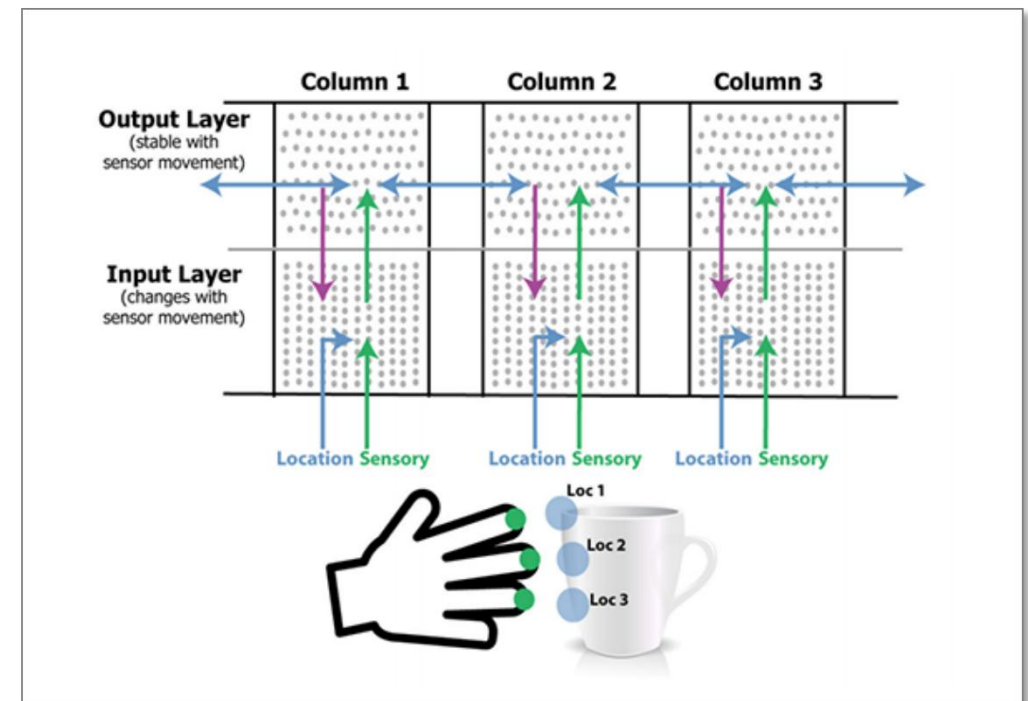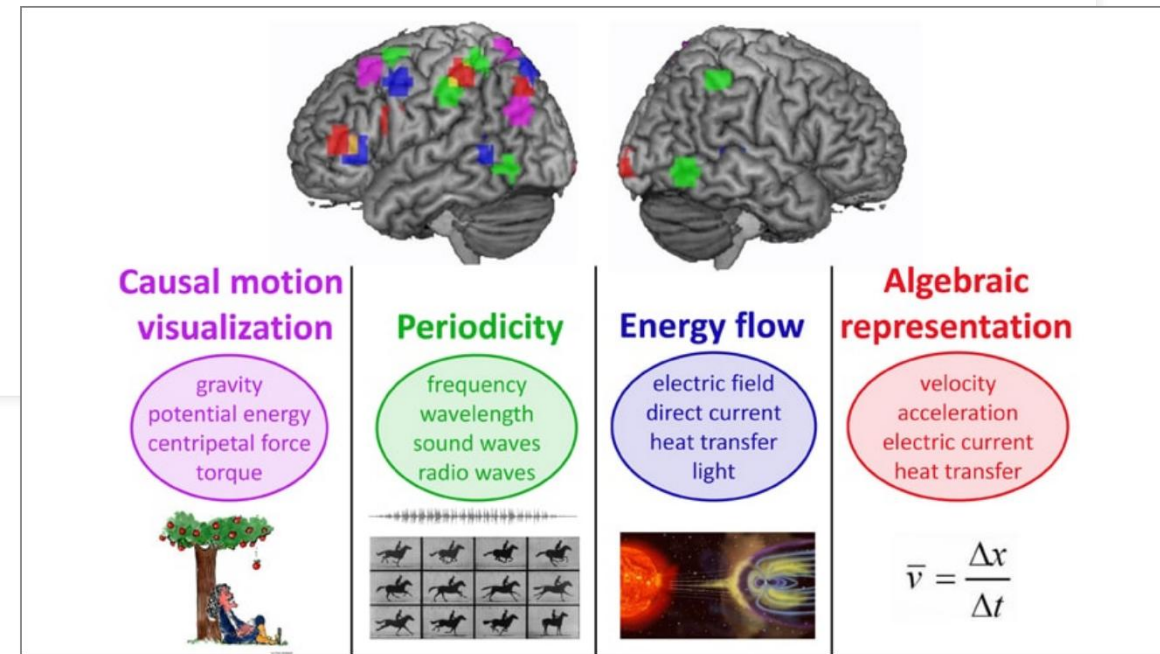
System 1 / System 2

- Human have two modes of thinking: a "system 1" and a "system 2".

- **System 1** are the fast answers, existing patterns and instincts. Shortcuts that consume less energy. Lazy and impulsive.

- **System 2** is the greater effort necessary to cross patterns, form new ones and think deeply.

- **System 1 always engages first.** It requires effort to go look for deeper answers on System 2.

SYSTEM ONE

Fast

Unconscious

Automatic A

Everyday decisions

Error prone

SYSTEM TWO

Slow

Conscious

Effortful

Complex decisions

Reliable

ice

Action-Implementation Gap

- All of us want to...
  - Lose weight,
  - Work hard,
  - Save money
  - Exercise
- ...but we don't get down to doing it. Why this inability to follow through on our own intentions?
- Because life gets in the way - **context keep changing**.
  - Brains don't have enough processing capacity to see too far in the future
  - System 1 *keeps reacting to present needs* as context is fluid.
- The "shoulds" controlled by System 2 are overwhelmed by the "wants" of System 1

Why does this matter?

- Instincts and most primitive behaviors have evolved for survival in a social group at the African savannahs.

- But not for a super-connected, multi-faceted modern life - and **economy**.

- Unlike classical economic theory believed, people don't make (or almost never make) perfectly rational decisions.

- In fact, quite the opposite: humans have all sorts of **psychological biases** and unconscious behaviors that tip our decision-making.

Humans vs. Econs

Econs are mythical creatures that live on the pages of economics textbooks.

but humans are not logical machines. lazy and impulsive, subjective and affected by *context*.

- Well-defined preferences
- Decisions maximize all alternatives
- Makes rational actions
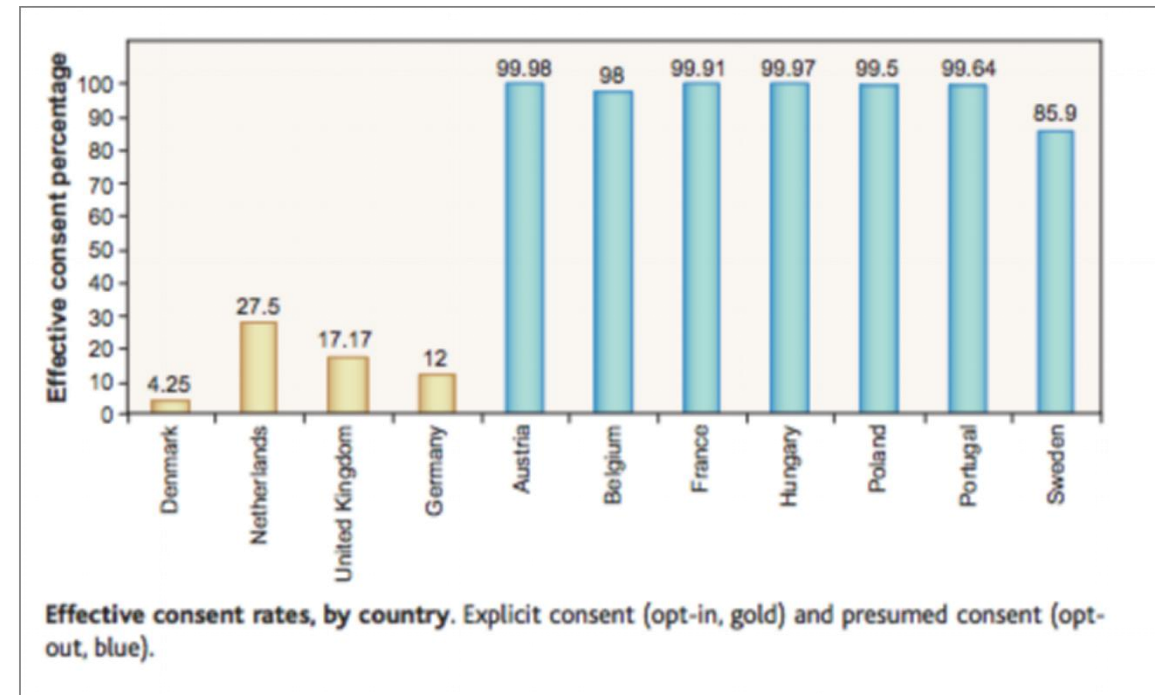- Pursues monetary gain

econs

humans

- Preferences less defined
- Easiest path is often the choice
- Vulnerable to guilt, fairness, social comparison, desire for luxury

ConversationAgent.com

Answers!

- Why do people choose medium coffee? Why some countries have higher consent for organ donations?

- They are the **Default** (or the *Status Quo*)

- For coffee, medium size is a compromise.

- For organ donation, countries with higher buy-in are "opt-out" by default.

- A default is a form of:
  - A no-action when an individual fails to make a harder decision.
  - A social compromise that signals something about everybody else.

Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).

Nudging Defaults

- Preferring defaults **is a bias of thinking.**

- And the thing is, this kind of psychological bias can be *manipulated*. Choice can be *architected*.

- This gas station has been selling gasoline in three grades 87, 89, and 91. And all of a sudden, they introduced a fourth - 94. Why?
  - To make more money selling 94?
  - Or to make a lot more money by selling... 91?
  - Indeed, the sale of 91 went up as a result!

- Games: first ideas stick and set the tone.
  - If players start with sword-and-shield fight style, most players stick to it.

Strategies to Change Behavior

How does nudging compare to more traditional approaches that try to *change behavior* and move people from point A to point B?

1. Popular with policymakers and governments is the notion of restriction. The problem is that they often create backlash.

2. Carrot and stick option, incentives, popular and effective on game design. Like a subsidy or surplus - or a tax, as a *negative* incentive.

3. Third option is classical advertising and persuasion. Marketers do this all the time.

4. Behavioral Economics is the fourth option: choice architecture. The idea is to **change the context to change the choice**.

Strategy	Policy and Welfare World	For-profit world	Game Design
1) Restrictions on choices	Bans and regulated supply (e.g. medication on prescription only)	Product unavailability	Level-lock, nerfs, power creep, max amounts.
2) Carrots and Sticks	Subsidies and taxes	Discounts and promotions	Rewards, bonuses, extra power, economy balancing.
3) Information and Persuasion	Disclosures	Advertising	In-game messages, UI/UX design, guilds, chats.
4) Nudging	Choice architecture	Choice architecture	Choice architecture via UI/UX, systems design, economy balancing.

Biases and Nudges

Foundations of Choice Architecture

Decision Points

- A lot of people who get the very large popcorn in the theaters don't actually want to eat all of it.

- If you split the same quantity of popcorn them in 3 or 4 bags most wouldn't want all of it.

- A phenomenon called a **theory of decision points.**

- The idea is that people take *metadecisions*:
  - They decide to eat popcorn, but they don't decide *how much*. Just keep going until the bag is all finished.
  - If a large resource - be it popcorn or soda or time or money - is partitioned into multiple units, we create extra *decision points*.

- *Partitioning* creates a larger number of decision points for the individual.

Decision Points in Games

- Natural decision points in games (ways in which content partitions):
  - End of a map / level
  - Level up
  - Loading screens
  - New item looted
  - New area unlocked

- Common decisions:
  - *Quit the game (friction)*
  - Craft / spend resources
  - Buy or Sell items
  - Change loadout / equip
  - Purchase in-game transaction

- Design interventions to bring System 2 in control or avoid it:
  - Checkpoints on long levels or open worlds.
  - XP balance to level up with a certain frequency.
  - Unintrusive level up effects instead of a pop-up
  - Intrusive pop-ups to spend resources
  - Auto-equip items
  - NPC dialogs / no dialog / length of dialogs
  - Energy systems.

Regret Bias

- A bias where a previous decision that cannot be changed influences a future decision even when that's not logical or "rational".

- How? A common economic example goes like this:
  - A person is considering a membership to a health club.
  - The club is offering a 30% discount. The person thinks its a nice offer but takes too much time to decide.
  - The club withdraws the 30% discount and now offers a 15% discount.
  - But the person doesn't want to sign up for it anymore because he "lost" the 30% discount.
  - *However*, mathematically, it's still a lot better to still go to the gym with the 15% discount than full price...

- And people feel *more regret for actions taken* than those not taken.
  - If you sold stock and lost $1200 you will feel more regret than if you already owned the same stock and lost $1200.

REGRET

"THOSE WERE THE DROIDS I WAS LOOKING FOR"

Regret Bias in Games

- Regret is a common cause of *churn*. Bad choices can teach but can also frustrate and make people quit.
  - Bad investment in crafting results in a weak item.
  - Didn't save the game before attacking enemy territory.
  - Spent consumables to get to the end of hard levels, still ran out of resources.
  - Did a purchase that didn't give much value and went nowhere.
- It's possible to design ways out of bad decisions. Worst offenders to keep in mind:
  - Spending resources hard or impossible to recover.
  - Investing in fixed systems like skill trees.
 - Consecutive discounts in the same items.
  - RNG in loot boxes.

diablo 2

diablo 3

FF XIV

minecraft

Anchoring / Framing

Victim of anchoring bias
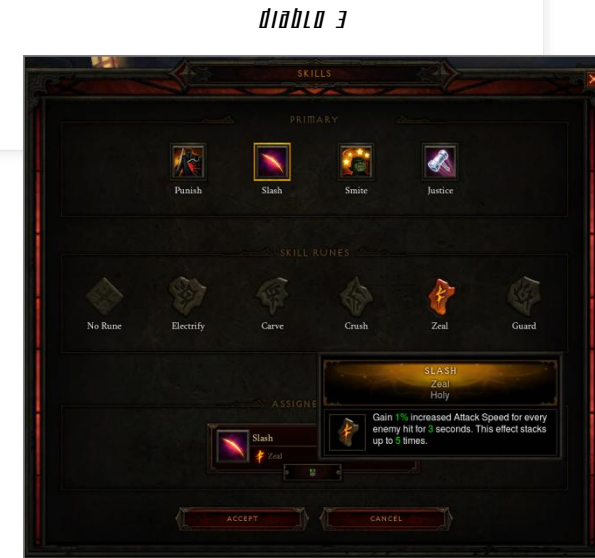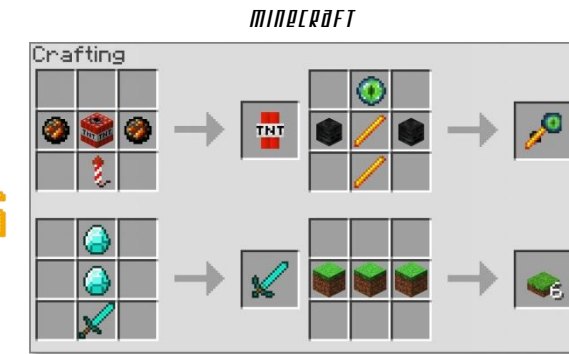
- People tend to make decisions based on *what they see*, not on all information available.
  - Humans never use all the information available to make decisions
  - Using lots of information is costly in energy and slow.
  - Instead, they replace it with heuristics that use data from the **context**.

- Examples:
  - Experiment with social security numbers and wine.
  - Real estate agents.
  - Auctions
  - Discount tags, Black Friday promos.

- You can create artificial comparisons to "anchor" the decision towards what you want.
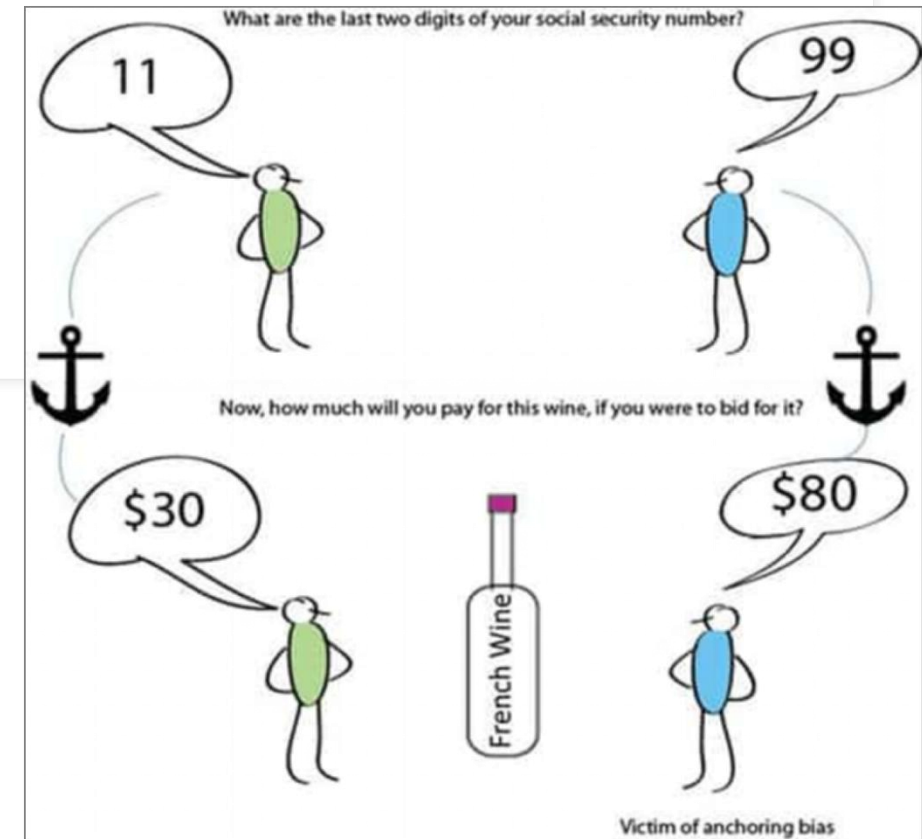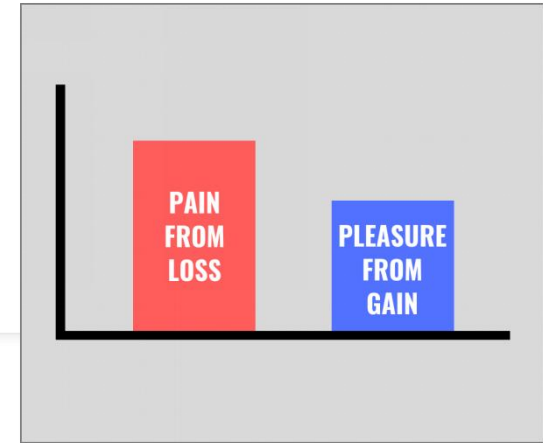
Anchoring in Games

- Very useful for IAP packs and IAP shop design.
    - "Decoy" packs: weak offers that are not there to sell but just to anchor the perceived value of *other* packs.
    - Discount badges, slashed prices, "extra value" tags.

- Also, you can use it to design choice across game systems.
    - Perceived value of stats / rewards across progression is anchored by the amount of stats / rewards before.
    - When players need to make a choice of what to do next, place anchors in dialog and the map.
    - Start the game with very powerful gear or end-game abilities that gets lost.
    - Start a level asking a large price for a pass.

15-Minutes Break

Loss Aversion

- Loss aversion is the notion **people feel loss more than they feel gain.**
  - Key to understand *a lo*t of human behavior.
  - All kinds of consequences, as people *prefer guarantee outcomes* than potentially better ones.

- By-product of the lizard brain looking for survival in a primitive world of scarcity.

- Prospect theory:
  - People tend to over-weight low and high probabilities
  - But under-weight *medium* probabilities.

- "Fear of missing out" also a consequence.

We'll toss a coin.

- If you lose, you pay $50

- How much should you win *at a minimum* to make this bet attractive to you?
  - A. $25 to $50
  - B. $50 to $75
  - C. $75 to $100
  - D. $100 to $125
  - E. $125 to $150
  - F. More

Loss Aversion in Games

- Game designers should counter situations of loss.
  - F2P: great feeling of loss = **churn**.
  - Loss is necessary sometimes in the loop. But then other systems can kick in to counter the feeling.

- Example: consider a ladder system.
  - Gaining positions on the ladder is good, but losing positions is devastating.
  - Hardcore players will be more tolerant but casuals will give up. Some *will prefer to not play at all* to avoid losing ranks.

- Can also be used to *improve* stickiness:
  - Time-limited events / Bonus under timers
  - "Ransomed rewards": earn chests or items but only *unlock* them by finishing a level or section of the game.

- Also consider *people are more willing to lose time than to lose resources.*

Sunk-Cost Fallacy

Sunk Cost
- irretrievable costs that cannot be recovered.
www.economicshelp.org

- When people tend to **continue a behavior or endeavor as a result of previously invested resources**
  - Time, money or effort
  - In other words, the tendency to continue to invest in projects just because you already invested a lot.

- Examples:
  - When you order too much food and then over-eat just to "get their money's worth".
  - You keep playing a game you no longer like, but you invested so much time into it already!
  - Also affects companies and governments, like the Concorde project

- A consequence of primitive Loss Aversion.

THE SUNK COST FALLACY

LET'S GET OUT OF HERE, THIS IS THE WORST MOVIE I'VE EVER SEEN!

I THINK I'D RATHER STICK IT OUT – THESE TICKETS COST ME AN ARM AND A LEG.

Sunk-Cost Fallacy in Games

- Design strategies around sunk costs have been developed in F2P for years :
  - Energy systems
  - Harvest systems
  - Timed production + maximum storage
- Effective for retention, even if less so than before as players have been learning patterns over the years.
- Even when the game is not trying to do it deliberately, part of long-term players keep coming back due to sunk costs.

Choice Overload

PARADOX OF CHOICE
LESS IS MORE - TOO MUCH CHOICE IS STRESSFUL

- Also known as "analysis paralysis" or "the paradox of choice".

- Too many choices will overwhelm people. But **just enough choices will drive sales** and behaviors a lot better.
    - Experiment with jams.
    - Lots of options attracted customers to *browse*, but fewer choices got them to *buy*.

- Research shows that when there are too many options customers feel anxious, disengage and even become depressed.
    - You never feel that you made the best decision because there were too many options to consider.

- Attention is constrained: perfect rationality would need require to soak up lots of information. But there is competition for our attention.
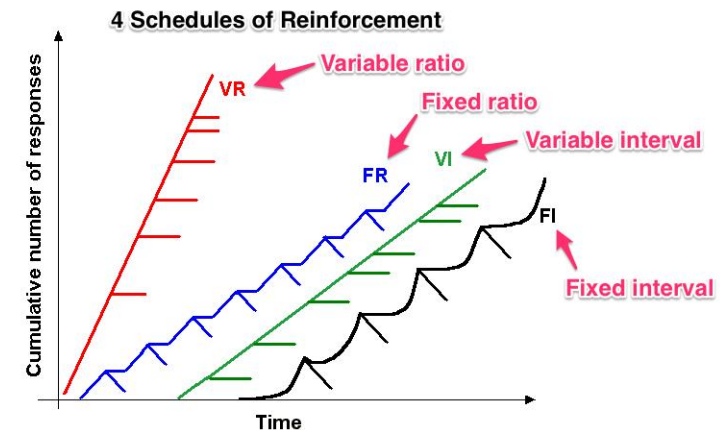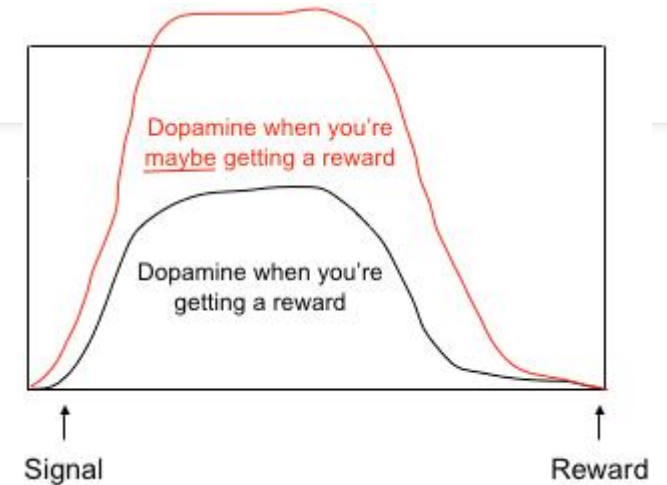

PEOPLE WHO BOUGHT

30% | 3%
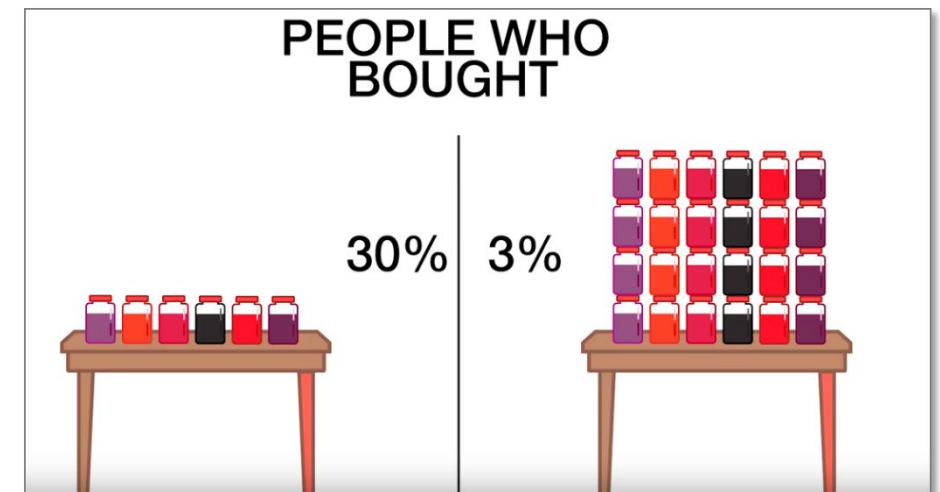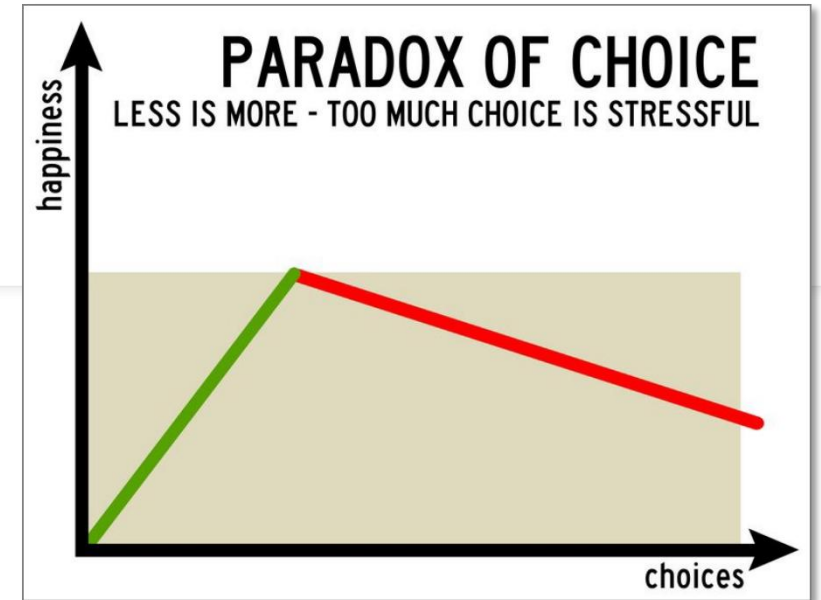
Choice Overload in Games

- Features that require decision-making should be cautious about amount of choices.
    - Partition and limit with techniques like classification, dependency constraining or random options.
    - Example: skill trees, tech research in 4X games, range of crafting ingredients (how many options can a single ingredient do?)
- In-game shops need to have just the right amount of items
    - Subdividing in tabs and categories help partition the choices available.
    - Rotating inventory of offers with timers also help re-engage players.
- (In game design, related to the idea of "illusion of choice")
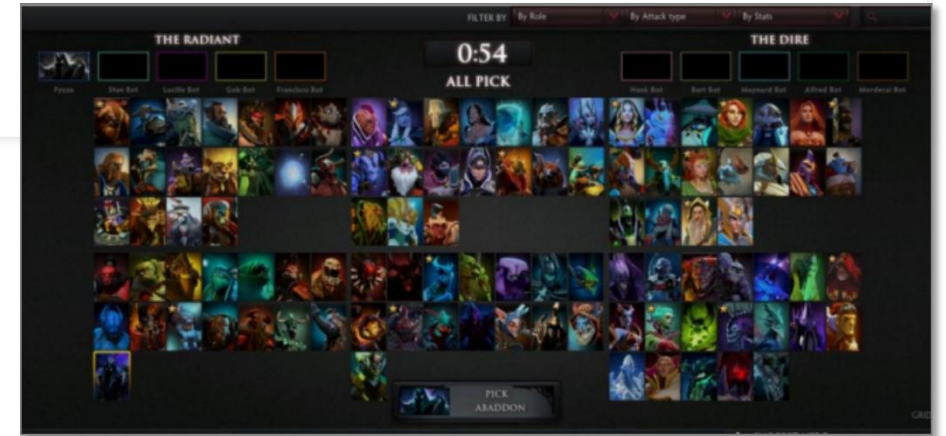
Intermittent Rewards / Reinforcement

- It's the **delivery of a reward at _irregular intervals_.**
  - The person does not receive a reward each time they perform a desired behavior or by any regular schedule, but at seemingly random intervals.
  - This forces a **check-in behavior: always coming back for more.**
  - In Behaviorism, the need to check-in in the app + the irregular nature of the reward triggers the "variable ratio" scenario.

- The theory as to why this is the case goes all the way back to our primitive past, pre-dating intelligence.
  - When food was not secure and appeared at random intervals in nature.
  - The behavior seems built-in genetically, as it also works in animals.

- _Extremely potent_ - and the #1 reason why gambling addicts.
 - Also why social media addicts. And e-mail, messengers, etc.

Dopamine when you're maybe getting a reward

Dopamine when you're getting a reward

Signal   Reward

4 Schedules of Reinforcement

Cumulative number of responses

Variable ratio — VR
Fixed ratio — FR
Variable interval — VI
Fixed interval — FI

Time

Intermittent Rewards in Games

- Well… **loot boxes!**
  - Any random reward system
  - The whole slot machines segment
- But also **reason of fun** in many forms of systems.
  - Loot in *any* random form
  - Secrets
  - NPC or world events
  - Card games
  - Exploring open worlds
- Intermittent events are used in F2P to keep players coming back.
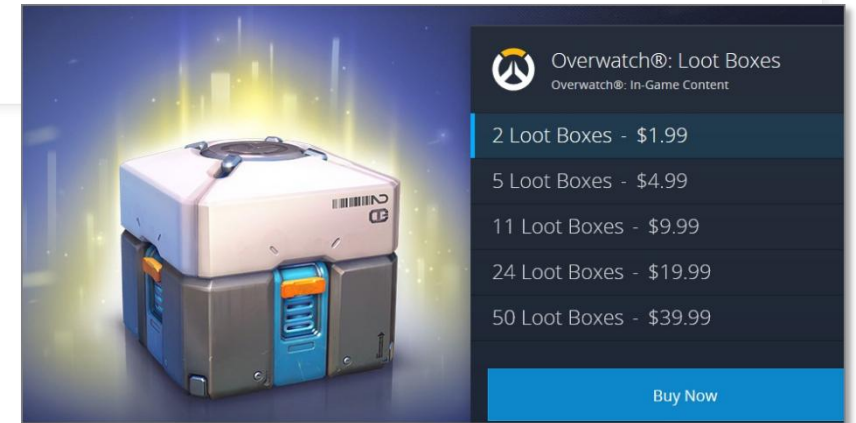
Gambler's Fallacy
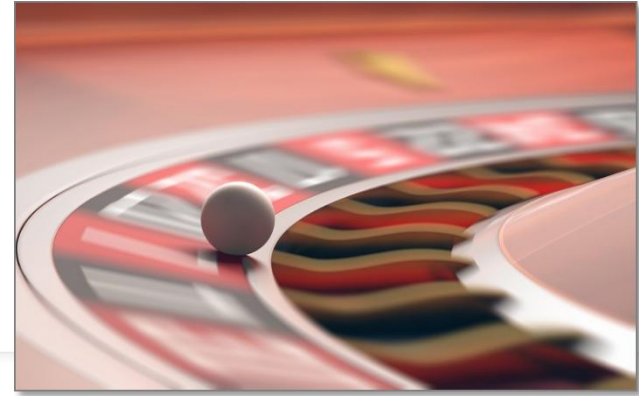
- The belief that a certain event becomes more probable over time given a series of previous events of the same nature.

- Belief in "**hot streak**" of gamblers
  - Probabilities don't change the more you gamble.
  - The casino has, in fact, worked the math so you *lose* the more you bet.

- Coincidences are bound, and in the short term, the human tendency to "find a pattern" trumps the simple nature of the fundamentals of an event.

- Brains are looking for patterns so bad that we see them in independent, random chain of events.

Peak-End Rule

- People judge an experience largely based on how they felt at its peak - the most intense point - and at its end.

- Same rule apply both to positive and negative experiences:
  - If the peaks or ends are negatives, the experience is reminded as negative.

- The End is stronger than the Peak.
  - Experiences with a positive Peak but a negative End has a greater chance of being remembered as negative.

- Due to negativity-bias, negative experiences are more impactful.
  - Positive experiences need to be a lot better than the negative ones to override.
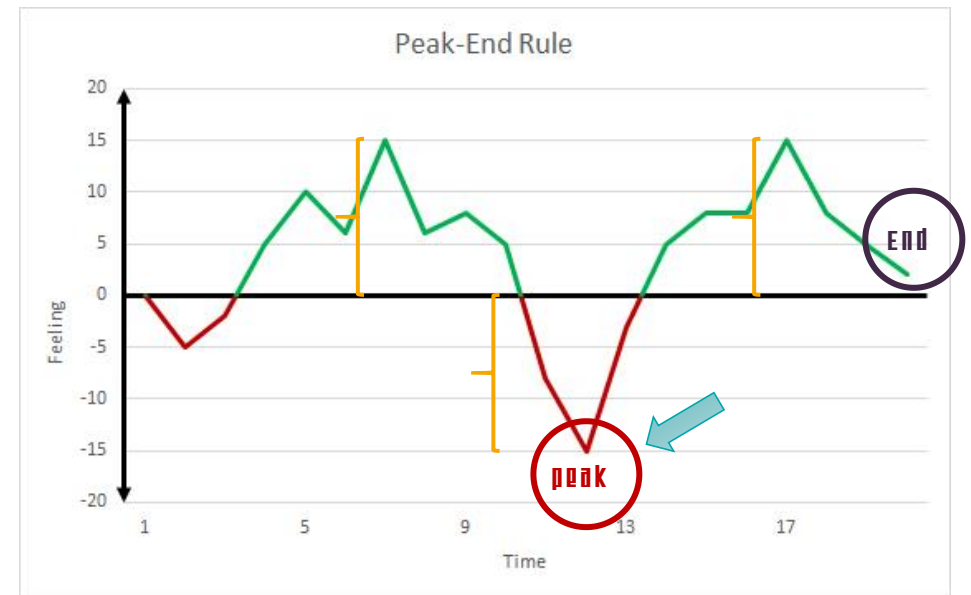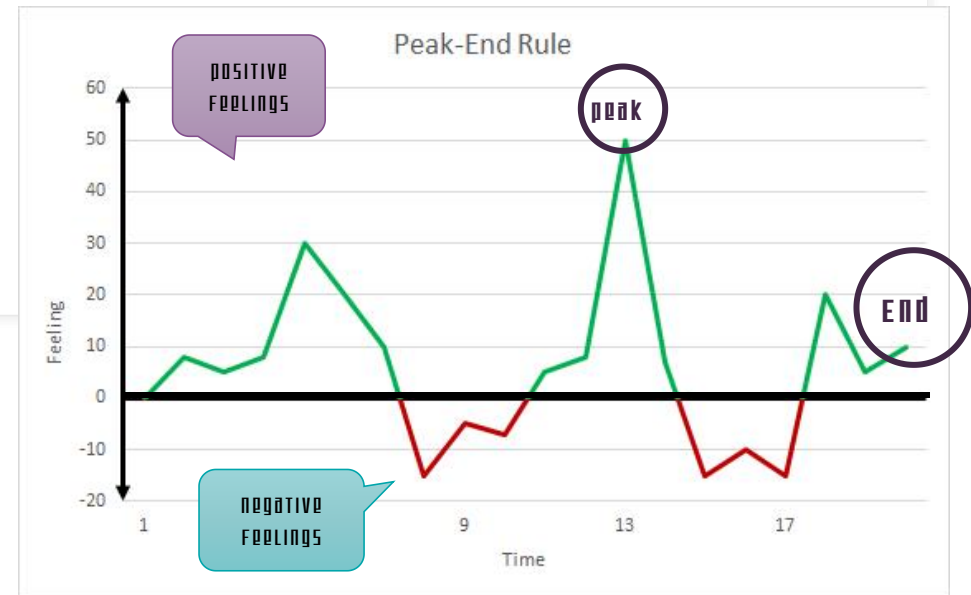
Peak-End Rule in Games

- You can't fully control positive and negative perception of your game.

- But you can try to make your game session end in a very rewarding way:
  - Design rewarding hooks next to potential Exit Points of your loop;
  - Set timers to set off in multiples of the expected duration of the main game loop.
  - Through your Live Ops systems, unlock game gifts at the end of the average session length;
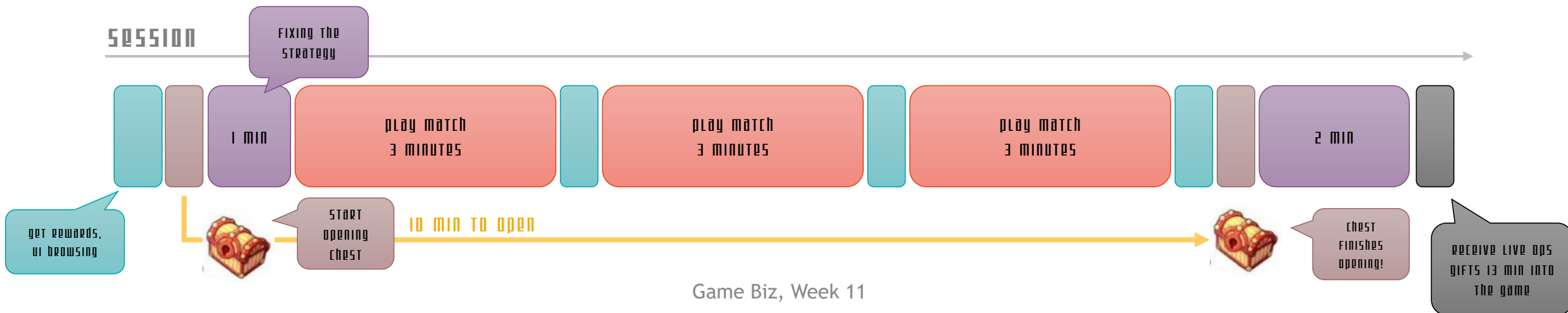
Zero-Risk

- Zero-risk bias is a bias where people feel better if a risk is eliminated completely instead of being merely reduced.
  - They are, therefore, **willing to spend top dollar for security**.
  - The whole Insurance industry sells on that.
- Related biases: **base rate fallacy** and **availability heuristics.**
  - Brains don't truly comprehend probabilities.
  - Exaggerate the extremes around 1% and **99%**.
    - Like people playing in lotteries.
  - Perception of what is probable is driven more by anchored perceptions and stereotypes.
    - People fearing shark attacks.

Availability Heuristic

What comes to mind quickly is deemed significant—sometimes incorrectly.

verywell
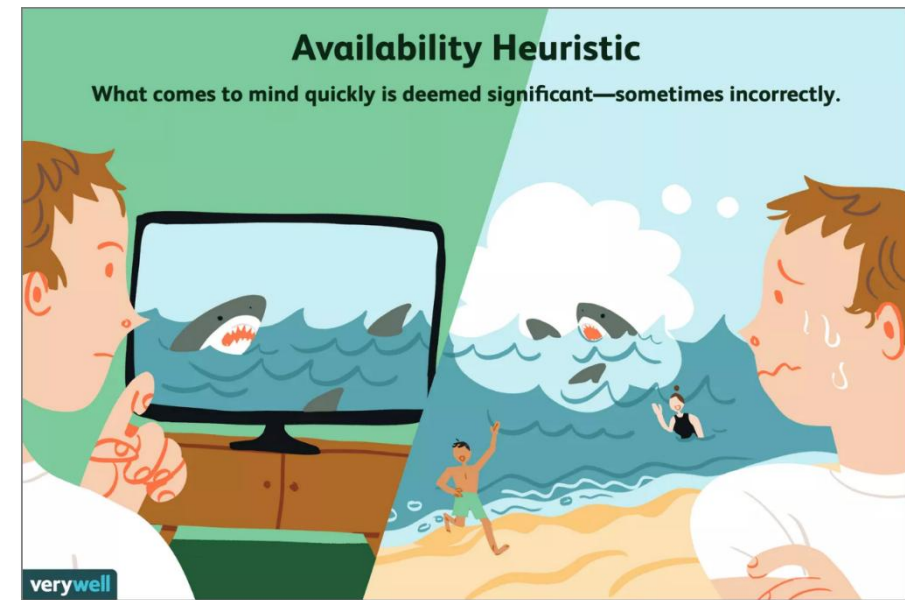
Zero-Risk in Games

- Sell "guarantees" that override random systems.
  - Extra items, extra scrolls,
  - Guarantee Rare or more spins in your lottery.
  - Guarantee loot in your Events.
- Advertise it abundantly!
- People will pay much more to go from 98% certain to 100% certain.
  - Sometimes more than double.
  - And this is how Insurance companies make money. This + Expected Value calculations.
  - So now you can do your own Insurance company after learning game economy design!

Scarcity Bias

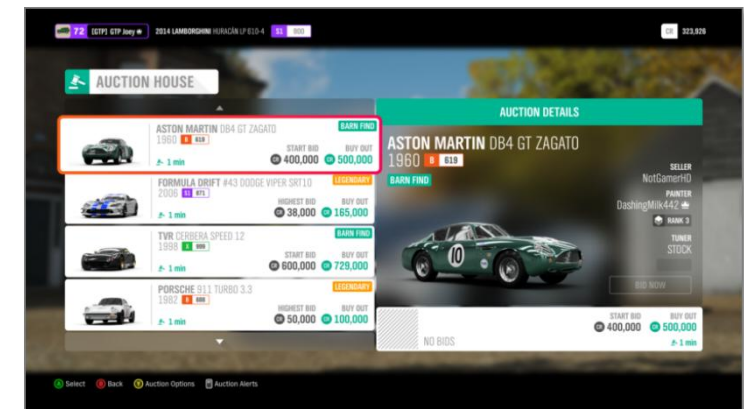Figure 1. Example scenarios for scarcity manipulations.

- **We value more what is scarce or limited.**
  - Our brains have, in fact, evolved among scarcity of many resources.
  - Even as the modern world reeks abundance, we still think in scarcity terms.
    - The belief that the national economy is a zero-sum game.
    - Neo-Malthusianism
  - Another manifestation of Loss-Aversion.

- People desire more of what they can't have.
  - Scarcity functions like an obstacle to goal pursuit, which intensifies the value of the goal.
  - "The best way to make oneself sought after is to be hard to find."

- **Scarcity prioritizes our choices**
  - Can make us more efficient: approaching deadlines, optimize short money.
  - But *also* more vulnerable if we are *anchored:* auctions, PS5 poachers, political discourse of various kinds, artificial scarcity created by marketing.

Scarcity Bias in Games

- Artificial scarcity is a primary tool of marketers everywhere and game monetization in particular.
  - Limited / collector editions
  - Time-limited offers
  - Max amount of in-game purchases
    - Max amount per user, per guild, even overall among all users.
  - Auction houses

- Another effect is that items that drop more rarely will be naturally valued more, but it's up to the designer to balance the game so that such item is actually "good".
  - A differential between rarity and effectiveness in the game frustrate users. The rarer the rate and the less effective the item is, the worst.

Assignment

Q&A