

# Psychology of games

Part 1: Behavioral economics, behaviorism  
(a.k.a. Behavioral Game Design)

Perttu Hämäläinen 2020

- This lecture is about the psychological principles of affecting player behavior

GET  
READY! !

# Explanations

- $11-4=7$ ,  $12-5=7$ , and the last arithmetic operation before the final question was a subtraction
- 7 is close to the mean of the range 5...12
- 7 is the only number not shown (might work for those that try to come up with something unexpected)
- Odd numbers are perceived as slightly more random
- 7 is simply a common number people think of

# The real psychological trick?

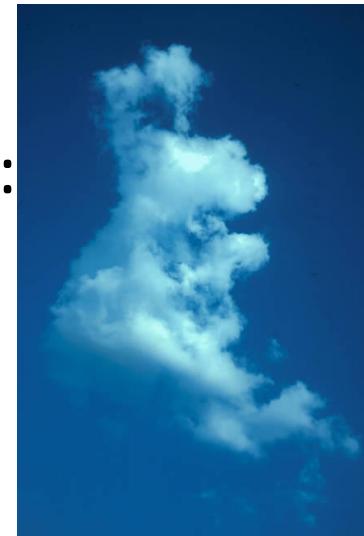
- Asking for the shares from those who "fell" for it
- Maximizes perceived success rate
- Maximizes virality



# Theoretical framework: two types of thinking

SYSTEM 2: EXPLICIT/CONSCIOUS:  
SLOW, ALGORITHMIC, EFFORTFUL

SYSTEM 1: IMPLICIT/UNCONSCIOUS:  
FAST, ASSOCIATIVE, EFFORTLESS,  
INTUITIVE



ATTENTION,  
PRIMING,  
INHIBITION

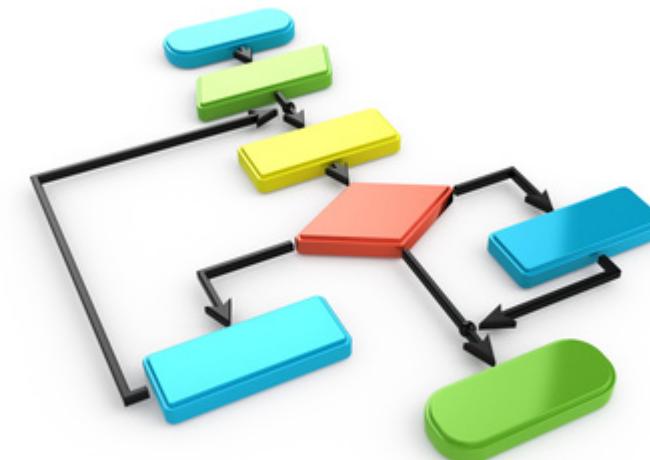


IDEAS,  
ASSOCIATIONS,  
IMPULSES  
(AUTOMATION)

ASSOCIATION



©Warren Photographic





And you will read this at the end

**You will read  
this first**

And then you will read this  
Then this one



# Rate Your Experience

Enjoying Dungeon Keeper?

5-Star ratings from you help us  
provide free updates!



How would you rate  
Dungeon Keeper?

1-4 Stars

5 Stars

# Utilization of the two systems outside games

- Martial arts: probing and then exploiting the opponent's automatic (i.e., predictable) behaviors
- Politics: designing campaigns and advertising to exploit cognitive biases (mere exposure effect, hate speech or even lies that trigger strong impulses and emotions)
- Magic tricks
- Sales and marketing

# Motivation

- Players now predominantly spend money in-game, not in a store
- Game designer = sales attendant, player = customer.
  - Concrete example: F2P games often offer discount campaigns on IAPs, but these are only offered to players not paying money otherwise.
  - With their behavior, players are effectively negotiating price of virtual goods.
- Implication: A game designer should understand marketing and sales psychology
  - Both to monetize and understand what's wrong in F2P



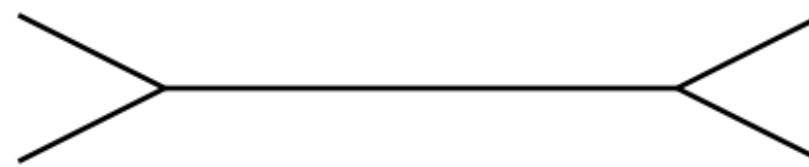
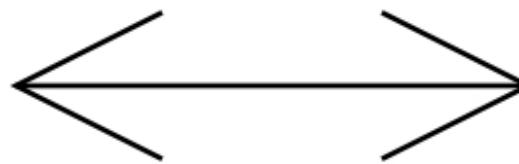
**Revolutionizing how game developers monetize with  
Unity Monetization SDK 3.0**

# Behavioral economics?

- The science of irrational decision making
- Studies the effects of psychological, social, cognitive, and emotional factors on the economic decisions (e.g., making a purchase)
- Our irrationality biases our decision making statistically. Not everyone will be affected, but given enough players, the effects are significant, especially if applied to optimize each link in a chain of random events



# Cognitive biases / illusions



# Behaviorism?

- Branch of experimental psychology that focuses on studying the effect of stimuli on measurable behavior
- Operant conditioning, reinforcement schedules
- Skinner's box
- Strong effects found on animals (rats, primates...), free-to-play games show that the principles very much apply to humans, if optimized
- Not going deep into the why's of motivation or what's going on in people's minds, more of that later

# The big picture

- New technologies and approaches are enough for a short period of time (e.g., Doom had novel 3D interaction and graphics, but not much of a story...)
- When competition catches up, the new technologies and approaches become just an additional item in the designer's toolbox (e.g., ID Software is no longer dominating the FPS market, since brilliant graphics alone are no longer enough)
- Behavioral game design was such a novel approach – Zynga's games around 2010 did not have much else
- Presently, one needs to have good behavioral game design in addition to gameplay, visuals, audio, story/theme....

# Structure

- Rewards / reinforcement
- Perception (acquiring information)
- Cognition (processing information)
- Memory (storing information)
- Social (effect of other people)

# Principles

## Rewards

- Anticipation of reward
- Reinforcement schedules
  - Randomness of rewards
  - Frequency of rewards
- Endowment progress effect

## Cognition

- Loss aversion
- Avoiding thinking / going with the default
- Scarcity principle
- Sunk cost fallacy
- Commitment & consistency

## Perception

- Contrast effect
- Anchoring & confirmation bias
- Halo effect

## Memory

- Peak-end Rule

## Social

- Reciprocity
- Social proof

# Exercise 1: Play Walking Dead No Man's Land

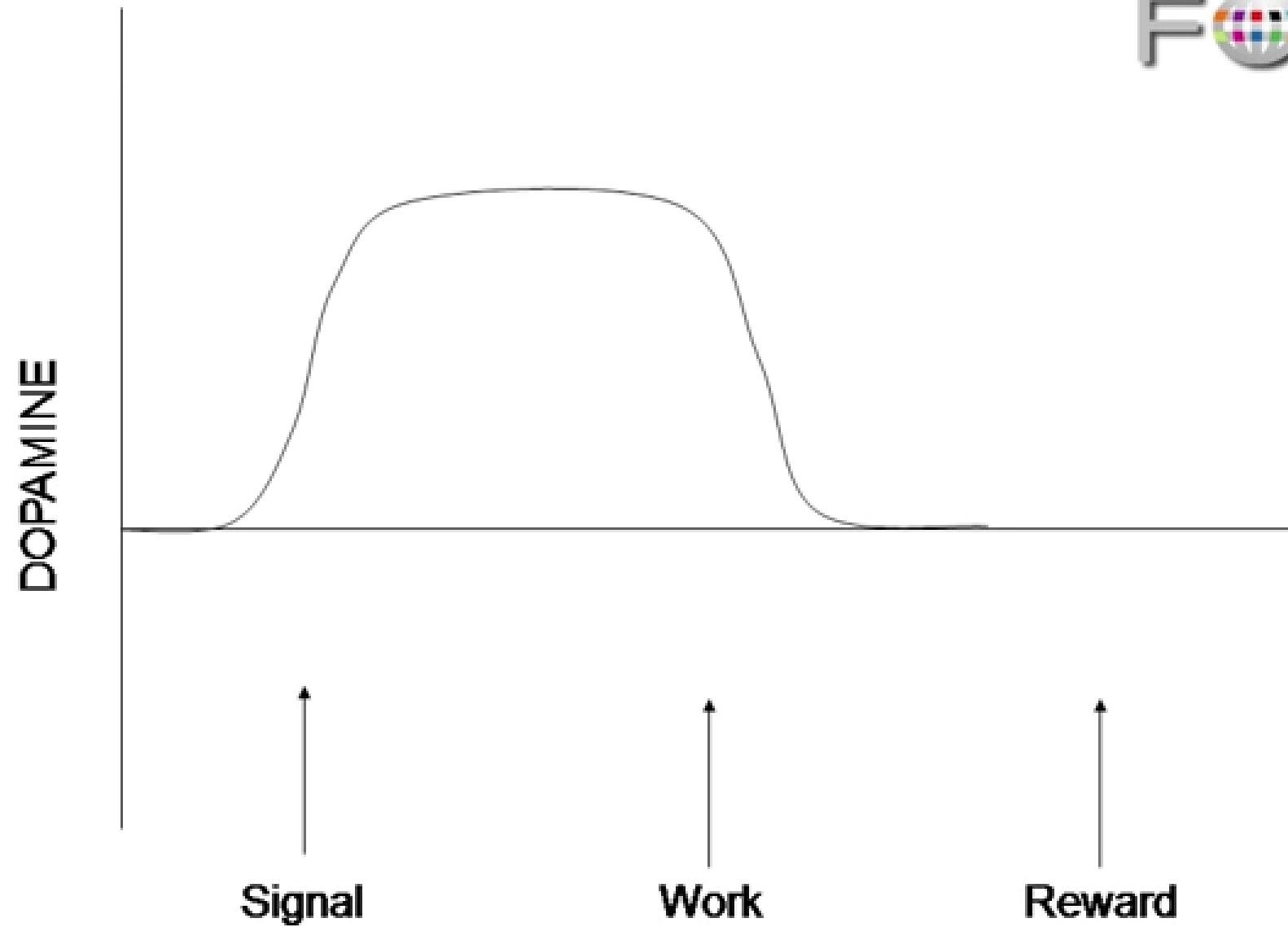
- In the following slides, I'll be using WDNML extensively as an example case. Thus, you have to play it to get the most out of this lecture.
- Complete first two episodes or play until you run out of virtual currency.

# Rewards / reinforcement

Anticipation, frequency, randomness, endowment progress effect

# Anticipation of reward

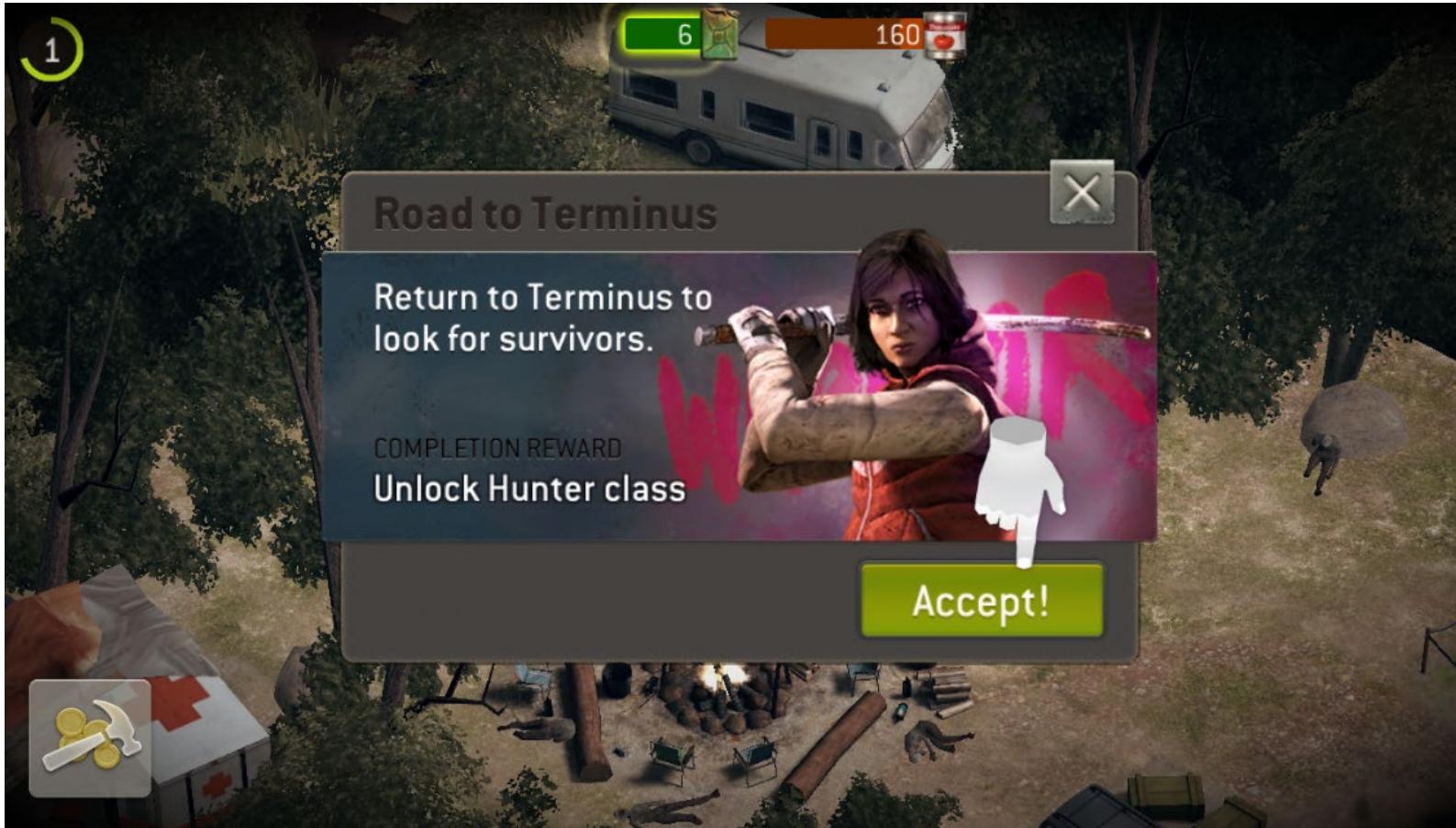
- Games reinforce desired behavior with rewards and penalties.
- Dopamine is the key neurotransmitter, linked to seeking reward and pleasure in games, gambling, work, sex...
- Dopamine peaks when anticipating reward, not when getting the reward. The rise of dopamine drives us to action. Inhibiting the rise of dopamine leads to demotivation.



# It's not the reward but the anticipation

- Design implication: Always dangle some carrot in front of the user, the next one already in place when previous one reached.

# It's not the reward but the anticipation



WDNML: Clearly state the reward that the player will get, e.g., after completing an episode

12 56543/80000



50

203



108



tuhov  
hulluhan se on



4811



PASS ROYALE

NEXT REWARD



Battle

Party!

New Mode!



Queue

3H

Chest Slot

Special Offer Available

OPEN



Battle



MASTER

5000

LEAGUE 4  5000

i

4900



 4811



4700



League Season Reset

 4406

 25d 23h

i

# It's not the reward but the anticipation



WDNML: Cascaded rewards. Many rewards cannot be used immediately, player has to first reach some other goal(s).

# Random rewards

- Random reward (e.g., slot machines) is more efficient than fully predictable reward.
- Much stronger dopamine response
- Psychology term: Variable ratio reinforcement
- Design implication: Good to have both randomness and skill-based play
- Additional benefits of randomness: reaching a wider target group of various skill levels, serving both grinders and those who pay

2m 56s

4



0



240



+

147



Unlocks  
left



In these  
boxes



After a mission you get 3 free unlocks.



Next

2m 52s

4



0



240



+

147



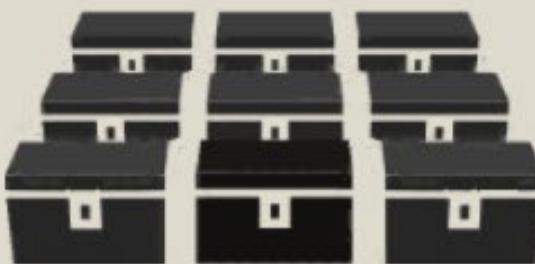
Unlocks  
left



In these  
boxes



All crates contain valuable items.



Next

2m 39s

4



0



240



147



Unlocks  
left



In these  
boxes



2m 33s

4



56

34

147



Unlocks  
left



In these  
boxes



2m 29s

4



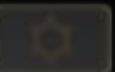
100



340



147



Unlocks  
left



In these  
boxes



2



Hey not bad.



2m 25s

4



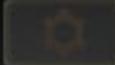
100



340



147



Unlocks  
left



In these  
boxes



The golden crate is still out there.



2m 22s

4



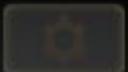
100



340



147



Unlocks  
left



In these  
boxes



Buy 3 extra unlocks. This time it's  
free.



2m 16s

4



100



340



147



Get 3  
more



Free



2



100



In these  
boxes



2m 12s

4



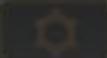
100



340



147



Unlocks  
left



In these  
boxes



Alright, open 3 more!



2m 3s

4



110



340



147



Unlocks  
left



In these  
boxes



2m

4



200



440



147



## Unlocks left



Continue



## In these boxes



6



1087



690



94



Get 3  
more



Watch  
video



25

In these  
boxes



Continue

# Endowment progress effect

- If a 12-stamp coffee card is given with the first two marked off for free, customers buy the final 10 coffees quicker than if a 10-stamp card is used
- Motivation increases when the reward or goal is near
- WDNML: log-in rewards give the player some initial progress for each session

# Anticipation of rewards, cognitive limits

- Again: Motivation increases when the reward or goal is near
- A reward seems closer if we don't remember or foresee all the hurdles that lie ahead
- The initial enthusiasm of a game project: Many projects would not even start if people realistically anticipated the difficulties.
- F2P games want to keep you playing and paying for a long time
  - Makes sense to obfuscate the struggle needed for a reward
  - Of course a fine line between keeping the player hooked and frustrated

# WDNML reward & goal cascade:

- Reward: a new weapon
- Needs leveling up a character
- Leveling up a character needs higher-level training ground
- Leveling up the training ground needs a council upgrade
- Council upgrade needs lot's of supplies => need to upgrade supply storage
- Hard to keep the whole cascade in mind and anticipate how much grinding/waiting/gold needed => boosts the anticipation of getting to use the new weapon.

# The big picture of game rewards & anticipation

- Reward for failing and trying again (WDNML: XP from killed walkers, timers that complete while playing)
- Reward for reaching goals (WDNML: loot boxes)
- Reward for coming back the next day (WDNML: upgrade timers, XP & can producers, random walkers)
- Reward for playing day after day (WDNML: episodic structure and episode rewards, character leveling, episodes too long to be completed in a single session)
- Remember randomness and endowment progress effect (making the reward random and/or seem closer)



4

6

1311

810



83



4



219



Map



4

6

1314



83



109



4



Map





6



1314



919



83



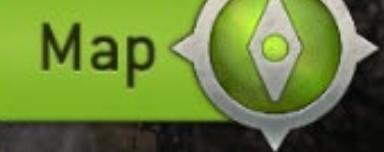
4



XP

+

83



# Clash Royale rewards

- Battle success: chests
- Battle failure: crowns for crown chest
- Login: chest timers have expired, you can open. Free cards in shop.
- Daily: get 10 crowns for crown chest, the 2-day structure of clan wars (collection day + war day, very bad socially to miss either – you might get kicked out from the clan)
- Weekly: Epic Sunday (can request and donate epics with clan, free epic in shop, more epics and legendaries to buy in shop)
- Longer term: Getting to new arenas, clan war season rewards, challenger season rewards

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- Loss aversion
- Avoiding thinking / going with the default
- Scarcity principle
- Sunk cost fallacy
- Commitment & consistency

## Perception

- Contrast effect
- Anchoring & confirmation bias
- Halo effect

## Memory

- Peak-end Rule

## Social

- Reciprocity
- Social proof

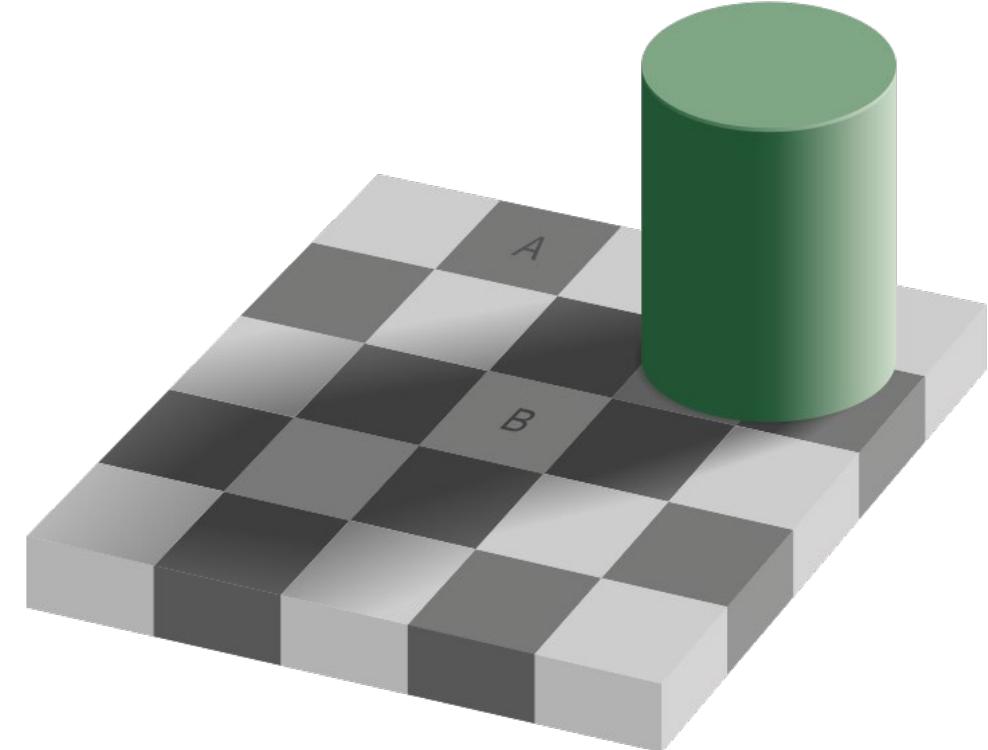
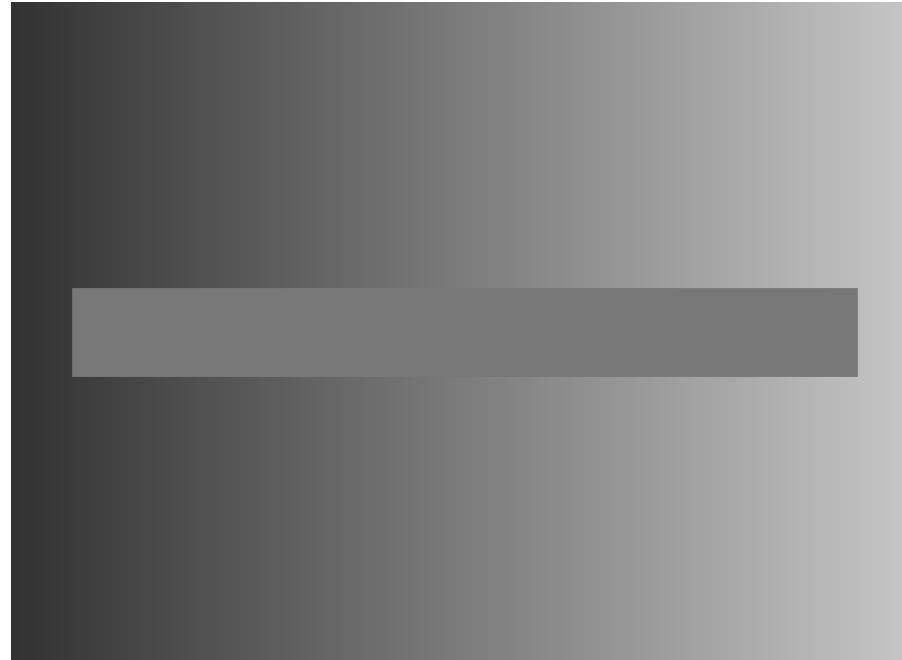


# Perception

Contrast effect, anchoring & confirmation bias, halo effect, placebo effect

# Contrast principle (perception is adaptive and relative)

- Perception and judgements are always relative and adaptive
- A light seems brighter in the dark. We don't notice our own smell.
- Want to charm someone? Be sure to have an uglier friend with you.



# Contrast in sales

- The trick of three product versions: two cheaper ones, one more expensive one, one of the cheaper ones has clearly more value => perceived as having both high value and low price. The user feels smart selecting that one even if the others were not even designed to be purchased.
- Men pay more for accessories if purchasing them after purchasing a suit.



# Anchoring & confirmation bias

- Our perception is affected by prior information
- Price estimates of houses affected by asking price (the "anchor")
- Number of pebbles in a jar: the mean of people's guesses is surprisingly accurate, but only if they guess without knowing what others guessed.
- We trust information that matches our prior beliefs

# Rate Your Experience

Enjoying Dungeon Keeper?

5-Star ratings from you help us  
provide free updates!



How would you rate  
Dungeon Keeper?

1-4 Stars

5 Stars



# The importance of first impressions

Alan: Intelligent, industrious, impulsive, critical, stubborn, envious.

vs.

Bill: Envious, stubborn, critical, impulsive, industrious, intelligent.

# Implications

- Optimizing the first few minutes is of utmost importance, especially in free games where there's no sunk cost keeping the player from quitting.
- Loading time, menu flow, tutorial...
- Can't raise the price of a game (or virtual goods) after launch, can only lower it. Thus, rather set a too high than too low initial price. Sometimes a high price raises the perceived value.

# Halo effect

- Some qualities of a person or product may be irrationally dominant (possibly because they steal our attention?)
- Attribute A affects the perception/judgement of attribute B
- Handsome people have higher salaries and get more votes in elections
- Games: better to invest resources in make some aspect of the game really stand out.
- Conversely, if some part of the game is really broken, the whole game can be perceived as low quality.

# Placebo effect

- Medical studies compare drugs to placebo, but both placebo and an actual drug can work. Explains the popularity of homeopathy.
- Halo effect & placebo: A more expensive drug will have a stronger effect
- WDNML: Weapons and characters familiar from the show might feel more powerful? (Like the show => like everything related)
- Recent research: "Adaptive AI" claim will bias player judgement of a game

# Perception recap

- Perception is **adaptive and relative**, affected by **spatial and temporal context** (pricing strategies, anchoring, confirmation bias, placebo effect)
- There's **bleed/crosstalk** between perceptions and judgements (Halo effect)

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- Halo effect, placebo effect

## Memory

- Peak-end Rule

## Social

- Reciprocity
- Social proof

# Cognition & decision making

Loss aversion, avoiding thinking / power of default, scarcity principle, sunk cost fallacy

# Framing effects

- Loss aversion
- Power of the default

# Loss aversion

Problem 1: You have been given \$1000. You are now asked to choose one of:  
50% chance to win \$1000 OR get \$500 for sure.

Problem 2: You have been given \$2000. You are now asked to choose one of:  
50% chance to lose \$1000 OR lose \$500 for sure.

Problems are equal in terms of outcomes, but people choose the sure thing in 1 and gamble in 2.

Application in F2P: frame paying as avoiding a loss. E.g., instead of getting loot as level completion reward, the player wins epic loot in a dungeon, but dies when exiting, and has to either lose the loot or pay to keep it.

# Special Offer Reward

This limited offer is a ONE time PURCHASE!

Celebrating YOUR PROGRESS to Arena 9!  
Legendary Arena Value Pack

X5  
VALUE



Legendary Chest



Bucket of Gems



Wagon of Gold

9,99 €

OFFER ENDS IN: 12H 12MIN



4m 45s

5



160



20



## Unlocks left



You found several loot crates during  
the mission. Open them.



2m 25s

4



100



340



147



Unlocks  
left



In these  
boxes



The golden crate is still out there.





# Avoiding thinking, going with the default

- Analyzing System 2 thinking requires mental effort, which people avoid
- Implication: people often go with the default, automatic response
- Ego depletion: mental effort drains resources. When tired, people are even more prone to go with the default option

# The power of the default

- In many countries, getting a driver's license includes indicating whether you are a willing organ donor in case of accidental death
- Even in such an important decision, people go with the default, avoiding thinking.
- Checking a box to opt out: nearly 100% of people become donors
- Checking a box to opt in: donor rate drops near or below 10%
- Example 2: parole judges deny more parole requests (the default and safe choice) when hungry and tired

6



1087



690



94



EPISODE 1

# ROAD TO TERMINUS

## Hello there!

Are you enjoying The Walking Dead: No Man's Land so far?  
Would you like to recommend us in the App Store?

[Write a review](#)[No, thanks](#)[World map](#)[Camp](#)

# Rate Your Experience

Enjoying Dungeon Keeper?

5-Star ratings from you help us provide free updates!



How would you rate  
Dungeon Keeper?

1-4 Stars

5 Stars



# Most common “default design” task in games?

- Menu flow that gets you into the game if you don’t want to think and just keep pressing ‘X’

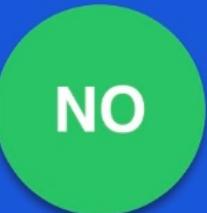


# User Inyerface

a bagaar frustration

Hi and welcome to User Inyerface,  
a challenging exploration of  
user interactions and design patterns.

To play the game, simply fill in the form  
as fast and accurate as possible.



Please [click HERE](#) to GO to the next page

<https://userinyerface.com/>

# Avoiding thinking

- Going with the default is only one manifestation of the general tendency to avoid effortful thinking (i.e, engaging System 2)
- Currency conversions are an infamous example – holiday spending
- One reason for virtual currencies: players often don't make the effort of doing the conversion, and act as if on holiday, not conscious of how much they are spending.
- Mental accounting: purchased gems are transferred to your game spending account, don't anymore care so much about the monetary value
- WDNML: in addition to currency conversion, the cascaded upgrade requirements obfuscate how much things cost

# Commitment & consistency

- Our actions change our self-concept.
- If you've paid at least once, you're more likely to pay again
  - Conversion rate: how many players "convert" from "freeloaders" into paying customers
  - Design implication: There should be at least one **no-brainer first purchase** that one is insane not to make (e.g., due to contrast effect)
  - Design implication: Paid actions such as upgrades should be available for free at first so that the player gets used to them

6

1095

810



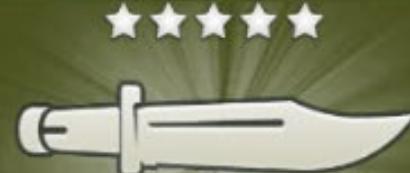
83



4

**400 Gold!****1 Survivor slot**

## Fresh Survivor

**BUNDLE****Legendary Weapon Scout****5 Phones!****Full supplies****€2,99 BUY****Map**

# The power of commitment and consistency

- After placing a bet, people are much more confident of their horse's chances of winning than they are immediately before laying down that bet.
- People's actual donations and voting behavior are consistent with earlier polls. However in a hypothetical poll, it is easier to promise to do good => voting activity and donations can be increased by organizing a poll.
- Active, public and effortful commitments are the most effective.
- Difficult, painful initiation rites increase compliance with a group's values
- Efficiency of lowballing
- Inefficiency of threats in long-term compliance – a child learns best if guided to choose the correct behavior voluntarily

# Sunk cost fallacy

- When making an investment, people tend to throw good money after bad. "Oh I've lost quite a bit but maybe my luck will turn if I give it one more go"
- We should only consider the expected return of future investment, not the already sunk cost
- Implication for games: People are willing to invest more time in games they have paid for => importance of the no-brainer first purchase
- Could be also seen as a form of commitment & consistency
- Pay to continue –mechanics (e.g., Candy Crush boosters offered after player has invested time in a difficult level but failed)

2m 25s

4



100



340



147



Unlocks  
left



In these  
boxes



The golden crate is still out there.



# Scarcity principle

- Adding artificial scarcity or urgency increases desirability & sales
  - Limited time sales (e.g., Steam sales of computer games)
  - Limited edition books etc.
  - Limited art prints
  - Rarity of game items / characters
- Goal: make the customer buy quickly without thinking too much about it (i.e., without engaging System 2)
- Can also be considered as a form of loss-aversion – avoid losing the special opportunity to buy

# Special Offer Reward

This limited offer is a ONE time PURCHASE!

Celebrating YOUR PROGRESS to Arena 9!  
Legendary Arena Value Pack

X5  
VALUE



Legendary Chest



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9,99 €

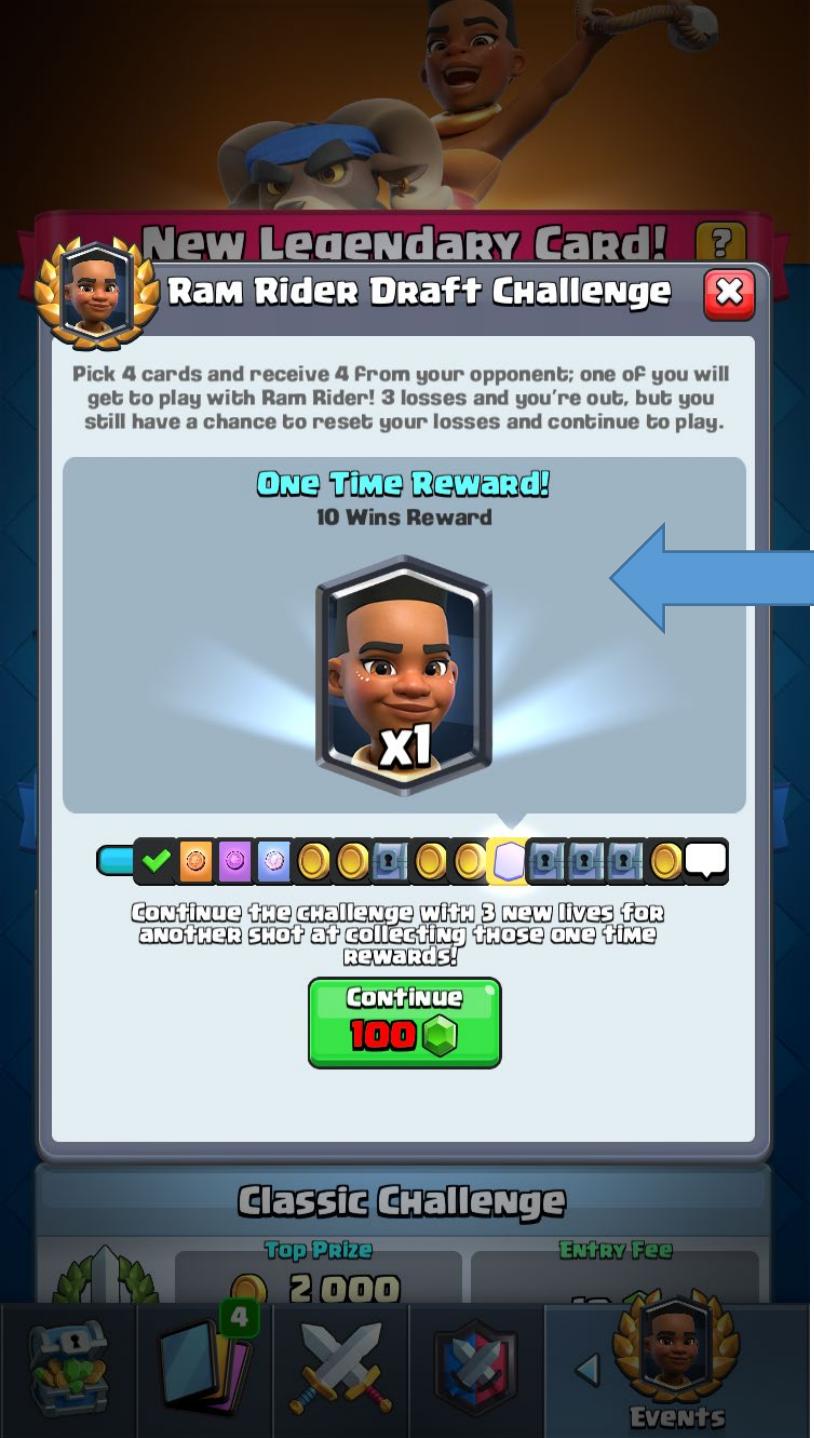
OFFER ENDS IN: 12H 12MIN



Elicit curiosity through novelty  
(more about this later)

Anticipation of reward

Scarcity (legendary)



Heighten the anticipation & scarcity

**New Legendary Card! ?**

**Ram Rider Draft Challenge**  
Ends in: 2d 15h

Your Progress: 1 Wins, 3 Losses

Continue: 100 Gems

Unlock Ram Rider and an exclusive emote!

**Challenges**

**Grand Challenge**  
Top Prize: 22 000 Gold, 1 100 Gems  
Entry Fee: 100 Gems

**Classic Challenge**  
Top Prize: 2 000 Gold, 4 Gems  
Entry Fee: 100 Gems

**Events**

**New Legendary Card! ?**

**Ram Rider Draft Challenge**

Pick 4 cards and receive 4 From your opponent; one of you will get to play with Ram Rider! 3 losses and you're out, but you still have a chance to reset your losses and continue to play.

**One Time Reward!**  
10 Wins Reward

Continue the challenge with 3 new lives for another shot at collecting those one time rewards!

Continue: 100 Gems

**Classic Challenge**

Top Prize: 2 000 Gold, 4 Gems  
Entry Fee: 100 Gems

**Events**

**New Legendary Card! ?**

**Ram Rider Draft Challenge**

Pick 4 cards and receive 4 From your opponent; one of you will get to play with Ram Rider! 3 losses and you're out, but you still have a chance to reset your losses and continue to play.

**Not enough gems!**

You're out of gems. Visit the Shop to get some more!

Go to Shop

Continue: 100 Gems

**Classic Challenge**

Top Prize: 2 000 Gold, 4 Gems  
Entry Fee: 100 Gems

**Events**



# Scarcity principle examples (as reported by Cialdini)

- A child photography company urged parents to buy as many poses and copies as they can because "stocking limitations force us to burn the unsold pictures of your children within twenty-four hours"
- A home vacuum-cleaner operation instructed the sales trainees to claim "I have so many other people to see that I have the time to visit a family only once. It's company policy that even if you decide later that you want this machine, I can't come back and sell it to you"

6



1314



999



83



4



## Carol Wolf bundle

BUNDLE

X

1200 Gold!

Carol's Blade

New Outfit  
Carol, Wolf

Offer ends in 1d 18h

€7,99 BUY



6

1014

999

XP

70



5



## Call survivors?

Get 1 to 5 star survivor



1 CALL

Boost the signal

Guaranteed 2 to 5 star survivor



5 CALL

Boost the signal

Guaranteed 3 to 5 star survivor



Upgrade your Radio Tent to level 2

Starting Level Range **1-3** Upgrade Radio Tent to get higher level survivors

Complete EPISODE 4 to unlock Shooter class.



Map



# Principles

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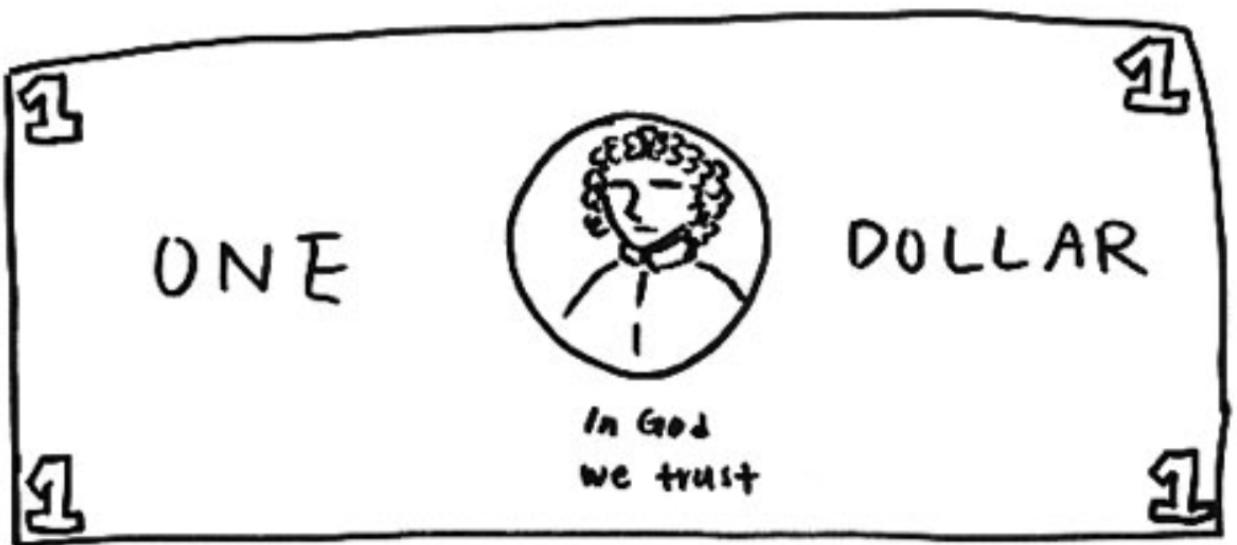
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- Duration neglect

## Social

- Reciprocity
- Social proof

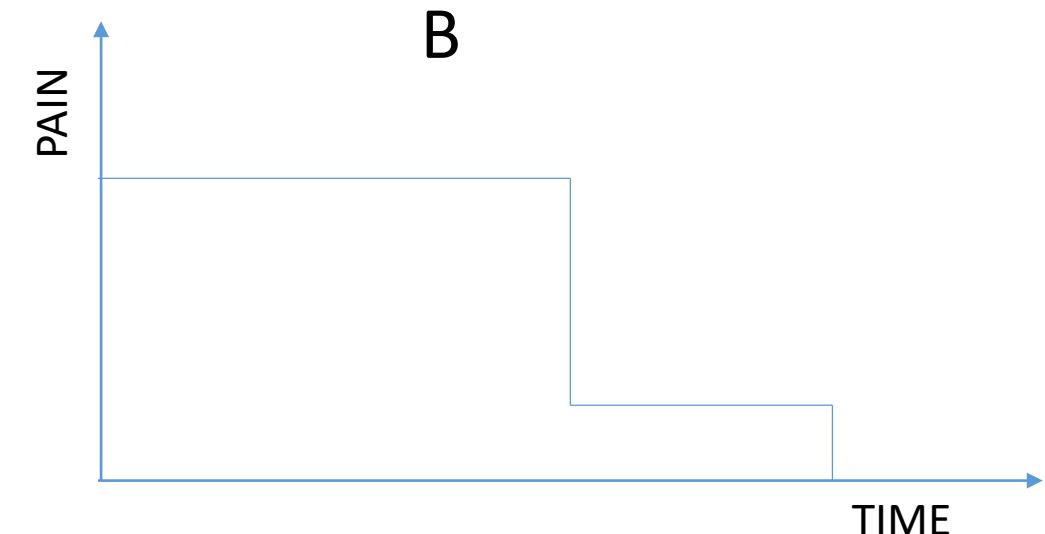
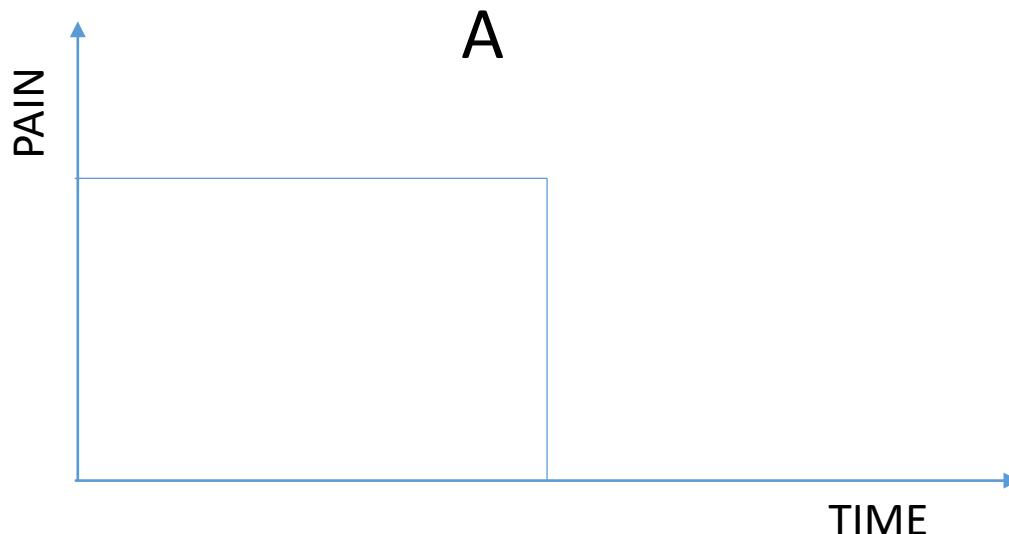
# Memory

Peak-end rule



# Peak-end-rule

- Our memory of pain, fun etc. roughly equals the mean of the peak and end
- If experience A has 50 seconds of intense pain and experience B has 50 seconds of intense pain followed by mild pain, people want to repeat B although there is more total pain



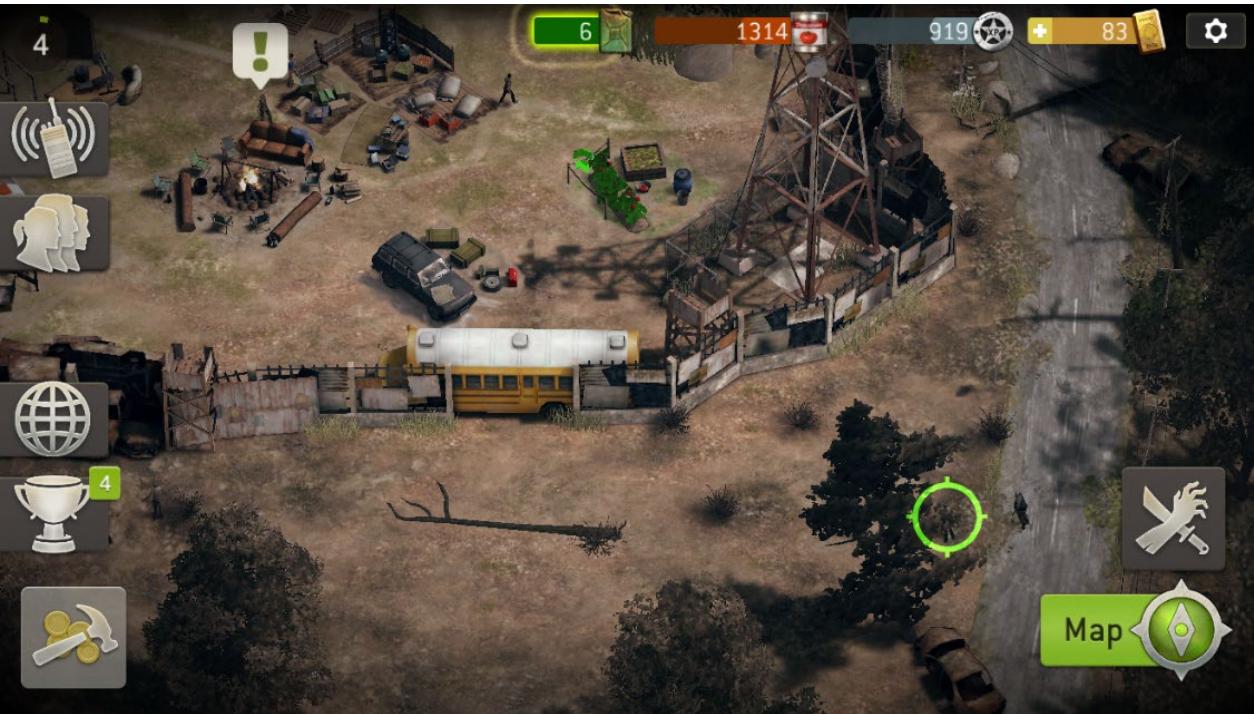
# Peak-end-rule

- Implication in game design: to make the player come back, every play session should be structured to have an engaging end and at least some peak moment
  - Can you predict when the session is going to end, e.g., average length?
- Also related to randomness: adding randomness adds peaks and thus boosts the remembered experience, even if the mean remains unchanged.
- Resource allocation: for the remembered experience, the peak and end matter most, so allocate most resources for them.

# Peak-end-rule in user interfaces

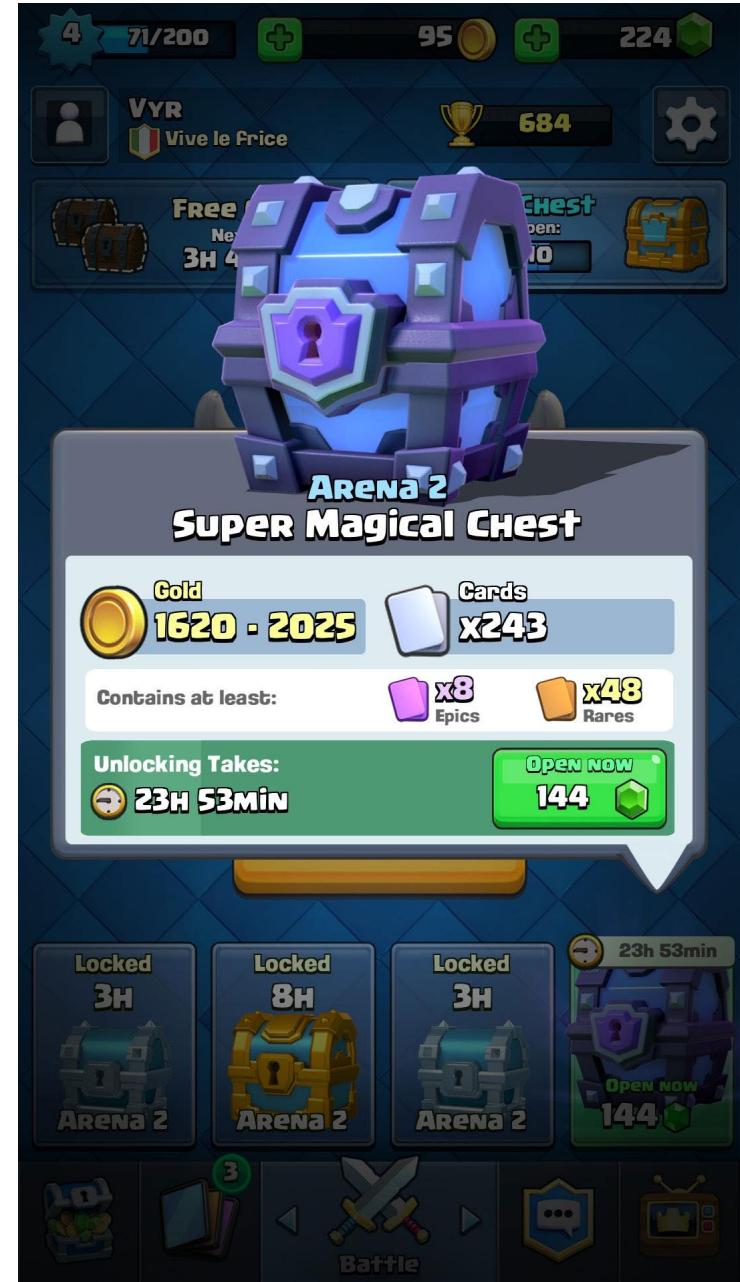
- Progress bars feel better if progress accelerates towards the end.
- Conversely, it's very annoying if the bar gets stuck at 95%

# Peak-end rule

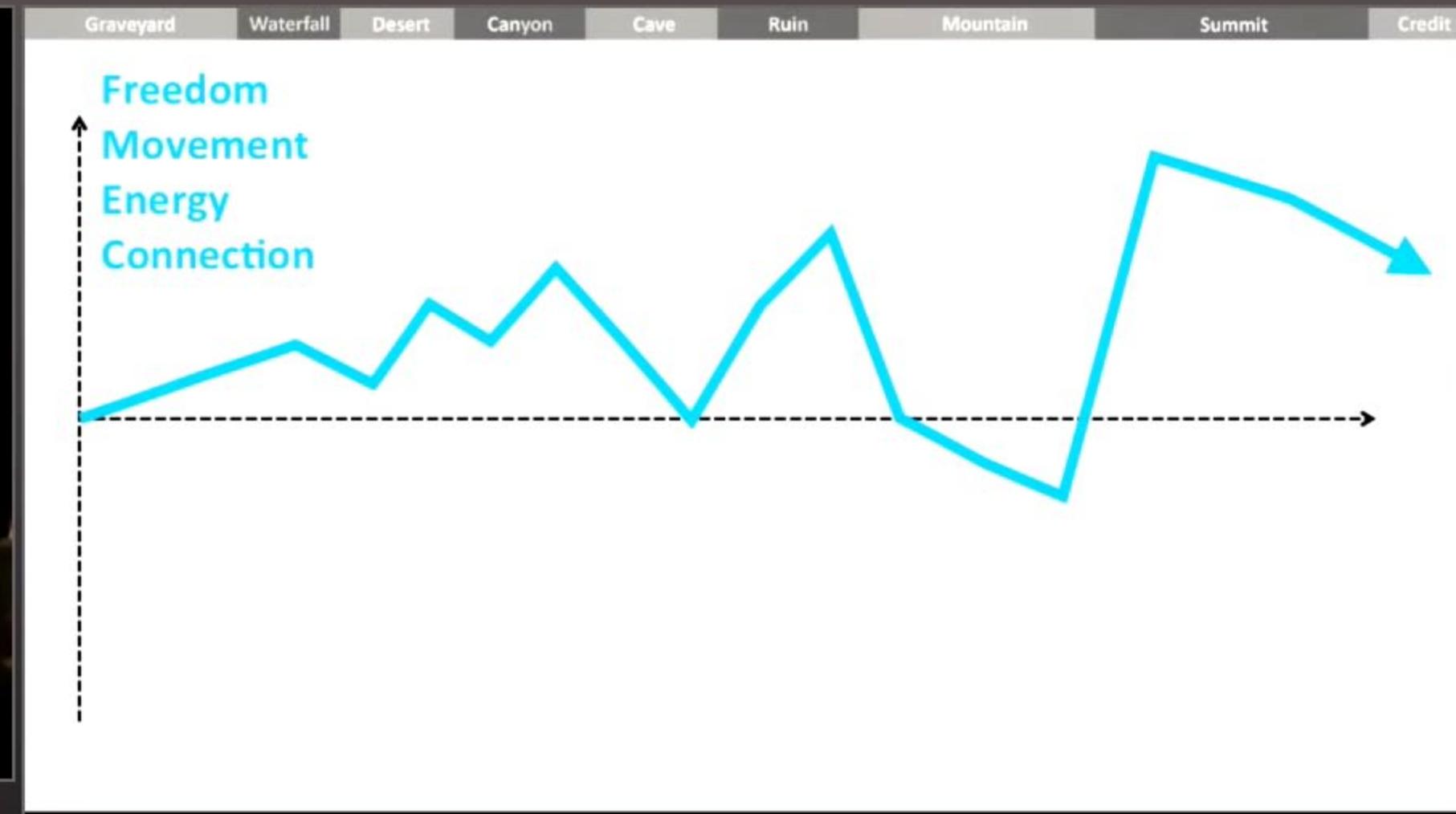


# Peak-end-rule

- In Clash Royale, very tight/improbable wins (right before time ends or winning when one's King has only a few HP left) seem to be rewarded with more rare chests
- Can be interpreted as the designers boosting the game's natural peak moments, making them even more memorable

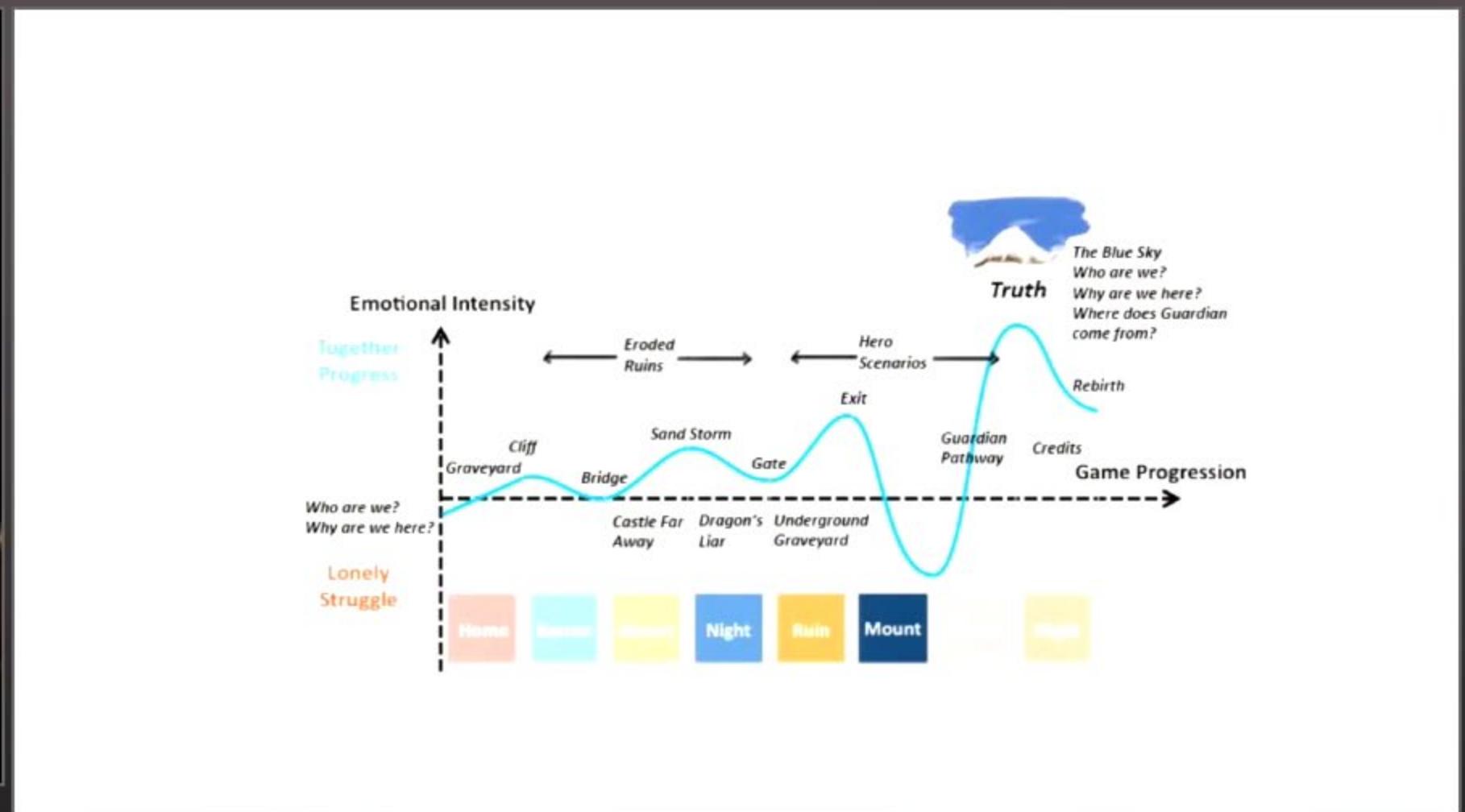


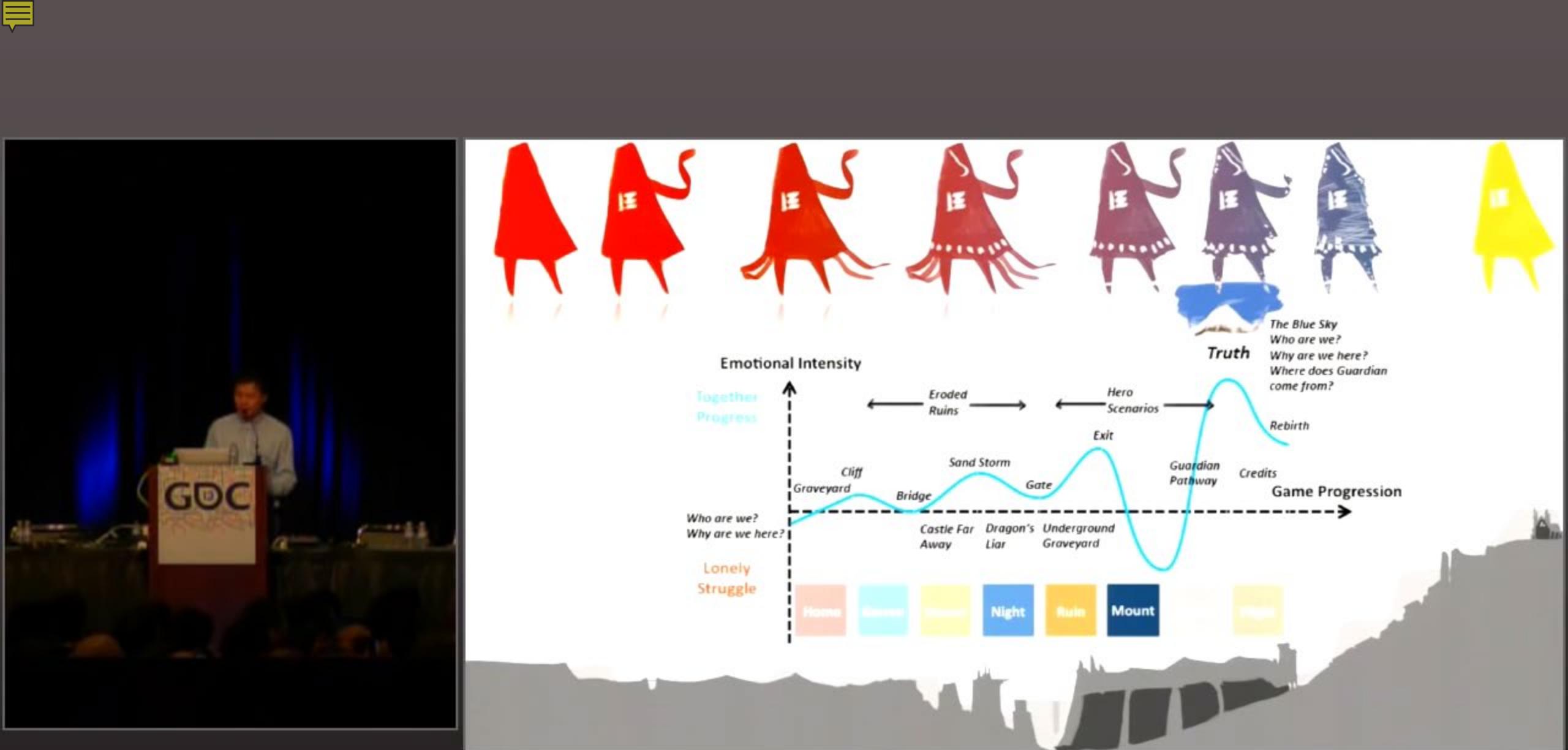
# Peak-end rule and contrast principle





**“Catharsis, a sudden emotional breakdown or climax that constitutes ... any overwhelming change in emotion that results in renewal, restoration, and revitalization.”**





# Confirmation bias

- Another explanation for confirmation bias is that it takes more effort and brain capacity to learn novel things that cannot be stored as small additions on top of what we already know.

# Principles

## Rewards

- Anticipation of reward
- Reinforcement schedules
  - Randomness of rewards
  - Frequency of rewards
- Endowment progress effect

## Cognition

- Loss aversion
- Avoiding thinking / going with the default
- Scarcity principle
- Sunk cost fallacy
- Commitment & consistency

## Perception

- Contrast effect
- Anchoring & confirmation bias
- Halo effect

## Memory

- Peak-end Rule

## Social

- Reciprocity
- Social proof

# Social

Commitment and consistency, social proof, reciprocity

# Social proof

- The oldest sales trick, "Finland's most popular car", "Already 10 Million downloads" etc.
- Highlighting most frequently purchased items or "people who bought X also bought..."
- The effect is stronger with closer social ties
  - Facebook shows "Friend X likes Y" ads
  - "90% of your facebook friends purchased Y" in IAPs?
- Base building games: players can see the bases of other players, what they've bought or achieved.

6



1314



999



83



4



## Carol Wolf bundle

**BUNDLE****1200  
Gold!****Carol's Blade****New Outfit  
Carol, Wolf**

Offer ends in 1d 18h

**€7,99 BUY****Map**



Jennifer Aniston  
Co-Owner, Living proof

# The weight is over.

Finally, smoother, softer, satiny style in half the time.



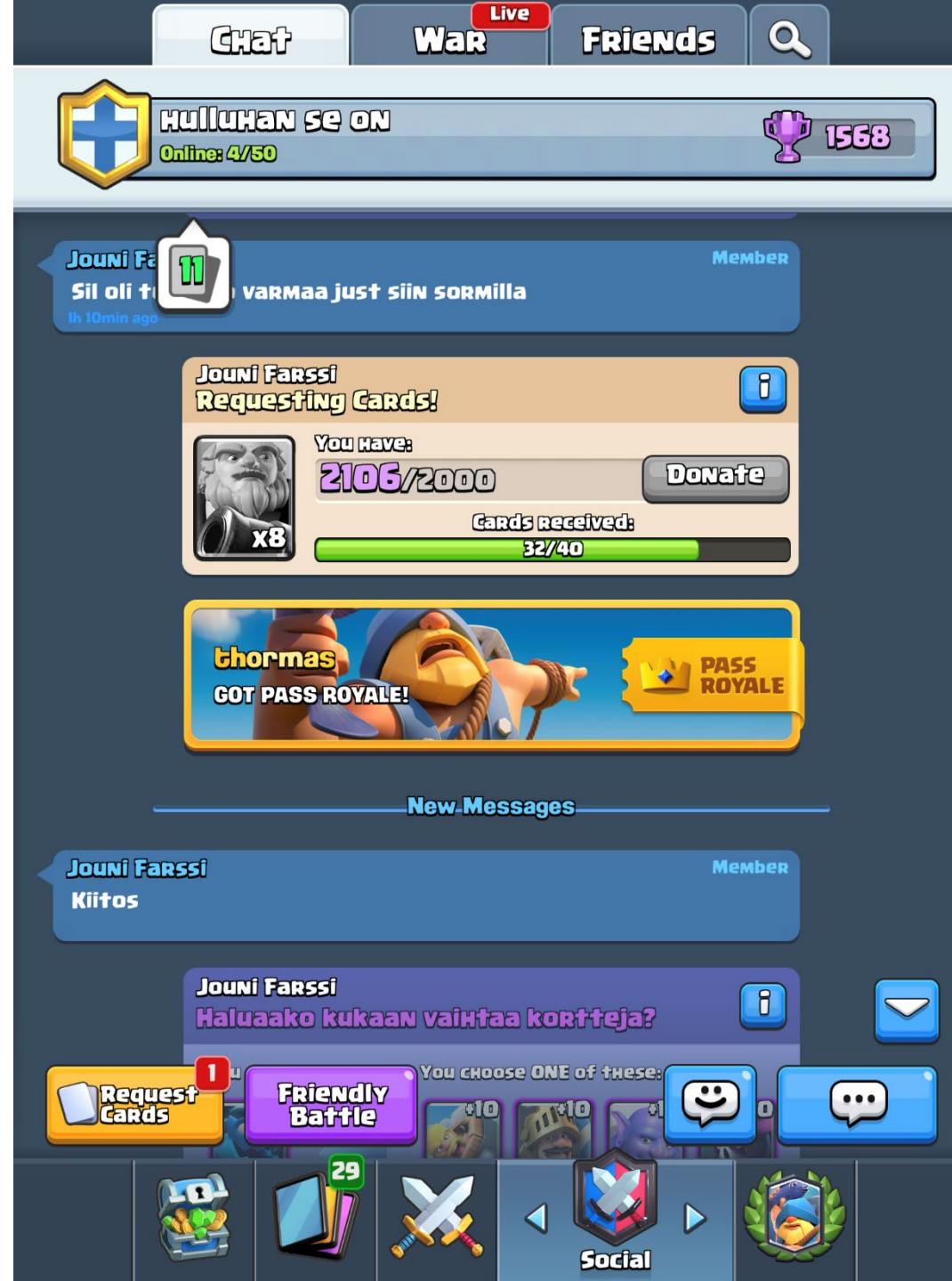
Living Proof Satin exclusively at  
**SEPHORA**  
Visit Sephora and receive a free mini of Satin.\*

\*Sample will be available 4/12/13 while supplies last. No purchase necessary. Available in Sephora stores and online only.

You are the  
**Living proof.**®

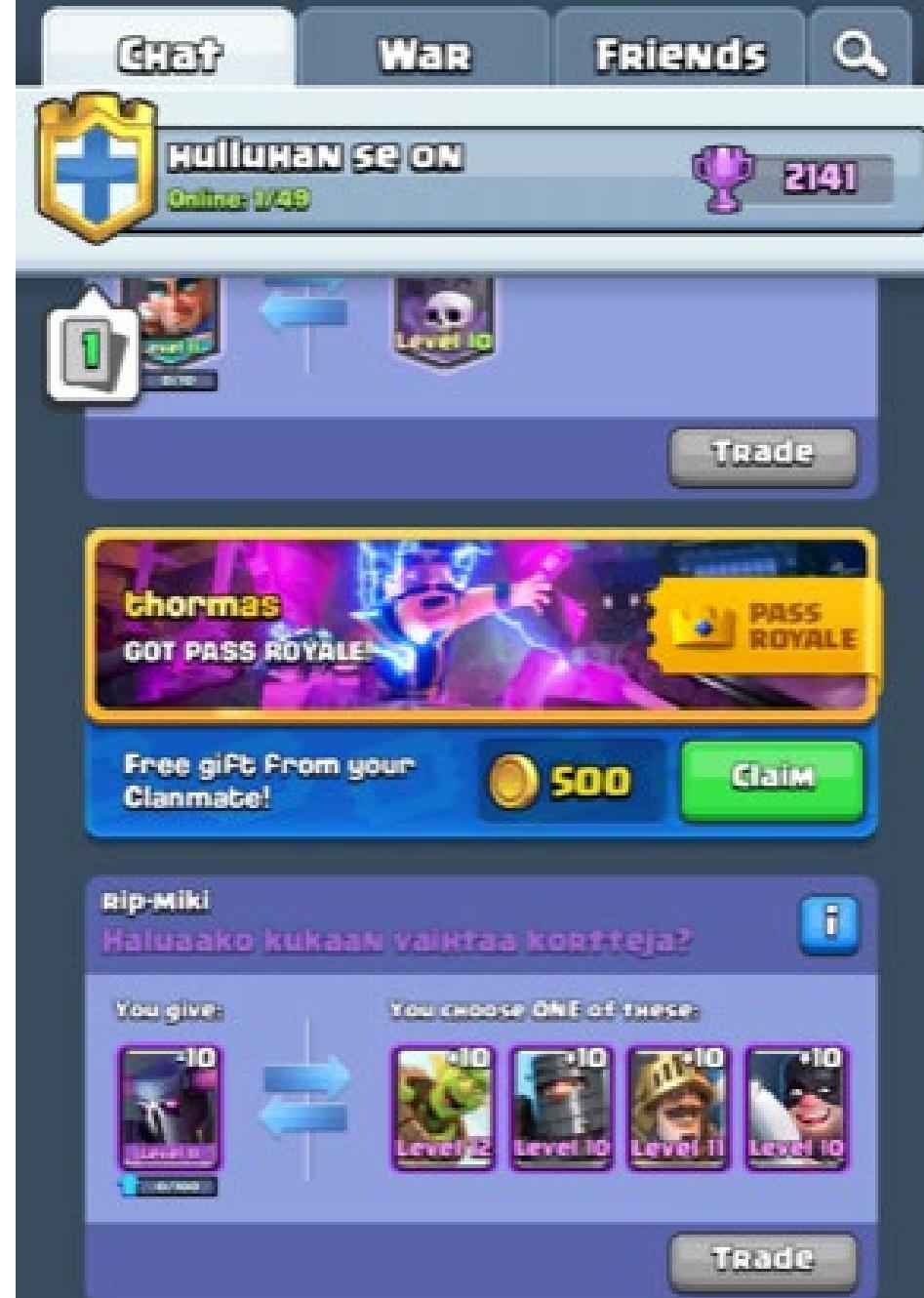
# Reciprocity

- Tendency to return favors.
- **Even an unwanted favor, once received, can produce indebtedness.**
- Sales and marketing: free samples.
- Hare Krishna: give a gift flower, insisting it's really a gift, before asking for a donation.



15.09

4G



# Reciprocity in games

- Social games: gifts were popular on fb but fell out of fashion. Now on the rise again
- Can virtual characters or game creators trigger social reciprocation in players?
- Some games try to solicit reviews by making the player feel that a small indie team has struggled to make a great game for the player's benefit, and the player can give back by giving a 5-star review.
- Youtubers/influencers getting free games and in-game items, probably biases their reviews and videos



# Principles

## Rewards

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## Memory

- Peak-end Rule

## Social

- Reciprocity
- Social proof



## These work and are used in many games

- Anticipation of reward (give and advertise both short and long term rewards)
- Random rewards (Loot boxes, game balancing)
- Contrast effect (IAP pricing)
- Social proof (IAP advertising)
- Scarcity principle (limited offers)
- Power of default (many players just mash 'x' to get into game)
- Reciprocity (gifting mechanics increase engagement & virality)

## The impact of these is more subtle or yet to be proven in games

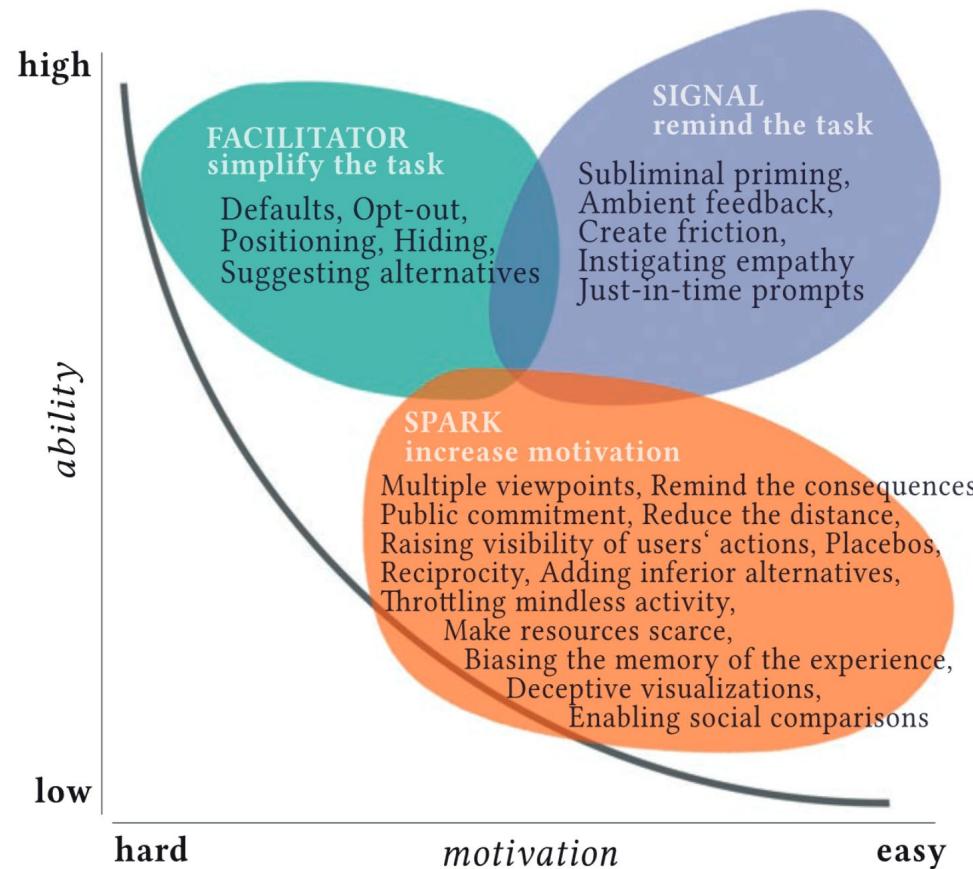
- Peak-end-rule
- Loss-aversion (framing paying as avoiding loss)
- Anchoring & confirmation bias
- Halo effect (something really unique and great can dominate the perception of an otherwise average game)
- Endowment progress effect
- Commitment & consistency (importance of no-brainer first purchase)
- Sunk cost fallacy (e.g., "pay to continue" after investing a lot of time on a level and failing)

# Summary

- There are multiple psychological principles that a designer should know.
- They are not a silver bullet, but a foundation that should feel natural, same as proper use of colors, UI design principles etc.
- Especially important: understand how human **perception**, **information processing** and **memory** all have features and limitations that affect behavior, and how social interaction also contributes.
- Reward anticipation & dopamine!
- Two systems theory: interplay of instinctive/fast and analytic/slow, and our tendency to avoid the latter.



# Additional reading: A recent review of psychological “nudges” in Human-Computer Interaction: Caraban et al. 2019



**Figure 4: The 23 nudging mechanisms mapped into three types of triggers suggest by Fogg's Behavior Model.**

<http://persuasive.cut.ac.cy/2019/01/28/chi19-paper-23-ways-to-nudge-a-review-of-technology-mediated-nudging-in-human-computer-interaction/>

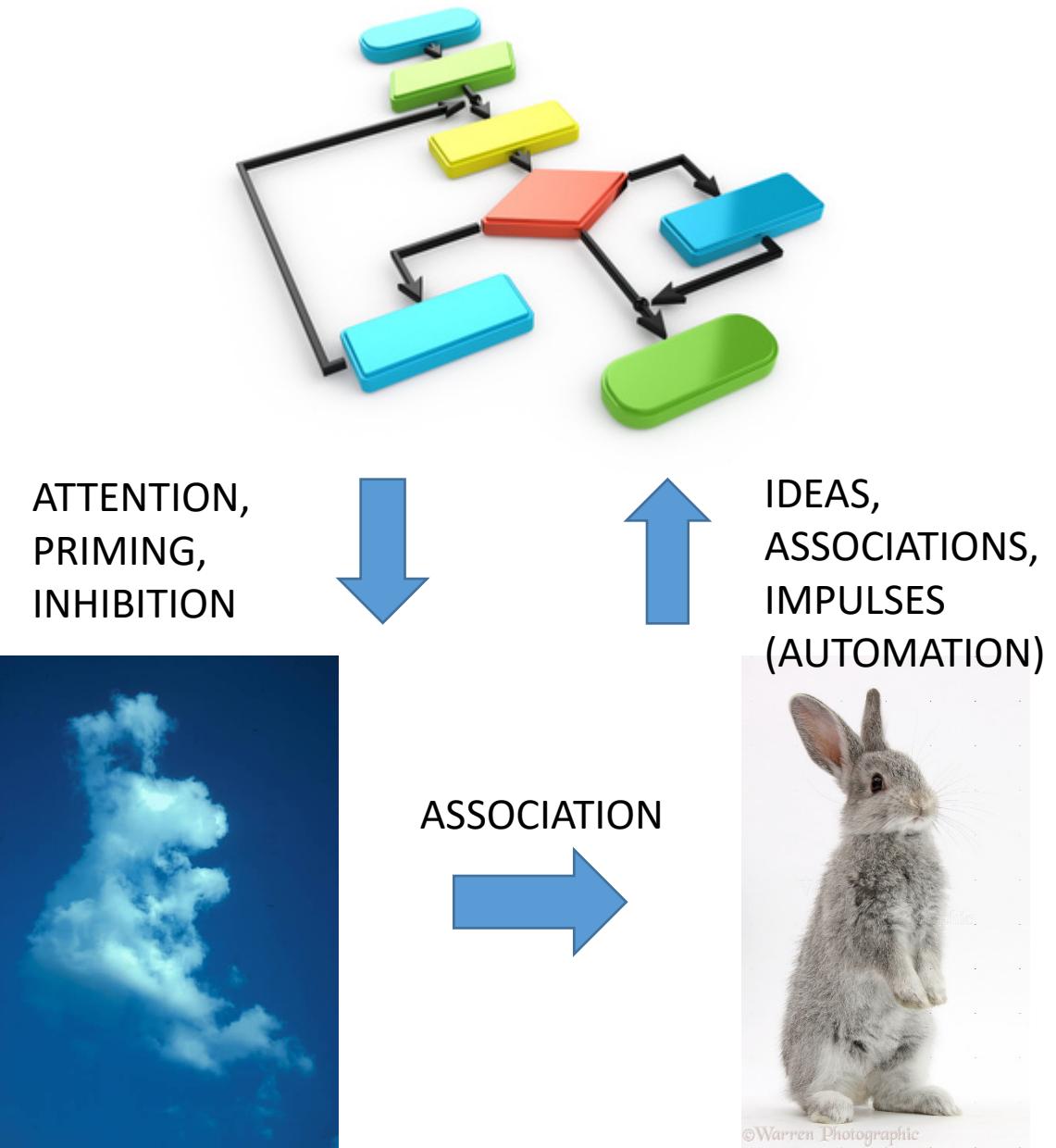
# Exercise: in groups, pick a free-to-play game, analyze

- What psychological principles are utilized?
  - Add screenshots (or series of them) to illustrate the principles.
- Focus on these:
  - Anticipation of reward (both short and long term)
  - Random rewards
  - Contrast effect
  - Social proof
  - Scarcity principle
  - Power of default
  - Reciprocity
- What psychological principles could be utilized better?
- Collect the results in a shared Google Slides: <https://urly.fi/1omg> (Day 3 exercise)

# Theoretical framework: two types of thinking

EXPLICIT/CONSCIOUS:  
SLOW, ALGORITHMIC, EFFORTFUL

IMPLICIT/UNCONSCIOUS:  
FAST, ASSOCIATIVE, EFFORTLESS



# Resources

## Books:

Kahneman 2011: Thinking, fast and slow

Cialdini 2006: Influence – The psychology of persuasion, revised edition

Ariely 2008: Predictably Irrational

## Research papers and reports:

UTA Free2Play Research Project Final Report: <http://tampub.uta.fi/handle/10024/98584>

Hamari 2011: Perspectives from behavioral economics to analyzing game design patterns: loss aversion in social games

Butler 2014: Game design through the lens of behavioral economics

Lewis et al. 2012: Motivational Game Design Patterns of ‘Ville Games

## Video:

South Park episode: Freemium isn't free

## Web:

<http://www.psychologyofgames.com>

[http://www.gamasutra.com/view/feature/172409/10\\_years\\_of\\_behavioral\\_game\\_design\\_.php](http://www.gamasutra.com/view/feature/172409/10_years_of_behavioral_game_design_.php)

[https://en.wikipedia.org/wiki/List\\_of\\_cognitive\\_biases](https://en.wikipedia.org/wiki/List_of_cognitive_biases)

<https://www.youtube.com/watch?v=xNjl03CGkb4> (Let's go Whaling talk – informative if not ethical)