

# Psychology of games

Part 3: Emotion

Aalto University Game Analysis course, 2022  
Prof. Perttu Hämäläinen

Material also contributed by Prof. Elisa Mekler (ITU)

Disclaimer: This content is perpetually work-in-progress, updated every year.

# Contents

- What is emotion?
- How do emotions relate to game design?
- Emotional challenge
- Emotion & meaning

# Examples?

- What have been some memorable emotional moments or experiences in games for you?

# History of emotion research



# Categorical basic emotions



FEAR



JOY



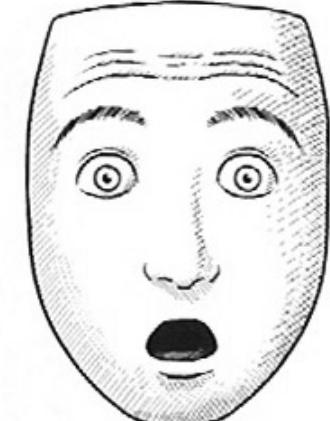
ANGER



DISGUST



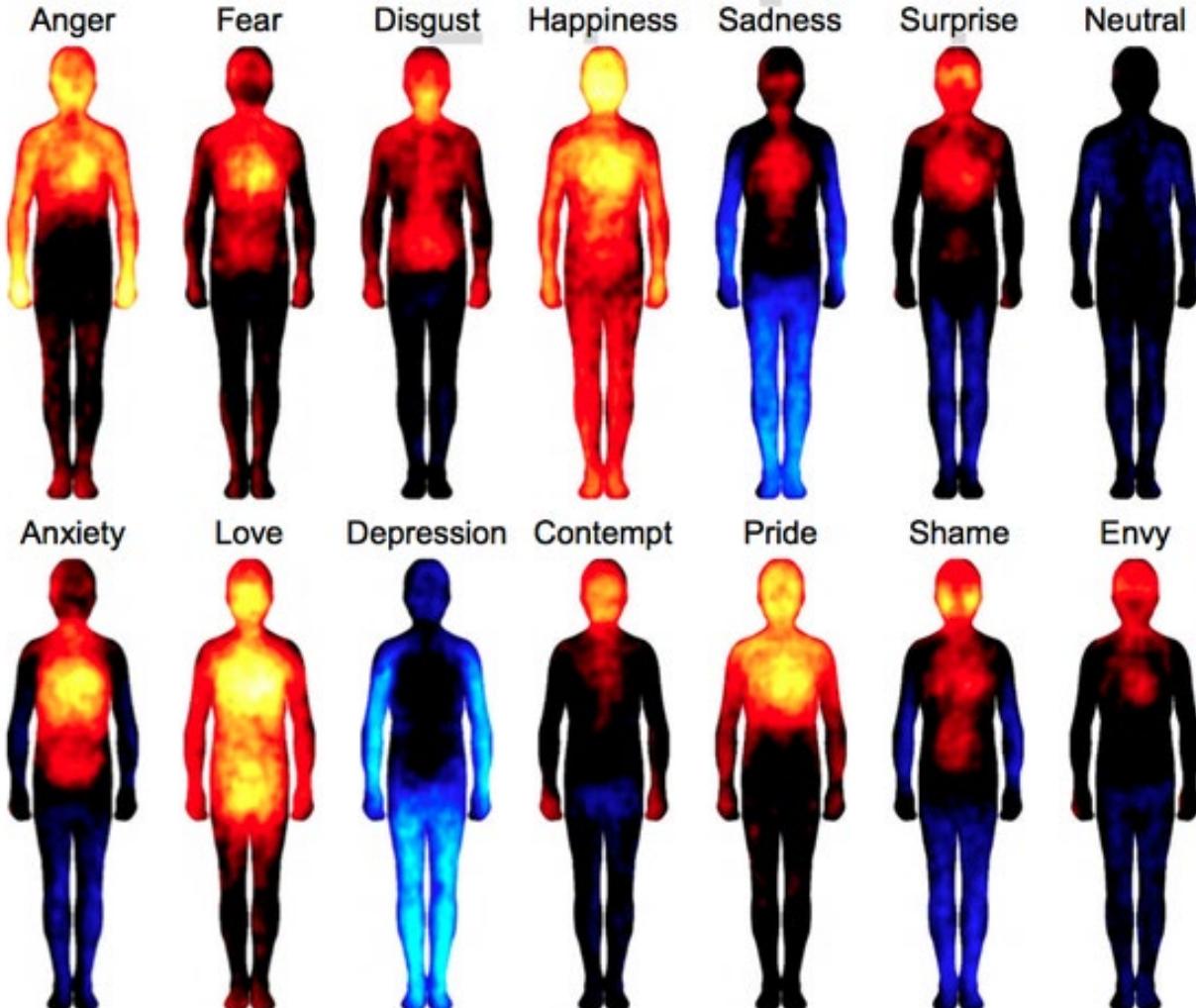
SADNESS



SURPRISE



# Emotions are embodied



## Bodily maps of emotions

Lauri Nummenmaa , Enrico Glerean, Riitta Hari , and Jari K. Hietanen [Authors Info & Affiliations](#)

Contributed by Riitta Hari, November 27, 2013 (sent for review June 11, 2013)

December 30, 2013 | 111 (2) 646-651 | <https://doi.org/10.1073/pnas.1321664111>

↗ 2,487,209 | 313



### Significance

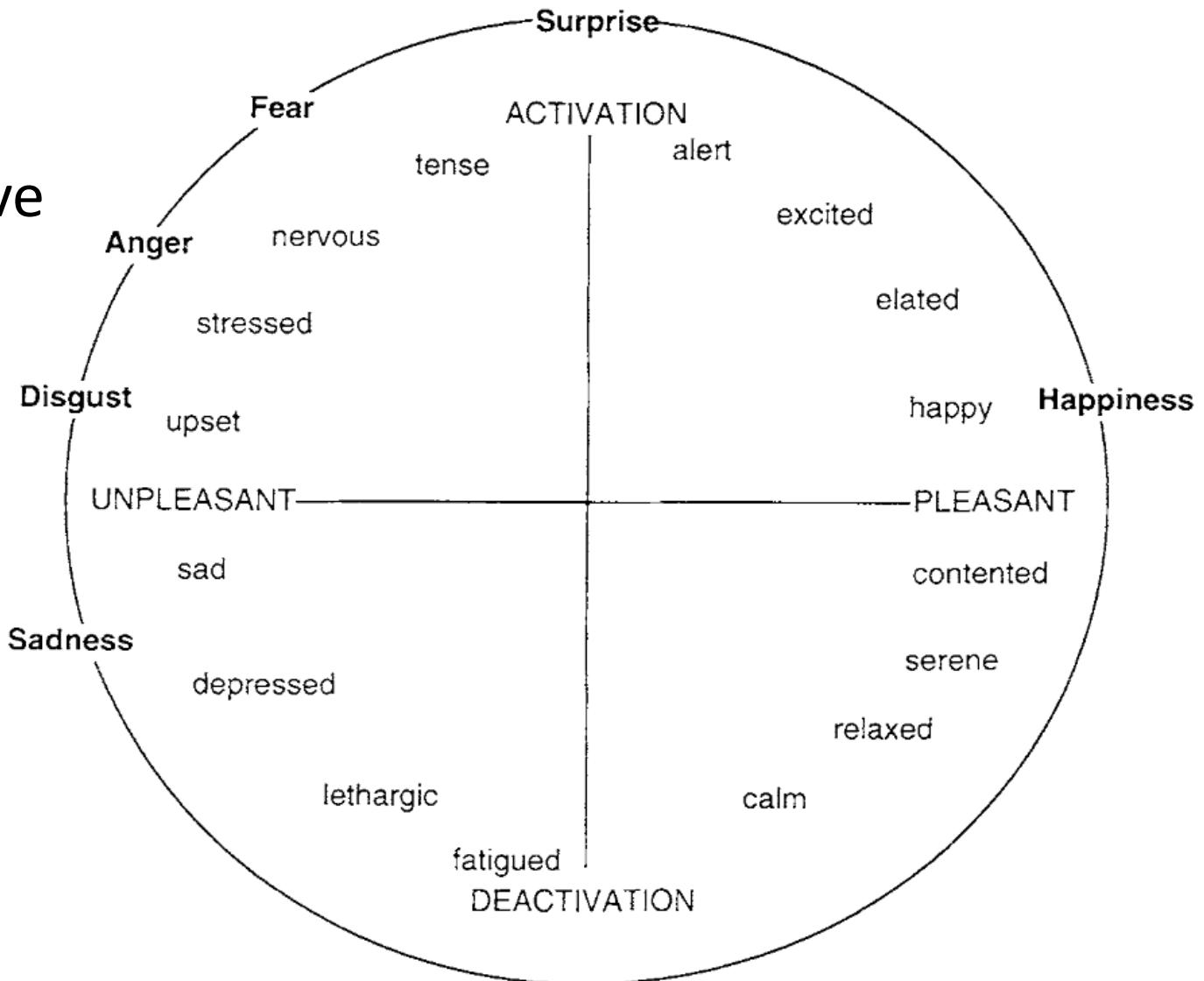
Emotions coordinate our behavior and physiological states during survival-salient events and pleasurable interactions. Even though we are often consciously aware of our current emotional state, such as anger or happiness, the mechanisms giving rise to these subjective sensations have remained unresolved. Here we used a topographical self-report tool to reveal that different emotional states are associated with topographically distinct and culturally universal bodily sensations; these sensations could underlie our conscious emotional experiences. Monitoring the topography of emotion-triggered bodily sensations brings forth a unique tool for emotion research and could even provide a biomarker for emotional disorders.

### Abstract

Emotions are often felt in the body, and somatosensory feedback has been proposed to trigger conscious emotional experiences. Here we reveal maps of bodily sensations associated with different emotions using a unique topographical self-report method. In five experiments, participants ( $n = 701$ ) were shown two silhouettes of bodies alongside emotional words, stories, movies, or facial expressions. They were asked to color the bodily regions whose activity they felt increasing or decreasing while viewing each stimulus. Different emotions were consistently associated with statistically separable bodily sensation maps across experiments. These maps were concordant across West European and East Asian samples. Statistical classifiers distinguished emotion-specific activation maps accurately, confirming independence of topographies across emotions. We propose that emotions are represented in the somatosensory system as culturally universal categorical somatotopic maps. Perception of these emotion-triggered bodily changes may play a key role in generating consciously felt emotions.

# Dimensional emotion theory

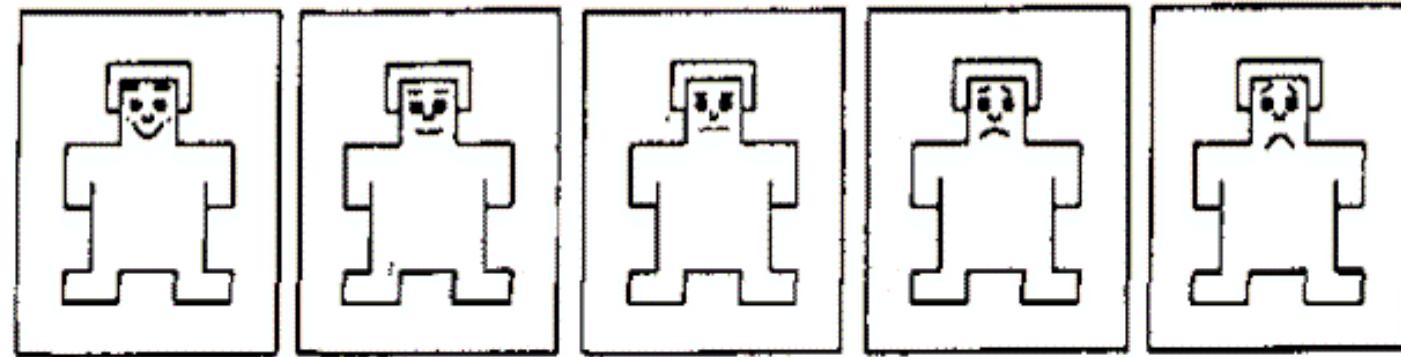
- Core affect: All emotions have dimensions of valence and arousal
- Valence axis: unpleasant – pleasant
- Arousal axis: deactivation - activation



**FIGURE 1**

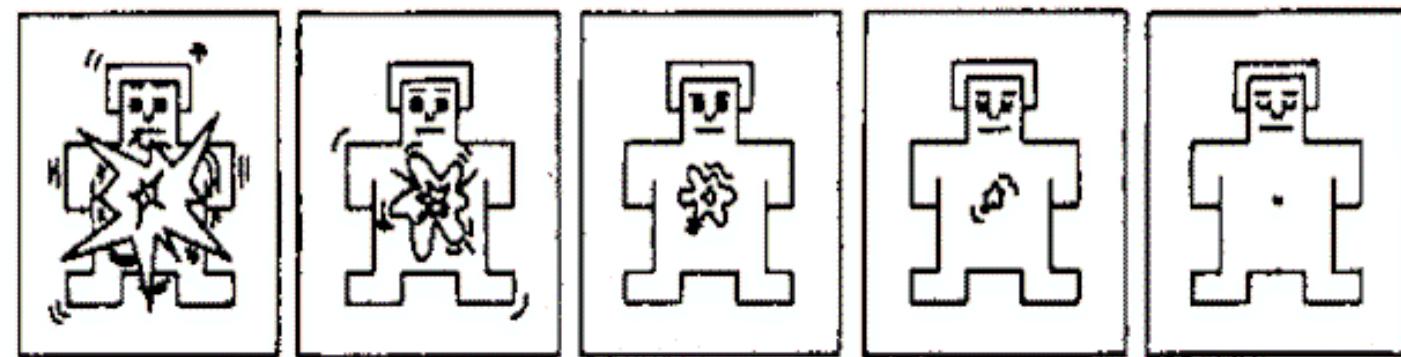
The Self-Assessment Manikin (SAM)

PLEASURE



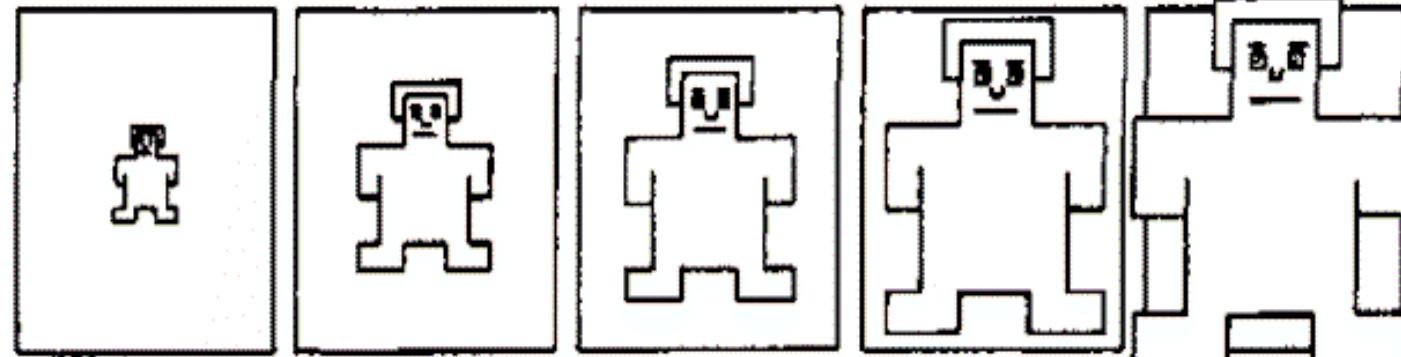
DISPLEASURE

HIGH AROUSAL



LOW AROUSAL

SUBMISSION



DOMINANCE

# Other theories

- Appraisal theory: Emotions are elicited by appraisals (evaluations) of aspects such as valence, arousal, approach vs. avoid, personal relevance
- Constructivist emotion theory: Emotions are not universal but instead social constructs, boundaries between basic emotions have cultural and individual differences



# Vocabulary (American Psychological Association)

- Affect: The experience of feeling or emotion
- Emotion: A complex reaction pattern, involving experiential, behavioral, and physiological elements, by which an individual attempts to deal with a personally significant matter or event.
- Feeling: A self-contained phenomenal experience. Feelings are subjective, evaluative, and independent of the sensations, thoughts, or images evoking them. They are inevitably evaluated as pleasant or unpleasant, but they can have more specific intrapsychic qualities, so that, for example, the affective tone of fear is experienced as different from that of anger.

# Modern emotion theory

# Human Affectome

- Emotion, feeling, mood, affect have all been used to describe aspects of the same, often in a confusing way
- 2022: Human Affectome, a research project and “consensus paper” by 173 scientists from 26 countries, aiming at a coherent definition

## The Human Affectome

Daniela Schiller, Alessandra N C Yu, Nelly Alia-Klein, Susanne Becker, Howard C Cromwell, Florin Dolcos, Paul J Eslinger, Paul Frewen, Andrew H Kemp, Edward F Pace-Schott, et al.

### ► To cite this version:

Daniela Schiller, Alessandra N C Yu, Nelly Alia-Klein, Susanne Becker, Howard C Cromwell, et al..  
The Human Affectome. 2022. hal-03728066

### Abstract

We present here a unifying framework for affective phenomena: the Human Affectome. By synthesizing a large body of literature, we have converged on definitions that disambiguate the commonly used terms—*affect*, *feeling*, *emotion*, and *mood*. Based on this definitional foundation, and under the premise that affective states reflect allostatic concerns, we take a goal-directed, enactive perspective. The human affectome is comprised of allostatic features (*valence*, *motivation*, and *arousal*) and allostatic concerns, which differ in the amount of action required to alleviate allostatic load. Allostatic concerns often fall into three ranges: physiological (the most immediate), operational (intermediate to distal), and global. Global concerns involve summations of overall trajectory, general wellbeing, and self-identity. Within this organizational scheme, the human affectome allows vastly different scientific interests to reside within the same theoretical framework and relate to each other. We hope this framework serves as a common focal point for affective research.

**Key Words:** Feeling; Emotion; Mood; Affect; Valence; Motivation; Arousal; Allostasis; Physiology



1. **Affect** reflects metrics of allostasis, including valence, motivation, and arousal, that indicate actionable deviations from an organismic comfort zone.
2. All **feelings** are affective in that they are allostatic mechanisms. Thus, emotion and mood are feelings, in the sense that they are subjective, first-person, conscious experiences, each denoting a certain class of affective experiences.
3. **Emotion** is a subset of feeling, or affective experience. Emotion is typically an evaluation of a particular object in relation to specific actions concerning the allostatic comfort zone—where allostatic implication is learned and, thus, varies across experiences, people, and groups. This subset tends to exclude physiological feelings.
4. **Mood**, also a subset of feeling, is more temporally extended compared to emotion, and it is not directed at a particular event or trigger. Rather, it is the cumulative momentum of momentary judgments, resulting in an extended affective experience.



# Vocabulary

- **Allostasis:** Regulatory error-anticipating process that meets predicted needs of an organism

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- **Affect:** The “core” of emotions/feelings/mood, characterized by allostatic features: valence, motivation, and arousal

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- **Allostasis:** Regulatory error-anticipating process that meets predicted needs of an organism
- **Affect:** The “core” of emotions/feelings/mood, characterized by allostatic features: valence, motivation, and arousal
  - Valence: pleasure vs. displeasure (e.g., better-than-expected or worse-than-expected rewards)
  - Motivation: avoid vs. approach (e.g., attraction vs. repulsion)
  - Arousal: degree of high alert and readiness for action

# Vocabulary

- **Allostasis:** Regulatory error-anticipating process that meets predicted needs of an organism
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- **Feeling:** conscious experience of affect



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NOTE: There are hundreds of feeling words and not everyone uses the same label for the same affective experience

# Vocabulary

- **Allostasis:** Regulatory error-anticipating process that meets predicted needs of an organism
- **Affect:** The “core” of emotions/feelings/mood, characterized by allostatic features: valence, motivation, and arousal
- **Feeling:** conscious experience of affect
- **Emotion:** subset of feeling, typically relating to operational allostatic concern(s)



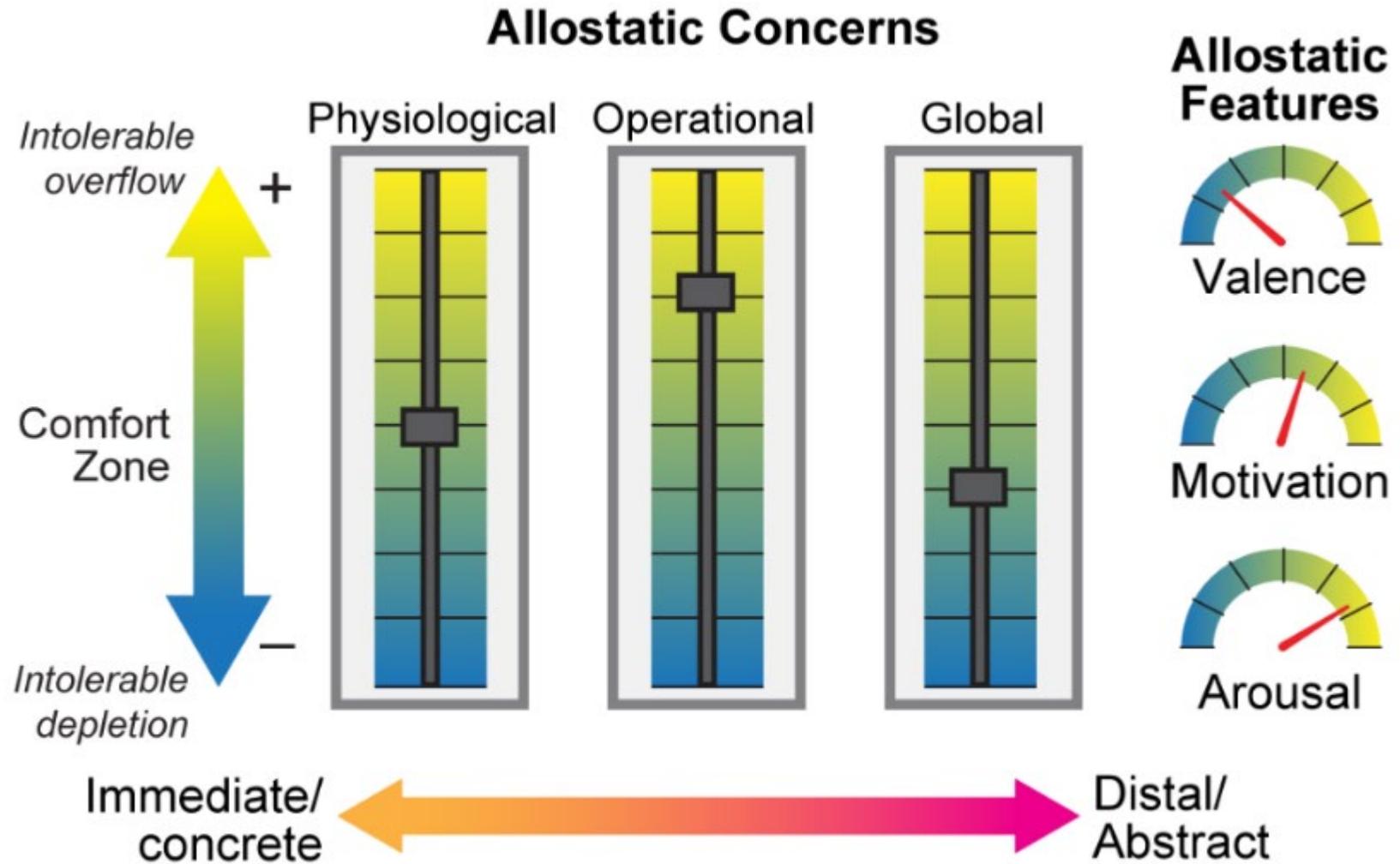
# Allostatic concerns

- Physiological (food, pain/physical integrity...)  
Feelings: full, hungry, starving, rejuvenated, nauseous...
  - Operational (safety, information, social connection...)  
Feelings: fear, anger, curiosity, belonging...
  - Global (autonomy, self-esteem, self-actualization, identity...)  
Feeling smart, accomplished, humble, respected, young/old...
- Feelings relating to operational concerns are what we typically call emotions.

# Vocabulary

- **Allostasis:** Regulatory error-anticipating process that meets predicted needs of an organism
- **Affect:** The “core” of emotions/feelings/mood, characterized by allostatic features: valence, motivation, and arousal
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- **Mood:** subset of feeling, temporally extended & not directed at a particular event/object/trigger.

# Conceptual model of the human affectome



# Want to know more?

- Read the affectome paper

## **Putting it all together: An Integrative Model of the Human Affectome**

Several principles arise from this synthesis:

1. Each affective state has the features of valence, motivation, and arousal, which in themselves may be experienced as a feeling.
2. Affective states are anchored to allostasis and reflect allostatic concerns.
3. Allostatic concerns vary from immediate to distal, or concrete to abstract. The immediacy or concreteness is measured by distance to allostatic impact: how many actions, or causal steps, are required to achieve organismic balance.
4. Immediate concerns relate to one's physiological and bodily needs.
5. Intermediate to distal concerns relate to the organism's operations in the environment, or one's interactions with concrete or abstract objects including social others. These operational concerns are what we typically regard as emotions.
6. Global concerns do not pertain to specific objects, but rather to the organism's overall trajectory (i.e., mood), optimization (i.e., general wellbeing), and identity (i.e., self-referential feelings).

# Computational rationality and emotion

- Is there a reward function formulation that would explain the role of emotions in behavior?
  - Would be super useful for emotional NPC:s and emotional playtesting AI
- Human Affectome: All affective experiences relate to allostasis
  - Positive rewards for actions that address allostatic concerns
- What about the earlier need-based reward definition?

# Psychological needs vs. allostatic concerns?

- Physiological (food, pain/physical integrity...)  
Feelings: full, hungry, starving, rejuvenated, nauseous...
- Operational (safety, information, social connection...)  
Feelings: fear, anger, curiosity, belonging...
- Global (autonomy, self-esteem, self-actualization, identity...)  
Feeling smart, capable, accomplished, humble, respected, young/old..

Feelings relating to operational concerns are what we typically call emotions.

basic psychological needs ≈ (a subset of) operational and global concerns

# Computational rationality and emotion

- Is there a reward function formulation that would explain the role of emotions in behavior?
  - Would be super useful for emotional NPC:s and emotional playtesting AI
- Human Affectome: All affective experiences relate to allostasis  
    ⇒ Rewards for actions that address allostatic concerns
- What about the earlier need-based intrinsic reward definition?
- **Unifying intrinsic motivation and emotion: Rewards based on both operational and global allostatic concerns.**

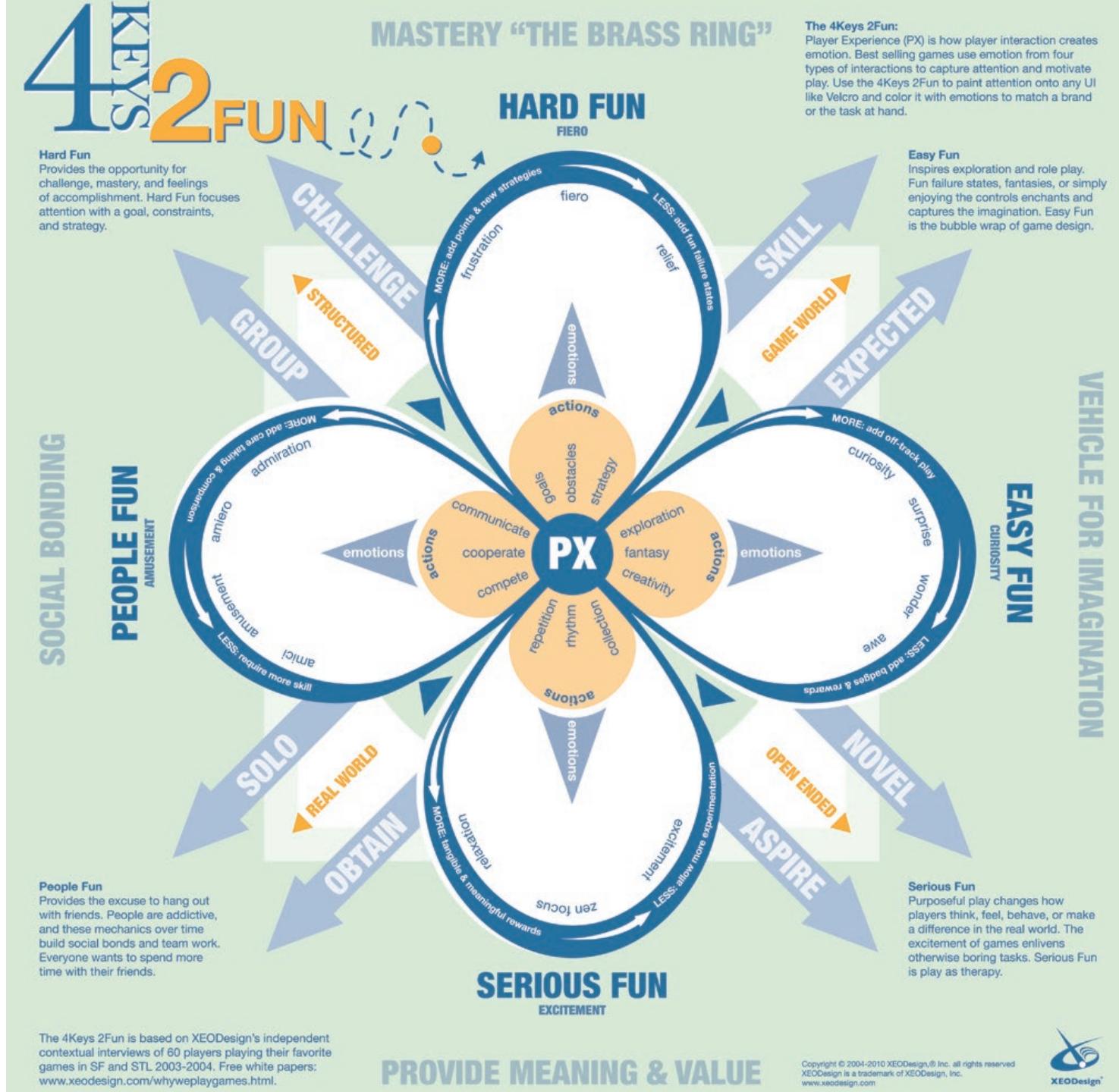
# Emotions and game design

- Types of fun
- Beyond fun: Negative emotion but positive experience
- How to convey emotion in games
- Emotional challenge
- Exercises

# Lazzaro's keys to fun

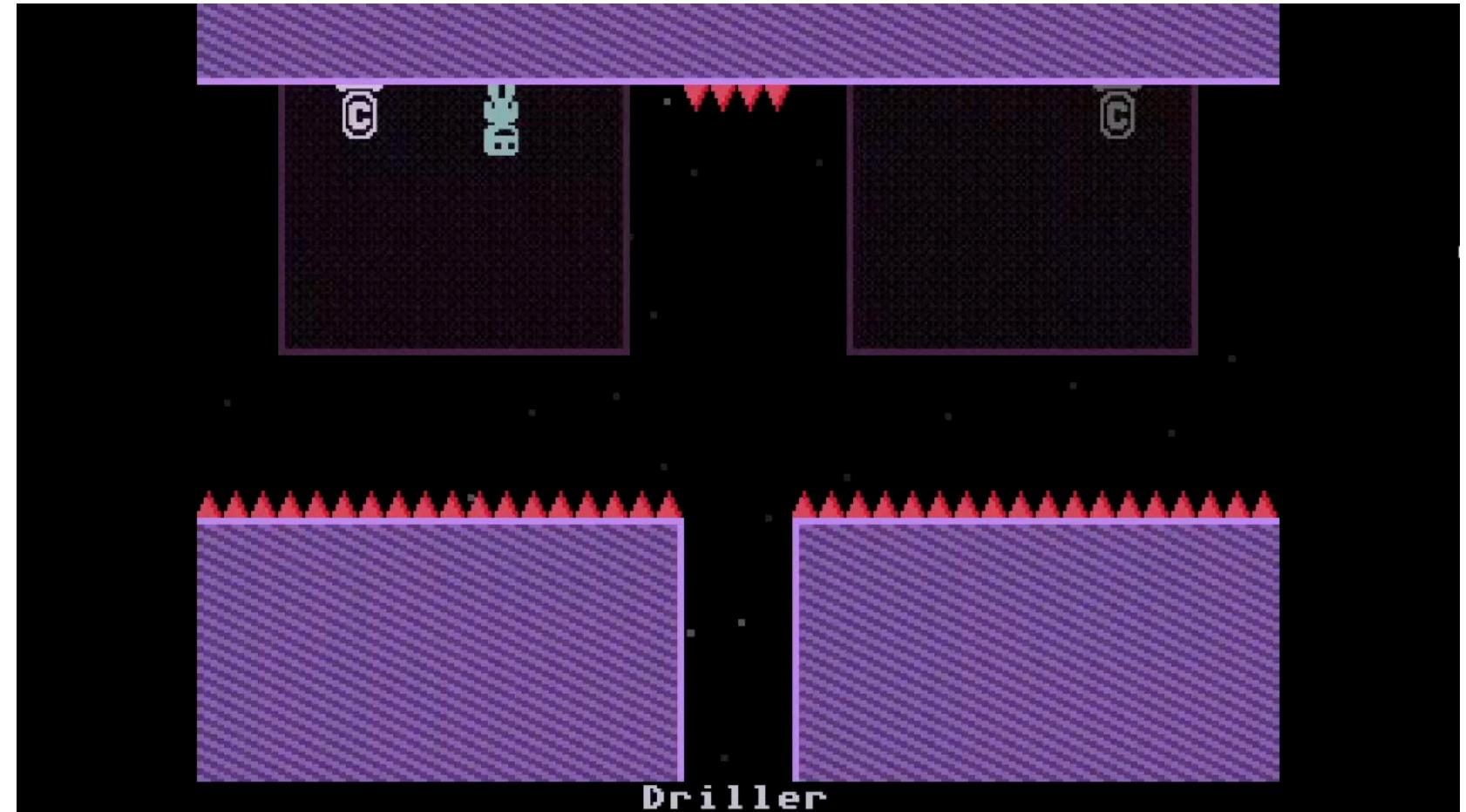
For a game to be fun, at least 3 of the 4 keys must exist in the game experience

- Hard fun
  - Easy fun
  - Serious fun
  - People fun



# Hard Fun

- Emotions:  
Fiero
- Game: goals,  
obstacles,  
strategy



# Easy Fun

- Emotions:  
Curiosity,  
surprise,  
awe,  
wonder
- Game:  
exploration,  
fantasy,  
creativity



# People Fun

- Amusement,  
admiration,  
friendship
- Game:  
communicate,  
cooperate,  
compete



# “Serious” Fun

- Emotions:  
Learning,  
Relaxation
- Game:  
repetition,  
rhythm,  
collection



# Beyond fun?

- For a long time, games were focused and considered as mere "fun"
- Modern games: Similarly emotionally rich experiences as movies and books
- Games vs other media: Unique 1st person experiences of emotions such as regret, pride, guilt



## CAN A COMPUTER MAKE YOU CRY?

■ Right now, no one knows. This is partly because many would consider the very idea frivolous. But it's also because whoever successfully answers this question must first have answered several others.

● Why do we cry? Why do we laugh, or love, or smile? What are the touchstones of our emotions?

▲ Until now, the people who asked such questions tended not to be the same people who ran software companies. Instead, they were writers, filmmakers, painters, musicians. They were, in the traditional sense, artists.

■ We're about to change that tradition. The name of our company is Electronic Arts.

### SOFTWARE WORTHY OF THE MINDS THAT USE IT.

We are a new association of electronic artists united by a common goal — to fulfill the enormous potential of the personal computer.

● In the short term, this means transcending its present use as a facilitator of unimaginative tasks and a medium for blasting aliens. In the long term, however, we can expect a great deal more.

▲ These are wondrous machines we have created, and in them can be seen a bit of their makers. It is as if we had invested them with the image of our minds. And through them, we are learning more and more about ourselves.

■ We learn, for instance, that we are more entertained by the involvement of our imaginations than by passive viewing and listening. We learn that we are better taught by experience than by memorization. And we learn that the traditional

distinctions — the ones that are made between art and entertainment and education — don't always apply.

**TOWARD A LANGUAGE OF DREAMS.** In short, we are finding that the computer can be more than just a processor of data.

● It is a communications medium: an interactive tool that can bring people's thoughts and feelings closer together, perhaps closer than ever before. And while fifty years from now, its creation may seem no more important than the advent of motion pictures or television, there is a chance it will mean something more.

▲ Something along the lines of a universal language of ideas and emotions. Something like a smile.

■ The first publications of Electronic Arts are now available. We suspect you'll be hearing a lot about them. Some of them are games like you've never seen before, that get more out of your computer than other games ever have. Others are harder to categorize — and we like that.

**WATCH US.** We're providing a special environment for talented, independent software artists. It's a supportive environment, in which big ideas are given room to grow. And some of America's most respected software artists are beginning to take notice.

● We think our current work reflects this very special commitment. And though we are few in number today and apart from the mainstream of the mass software marketplace, we are confident that both time and vision are on our side.

▲ Join us. We see farther. ELECTRONIC ARTS™





**“THE REAL INDICATOR  
[OF GAMES BEING ART]  
WILL BE WHEN  
SOMEBODY  
CONFESSES THAT THEY  
CRIED AT LEVEL 17”**

**STEVEN SPIELBERG (2004)**



# Emotional gratification in entertainment experience

- Experiencing emotions can be rewarding as such
  - Pleasure, excitement, sentimentality
- Emotions can contribute to the gratification of psychological needs
  - Painful and unpleasant feelings may stimulate social discussion and connectedness, or self-reflection and insight

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ISSN: 1521-3269 print/1532-785X online  
DOI: 10.1080/15213269.2012.693811

 Routledge  
Taylor & Francis Group

## **Emotional Gratification in Entertainment Experience. Why Viewers of Movies and Television Series Find it Rewarding to Experience Emotions**

ANNE BARTSCH

*Department of Media and Educational Technology, University of Augsburg,  
Augsburg, Germany*

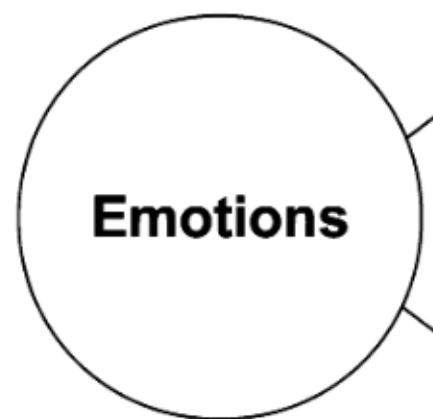
*This article presents four studies designed to assess different types of gratifications that can be associated with the experience of emotions in movie and television audiences. Exploratory and confirmatory factor analyses of a pool of statements derived from qualitative interviews revealed three factors that reflect rewarding feelings: 1) fun, 2) thrill, and 3) empathic sadness, and four factors that reflect the role of emotional media experiences within the broader context of individuals' social and cognitive needs: 4) contemplative emotional experiences, 5) emotional engagement with characters, 6) social sharing of emotions, and 7) vicarious release of emotions. Validation analyses showed that the scales developed to assess these factors are predicted by the experience of emotions and meta-emotions and served in turn to predict different aspects of positive content evaluation. Results are discussed with regard to theoretical issues including entertainment audiences' voluntary exposure to unpleasant feelings, and the role of entertainment in psychosocial need satisfaction and eudaimonic wellbeing.*

Emotions are often assumed to be the heart of media entertainment, be it in the form of movies, novels, television programs, music videos, or computer

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The author wishes to thank Reinhold Viehoff, Roland Mangold, and Peter Vorderer for their generous support and advice concerning the present research. She also extends her appreciation to the German Research Foundation for providing financial support. This work was supported by the German Research Foundation [grant number Vi 95/17].

Address correspondence to Anne Bartsch, Department of Media and Educational Technology, University of Augsburg, Universitätsstraße 10, 86159 Augsburg, Germany. E-mail: anne.bartsch@phil.uni-augsburg.de



## Intrinsically Gratifying Aspects of Entertainment Experience

### Rewarding Feelings

- positive affect
- arousal
- empathic sadness

### Psychosocial Functions

- relationship functions
- character engagement
- (self-)reflection

## Contribution of Entertainment to Personal Well-Being

Short term:  
Affect regulation

Long term:  
Sense of meaning and social connectedness

# Gratifications tested (“It was good to experience these feelings...”)

- Contemplative experiences (“*because it inspires new insights*”)
- Fun (“*because it makes me laugh*”)
- Thrill (“*because I like the tension associated with it*”)
- Character engagement (“*because I like to live through and share the characters’ experiences*”)
- Vicarious release of emotions (“*because it allows me to experience emotions that I avoid in real life*”)
- Emphatic sadness (“*because I like being moved to tears*”)
- Social sharing of emotions (“*because it encourages me to discuss issues with others*”)



# Full details in the paper

It was good to experience these feelings ...	EFA							CFA
	F1	F2	F3	F4	F5	F6	F7	
<i>F1: Contemplative experiences</i>								
... because it encourages me to focus on things that are important to me.	.72	.12	.20	.19	.15	.12	.06	.72
... because it inspires me to think about meaningful issues.	.72	.08	.09	.02	.21	.07	.27	.71
... because it inspires new insights.	.72	-.10	.05	.12	.11	.08	.10	.57
... because it makes me think about myself.	.61	.09	.04	.18	.23	.31	.06	.68
<i>F2: Fun</i>								
... because it makes me laugh.	-.03	.82	-.21	.05	-.04	.06	.12	.90
... because it puts me in a good mood.	.03	.78	.10	.02	.13	-.02	.03	.61
... because it amuses me.	-.05	.77	-.08	-.02	-.04	-.08	.11	.70
... because it is funny.	.21	.56	-.09	.04	-.12	-.12	-.08	.55
<i>F3: Thrill</i>								
... because I like the adrenaline I get from it.	.07	-.08	.82	.15	.18	.13	.08	.83
... because I enjoy the thrill of it.	.14	-.18	.80	.14	.10	.08	.11	.78
... because I enjoy the excitement of it.	.06	.05	.74	.16	.13	.26	.20	.76
... because I like the tension associated with it.	.07	-.10	.71	.16	.18	.24	.07	.74
<i>F4: Character engagement</i>								
... because I like to feel with characters.	.10	.03	.19	.80	.12	.26	.12	.87
... because I like to slip into the role of characters.	.07	-.06	.23	.78	.19	.06	.12	.79

# Gratifications as quality predictors

- Artistic value & lasting impression: contemplative experiences, character engagement, social sharing
- Good movie: all gratifications, especially fun, contemplative experiences, and character engagement

**TABLE 3** Studies 2 and 3: Hierarchical Regression Analyses of Emotional Gratification Ratings as Predictors of Different Aspects of Movie Evaluation, Controlling for Rating Task, Film Genre, Age, Gender, and Education

	Good movie	Entertaining	Artistic value	Lasting impression
Fun				
Beta	.28***	.48***	.10	.08
R <sup>2</sup> change	.05	.15	.01	.00
F change	31.69***	99.72***	3.61	2.18
Thrill				
Beta	.18***	.15***	.07	.17***
R <sup>2</sup> change	.03	.02	.00	.03
F change	17.37***	12.33***	2.99	14.98***
Empathic sadness				
Beta	.12**	.04	.05	.04
R <sup>2</sup> change	.01	.00	.00	.00
F change	7.53**	.80	1.19	1.04
Contemplative				
Beta	.29***	.04	.27***	.27***
R <sup>2</sup> change	.07	.00	.06	.06
F change	45.90***	.84	39.73***	39.67***
Character engagement				
Beta	.27***	.21***	.25***	.23***
R <sup>2</sup> change	.07	.04	.06	.05
F change	42.24***	25.92***	38.81***	31.98***
Social sharing				
Beta	.14**	.04	.15***	.14***
R <sup>2</sup> change	.02	.00	.02	.02
F change	10.70**	.74	12.80***	11.64**
Vicarious release				
Beta	.10*	.05	.04	.11**
R <sup>2</sup> change	.01	.00	.00	.01
F change	5.97*	1.59	0.92	6.69**

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Note. Scores are standardized regression weights at entry into the model. Each emotional gratification scale was entered in the last step of a separate regression equation to predict the movie evaluation variables, controlling for rating task, film genre, age, gender, and education.

# Hedonic vs. eudaimonic

- Hedonic enjoyment: mostly derived from positive emotions
- Eudaimonic appreciation: moving or thought-provoking experiences, search for deeper insight, meaning, and purpose in life.

ORIGINAL ARTICLE

## **Entertainment as Pleasurable and Meaningful: Identifying Hedonic and Eudaimonic Motivations for Entertainment Consumption**

Mary Beth Oliver<sup>1</sup> & Arthur A. Raney<sup>2</sup>

<sup>1</sup> Department of Film/Video & Media Studies, Penn State University, University Park, PA 16802, USA

<sup>2</sup> School of Communication, Florida State University, Tallahassee, FL 32306-2664, USA

*The purpose of this research is to broaden the conceptualization of entertainment selection to identify not only pleasure-seeking (hedonic concerns) as a motivator, but to also recognize that individuals may choose media as a means of “truth-seeking” (eudaimonic concerns). This article conceptualized and developed measures to illustrate that entertainment can be used as a means of experiencing not only enjoyment, but also as a means of grappling with questions such as life’s purpose and human meaningfulness. Four studies were conducted in the development of these measures, providing evidence for their validity in terms of entertainment preference and individual differences, and illustrating how these motivations predict preferences for entertainment that elicits unique affective experiences.*

doi:10.1111/j.1460-2466.2011.01585.x

Media scholars agree that viewers are motivated to consume entertainment for a variety of reasons. For example, research from a uses-and-gratifications perspective over the past 35 years has sought to delineate (via self-report) a variety of viewing motivations, including surveillance/information, personal relationships/social interaction and integration, personal identity, and diversion/escapism/entertainment (for overviews, see Rubin, 2008; Ruggiero, 2000). Acknowledging that motivations for entertainment consumption are recognized to be diverse, we also note that the ultimate “goal” or pursued “outcome” of entertainment has generally assumed to be that of enjoyment, and has therefore formed the basis of a great deal of theorizing in media psychology (Vorderer, Klimmt, & Ritterfeld, 2004). Such a focus undoubtedly not only has great intuitive appeal, but also empirical and anecdotal support as well, as farcical comedies, thrilling action movies, and romantic love stories likely form the vast majority of entertainment offerings. At the same time, however, there exist



## ORIGINAL ARTICLE

# Appreciation as Audience Response: Exploring Entertainment Gratifications Beyond Hedonism

Mary Beth Oliver<sup>1</sup> & Anne Bartsch<sup>2</sup>

1 Department of Film/Video & Media Studies, Penn State University, University Park, PA 16801, USA

2 Department of Media and Communication Studies, Martin Luther University Halle, 06108 Halle, Germany

*This article elaborates upon the notion of media enjoyment in the context of film viewing by proposing a complementary type of gratification that we conceptualize as appreciation. Three studies were conducted to tap into the multidimensionality of viewers' entertainment gratifications with a special focus on the domain of more serious, poignant, and pensive media experiences typically associated with genres such as drama, history, documentary, or art films. These studies provide evidence of and measurement for gratifications related to fun and suspense, but also gratifications related to moving and thought-provoking entertainment experiences, with all three gratifications leading to perceptions of entertainment having a more long-lasting or enduring effect. The results are discussed with regard to the theoretical conceptualization of entertainment gratification.*

doi:10.1111/j.1468-2958.2009.01368.x

What about games?

# Ways to convey and/or elicit emotion in games

- Visuals, sound, and music: audiovisual aesthetic emotions such as awe and wonder, overall valence & arousal
- Story, characters: complex social emotions
- Mechanics and dynamics: Interacting with the above, also enabling emotional challenge, regret and guilt over one's actions...



Similar to movies



Beyond movies



# Music, emotion & motivation

Outside games, music is known to boost physical exercise intensity and positive valence

Surprisingly little research on games, but it's clear that music matters and has an effect on player experience

## Music in the exercise domain: a review and synthesis (Part I)

Costas I. Karageorghis\* and David-Lee Priest

School of Sport and Education, Brunel University, London, UK

(Received 8 June 2011; final version received 6 October 2011)

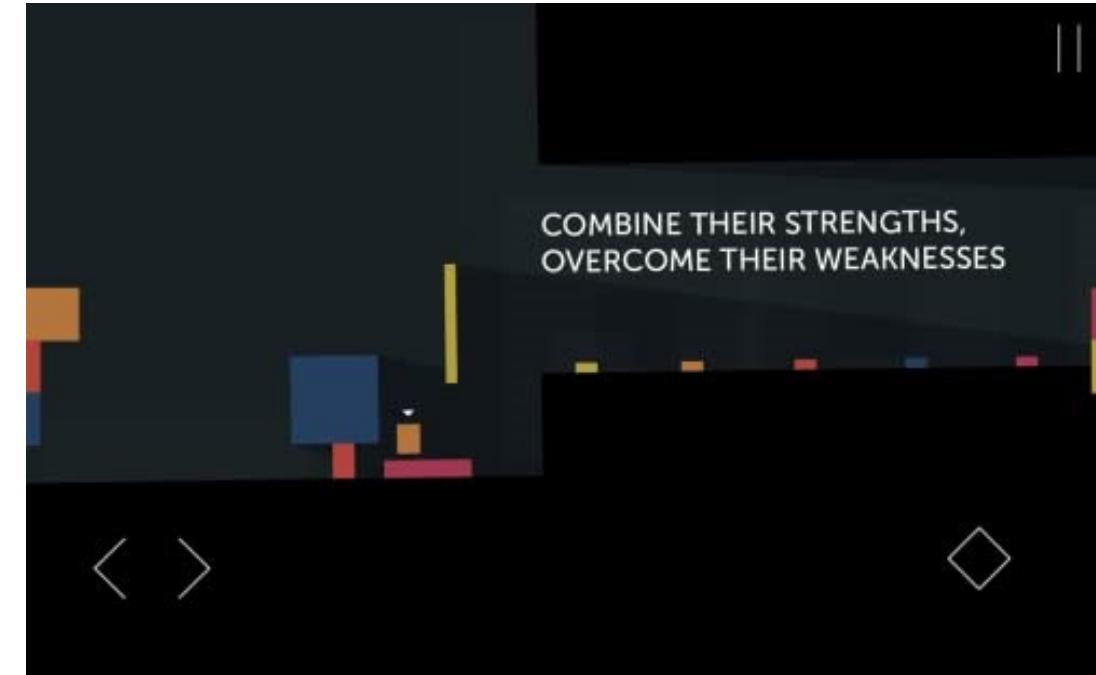
Since a 1997 review by Karageorghis and Terry, which highlighted the state of knowledge and methodological weaknesses, the number of studies investigating musical reactivity in relation to exercise has swelled considerably. In this two-part review paper, the development of conceptual approaches and mechanisms underlying the effects of music are explicated (Part I), followed by a critical review and synthesis of empirical work (spread over Parts I and II). Pre-task music has been shown to optimise arousal, facilitate task-relevant imagery and improve performance in simple motoric tasks. During repetitive, endurance-type activities, self-selected, motivational and stimulative music has been shown to enhance affect, reduce ratings of perceived exertion, improve energy efficiency and lead to increased work output. There is evidence to suggest that carefully selected music can promote ergogenic and psychological benefits during high-intensity exercise, although it appears to be ineffective in reducing perceptions of exertion beyond the anaerobic threshold. The effects of music appear to be at their most potent when it is used to accompany self-paced exercise or in externally valid conditions. When selected according to its motivational qualities, the positive impact of music on both psychological state and performance is magnified. Guidelines are provided for future research and exercise practitioners.

**Keywords:** pre-task music; asynchronous music; synchronous music; post-task music

The authors have spent the last two decades systematically investigating the effects of music in exercise, sport and other physical activity contexts (e.g., physiotherapy rehabilitation). The proposed benefits of music in such contexts have intrigued researchers for over 40 years. The purpose of this two-part article is to review and synthesise the extant literature with a primary focus on exercise-related activities; Daniel Bishop produced a comprehensive review of the sport-related literature recently in the *Sport and Exercise Psychology Review* (2010). The authors will critically evaluate some of the assumptions and methods that have underpinned the work they have conducted with their principal collaborators (Bishop, Jones, Lane, Lim and Terry) and appraise the exercise-related studies since the 1997 review of Karageorghis and Terry. The present review will aim to identify important trends, provide recommendations for future research endeavours and spawn firm evidence-based principles for exercise practitioners.

# Combining abstraction and emotion

- Facial expressions are powerful in communicating emotion, but realistic in-game facial animation can be expensive
- Nuances of voice acting are also efficient, and cheaper than realistic in-game faces
- Thomas was alone: Abstract visuals + good voice acting and music



Screenshot: Thomas Was Alone



Thomas Was Alone Longplay [Full Playthrough, No Commentary, Original Audio]



Retro Game Hacks  
642 tilaajaa

<https://www.youtube.com/watch?v=uMYgmpO-aoY>

# Combining abstraction and emotion

Gone Home: 3d but no visible characters, excellent emotional voice acting and music

(applies to many other successful walking simulators)



# Combining abstraction and emotion

Journey: abstract characters,  
no voice acting. Why does it  
still work as an emotional  
experience?





Thought of You - by Ryan Woodward

<https://www.youtube.com/watch?v=OBk3ynRbtsw>



# Negative emotion, positive experience

- Players enjoy and appreciate experiencing negative emotions such as sadness
- Emotions evoked by aspects such as in-game loss, character attachment and (lack of) agency, and were often accompanied by (self-)reflection
- Personal life experience and memories modulate the emotional experience

## Negative Emotion, Positive Experience? Emotionally Moving Moments in Digital Games

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### ABSTRACT

Emotions are key to the player experience (PX) and interest in the potential of games to provide unique emotional, sometimes uncomfortable experiences is growing. Yet there has been little empirical investigation of what game experiences players consider emotionally moving, their causes and effects, and whether players find these experiences rewarding at all. We analyzed 121 players' accounts of emotionally moving game experiences in terms of the feelings and thoughts they evoked, different PX constructs, as well as game-related and personal factors contributing to these. We found that most players enjoyed and appreciated experiencing negatively valenced emotions, such as sadness. Emotions were evoked by a variety of interactive and non-interactive game aspects, such as in-game loss, character attachment and (lack of) agency, but also personal memories, and were often accompanied by (self-)reflection. Our findings highlight the potential of games to provide emotionally rewarding and thought-provoking experiences, as well as outline opportunities for future research and design of such experiences. They also showcase that negative affect may contribute to enjoyment, thereby extending our notion of positive player experience.

### Author Keywords

Emotion; Player Experience; Enjoyment; Appreciation.

### ACM Classification Keywords

J.4 Social and Behavioral Sciences: Sociology, Psychology;  
K.8.0 Personal Computing: Games

*Please note that this paper contains major spoilers for several games.*

### INTRODUCTION

People play games for the experience [20], and one of the aims of player experience (PX) research is to understand what constitutes and contributes to positive gaming experiences [23]. Emotions are commonly considered a key component of good PX [6, 20, 22, 30, 31]. Fun and enjoyment, in particular, are some of the most frequently explored constructs in player experience [6, 24]. Negative affective gaming experiences, however, are far less researched, because they are

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CHI'16, May 07-12, 2016, San Jose, CA, USA.  
© 2016 ACM ISBN 978-1-4503-3362-7/16/05...\$15.00.  
DOI: <http://dx.doi.org/10.1145/2858036.2858227>

seemingly at odds with the focus on fun [20], positive affect and enjoyment [24]. Unfortunately, this may suggest that all negative affective experiences cannot by definition be considered positive, and implies that it is not worthwhile to design for such experiences [23], thereby restricting the spectrum of possible emotional experiences in games [6, 23]. Yet other forms of media such as literature or film are often acclaimed for their ability to convey a wide spectrum of emotional experiences [2, 3], and it has been argued that negative affect may also contribute to engaging player experiences [6, 10, 25]. Moreover, recent research on serious games suggests that emotionally challenging game experiences have the potential to stimulate reflection, thereby raising awareness of real world issues [16] and facilitating prosocial behavior [32].

While research on negative experiences and negatively valenced emotions in digital games is growing (e.g., [11, 15, 35]), the focus often lies on individual games or game aspects. Moreover, while several studies on serious games and uncomfortable experiences imply that players might value such experiences [9, 16, 32], it remains unclear how this relates to core PX concepts, such as enjoyment or need satisfaction.

The present paper reports on a study, in which 121 players reported an emotionally moving experience with a digital game. Employing both psychometric scales and open-ended questions, we explored what emotions were evoked, why players felt this way, what game components contributed to this, and whether players considered these experiences as rewarding. The contribution of this study is threefold: First, we provide evidence of the emotional and personal impact of games, highlighting the potential of emotional game experiences to stimulate (self-)reflection. Second, we identify a variety of interactive and non-interactive game aspects, but also personal factors as a possible source of emotions in games, which may provide a starting point for future research and design of emotional game experiences. Third, we contribute to a better understanding of the interplay between (negative) emotions and (positive) experiences in games, thereby broadening our notion of positive PX.

### RELATED WORK

Emotions are oftentimes considered a core component of the media experience [2, 12, 33]. Consequently, a sizable amount of research has been conducted on the role of emotions for the entertainment experience, especially why many people seem to value media experiences evoking negatively valenced emotions, such as horror or drama movies. Oliver and Bartsch [26], for instance, introduced *appreciation* as a possible explanation for why people are drawn towards these genres. Ap-

# What predicts appreciation and enjoyment?

- Enjoyment predicted by both happy and sad affect
- Appreciation predicted by sad and meaningful affect

		Appreciation	Enjoyment
<b>Affect</b>	Happy	-.02	.51**
	Sad	.45**	.32**
<b>Needs</b>	Meaningful	.40**	.02
	Autonomy	.02	.25*
	Character Engagement	.09	.29*
	Competence	-.17	.22*
	Contemplativeness	.46**	-.04
	Experiencing Emotions	.29*	.21*
	Social Sharing	.05	.02
	Vicarious Release	.02	-.11

**Table 2.**  $\beta$  weights of affect and need measures for appreciation and enjoyment.\* Significant at  $p < .05$ . \*\* Significant at  $p < .01$ .

Can emotions be part of a game's challenge?



# “An Odd Kind of Pleasure”: Differentiating Emotional Challenge in Digital Games

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## ABSTRACT

Recent work introduced the notion of *emotional challenge* as a means to afford more unique and diverse gaming experiences. However, players’ experience of emotional challenge has received little empirical attention. It remains unclear whether players enjoy it and what exactly constitutes the challenge thereof. We surveyed 171 players about a challenging or an emotionally challenging experience, and analyzed their responses with regards to what made the experience challenging, their emotional response, and the relation to core player experience constructs. We found that emotional challenge manifested itself in different ways, by confronting players with difficult themes or decisions, as well as having them deal with intense emotions. In contrast to more ‘conventional’ challenge, emotional challenge evoked a wider range of negative emotions and was appreciated significantly more by players. Our findings showcase the appeal of uncomfortable gaming experiences, and extend current conceptualizations of challenge in games.

## Author Keywords

Emotional Challenge; Challenge; Emotion; Player Experience

that emotional challenge plays a crucial role for the entertainment experience of film viewers [3]. Similarly, the notion of emotional challenge holds great promise for a better understanding of the player experience (PX). First, several scholars have emphasized the importance of exploring and understanding diverse types of game experiences [43], specifically with regards to the emotional spectrum games may evoke [16, 29, 35]. Indeed, emotional challenge was suggested to afford a wider range of emotions, beyond the frustration-fiero cycle [26] typical of more ‘conventional’ challenge [9]. Second, it may contribute to a more nuanced understanding of challenge in games, which was argued to be insufficient in current player experience research [11]. Third, as emotional challenge typically involves players confronting difficult subject matters [9], it may inspire the design of games aimed at raising awareness about real-world issues [15, 29]. Similarly, previous research has discussed the potential of games for emotional learning [27, 40]. A clearer understanding of what constitutes emotional challenge may hence inform the design and evaluation of such games. Finally, studying emotional challenge in games may provide novel insights into the nature of uncomfortable yet worthwhile interactions [5, 8].



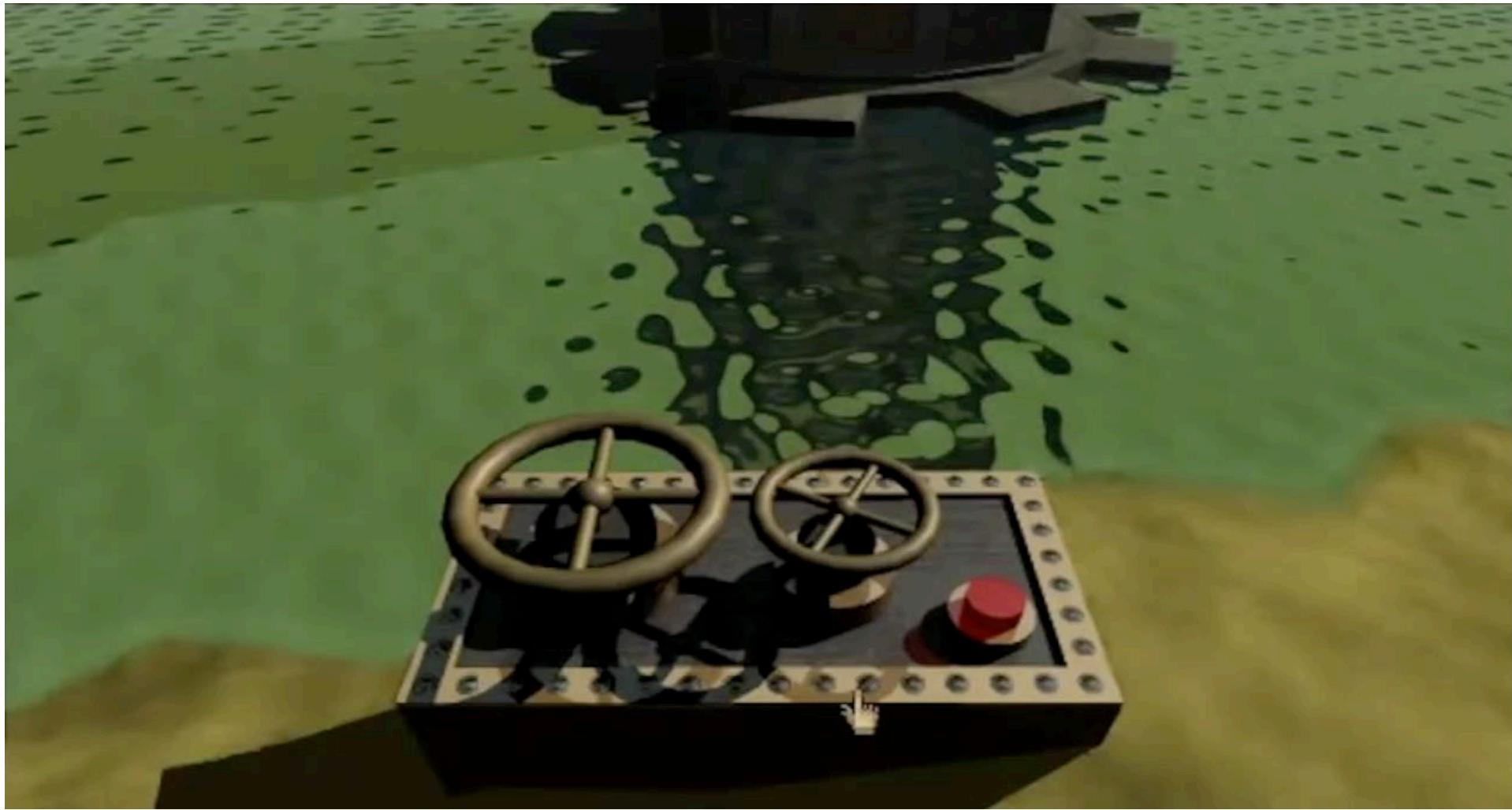
# Common types of challenge

- Perceptual-motor
- Cognitive
- Emotional

# Perceptual-motor challenge



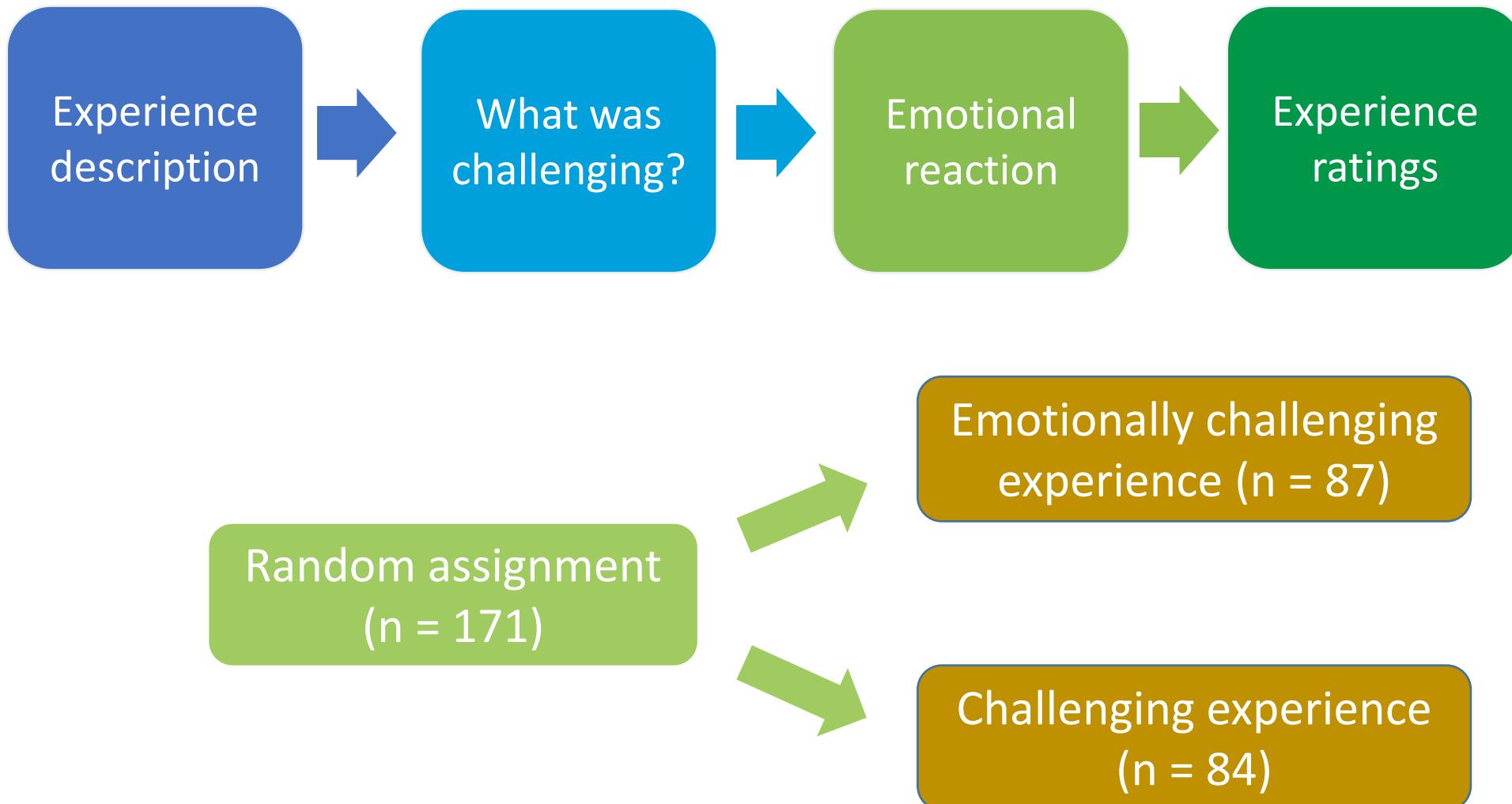
# Cognitive Challenge



# Emotional Challenge

- Confronting players with difficult themes by using strong characters and narratives
- Cannot be readily overcome by skill or dexterity
- Demand players to explore emotional and narrative ambiguities
- Difficult choices

# Study Procedure





*“Bring to mind  
an (emotionally)  
challenging  
experience  
you had with a  
digital game.”*

No. No, that's not.... No. No. NO. NO!

# Examples (both from The Witcher 3)

## Emotionally Challenging experience

- „(...) Then things go wrong, **you make the wrong choice.** You're not perfect. A woman, **the ex-wife to a Baron, is now dead.** (...) And the Baron who hired you to save his wife **has hung himself out of grief.** That is an emotionally challenging experience.“

## Challenging experience

- „*To kill the monster, I first had to travel through 3 different areas, which in itself provided challenges. There I had to collect different ingredients and swords to prepare myself, so I can beat the monster's weakness with my strength.*“

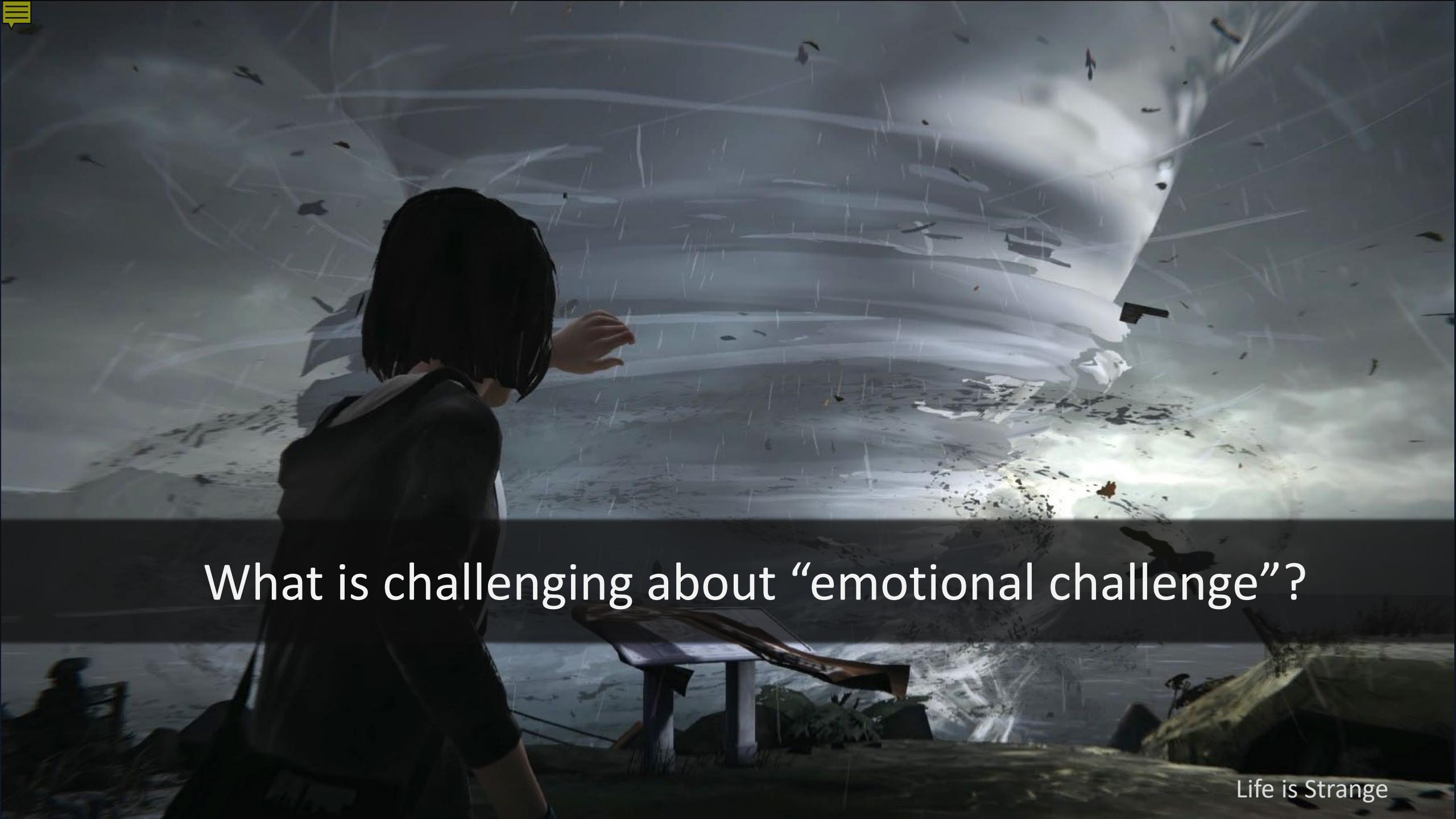
# Example (both from The Witcher 3)

Emotionally Challenging  
experience

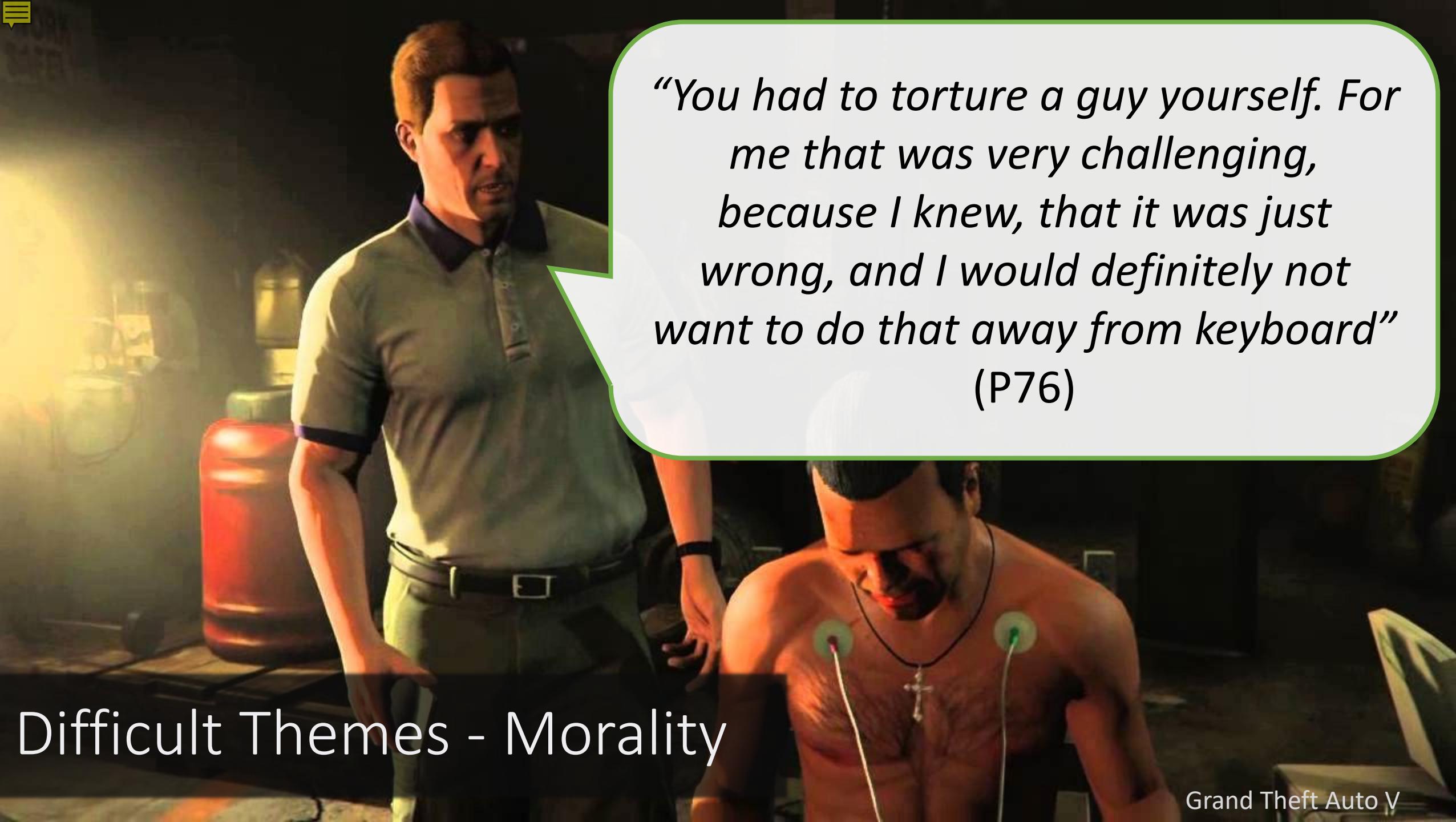
*„Very uncomfortable,  
actually went online to see  
if there was a way to  
avoid torturing the  
character.“*

Challenging experience

*„At first I felt hopelessness,  
because I simply couldn't even  
get close, as I got closer and  
closer I felt more frustrated than  
hopeless, because I started to  
believe I could do it, but I just  
kept messing up. Right after  
killing the boss I felt super  
relieved and happy.“*



What is challenging about “emotional challenge”?

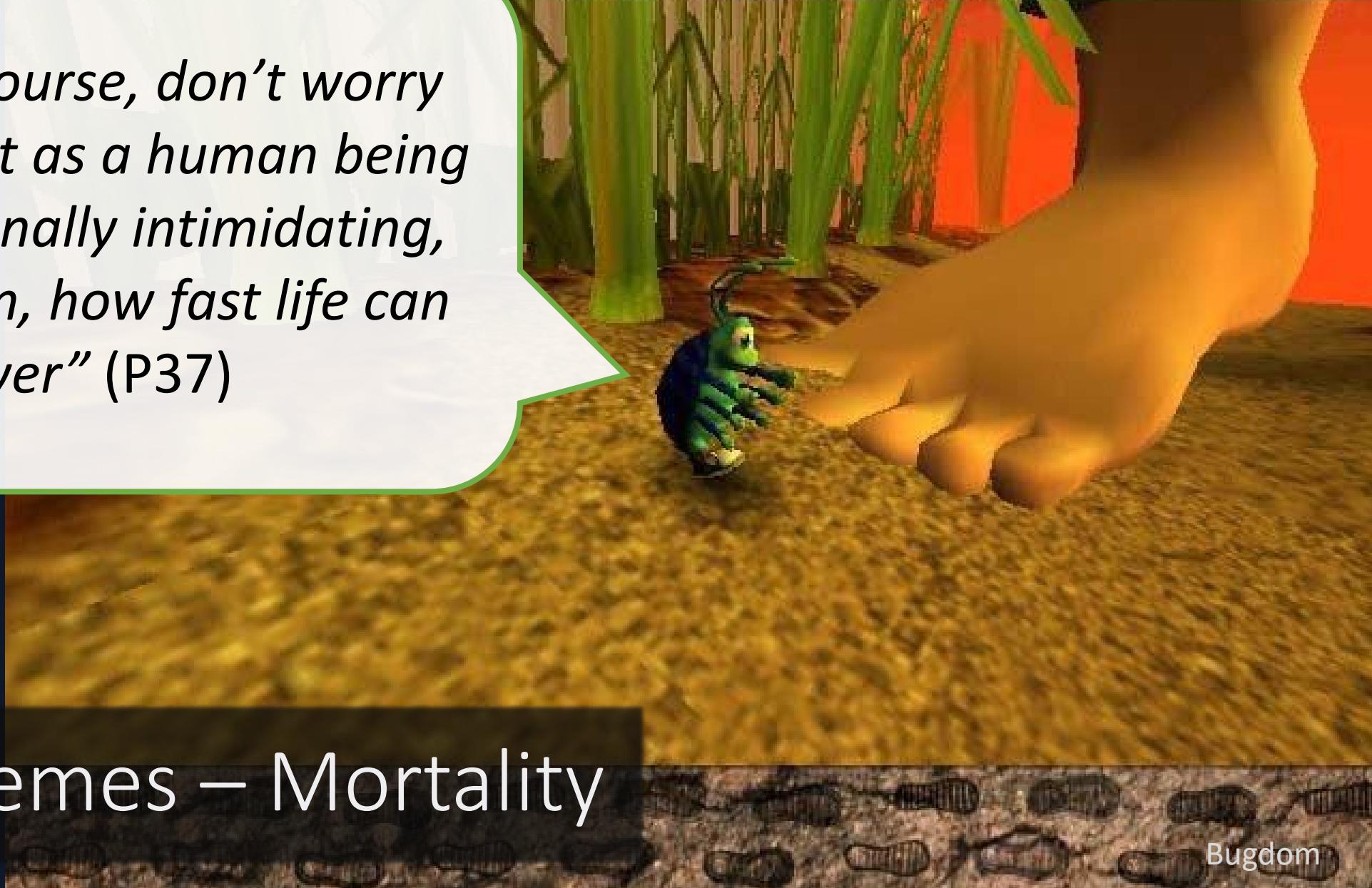


*“You had to torture a guy yourself. For me that was very challenging, because I knew, that it was just wrong, and I would definitely not want to do that away from keyboard”*  
(P76)

## Difficult Themes - Morality



*“Beetles, of course, don’t worry about that, but as a human being it was emotionally intimidating, the perception, how fast life can be over” (P37)*



Difficult Themes – Mortality



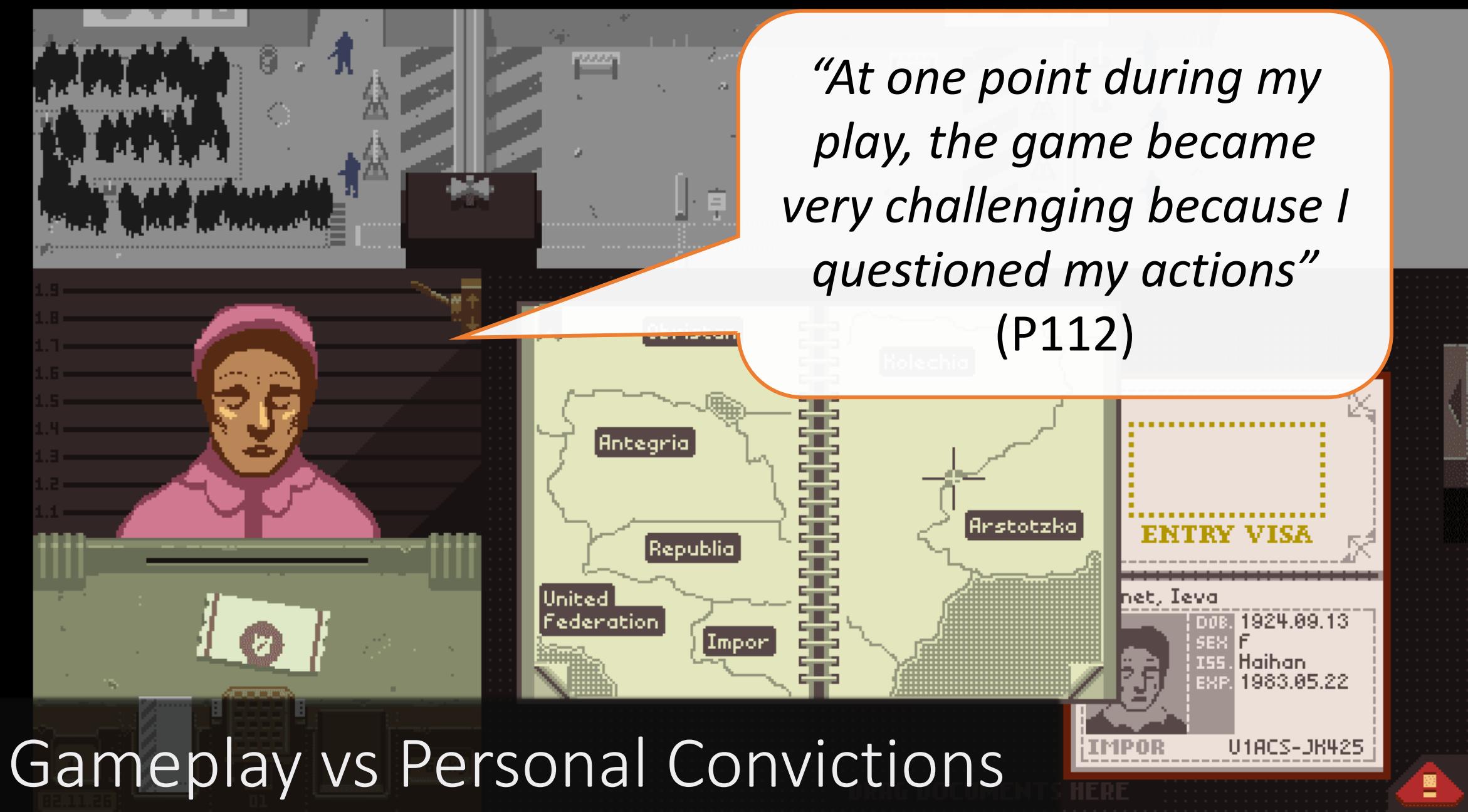
*“Neither option is clear cut to be right” (P55)*



Decision & Actions – No Clear Positive Outcome

*“At one point during my play, the game became very challenging because I questioned my actions”*

(P112)



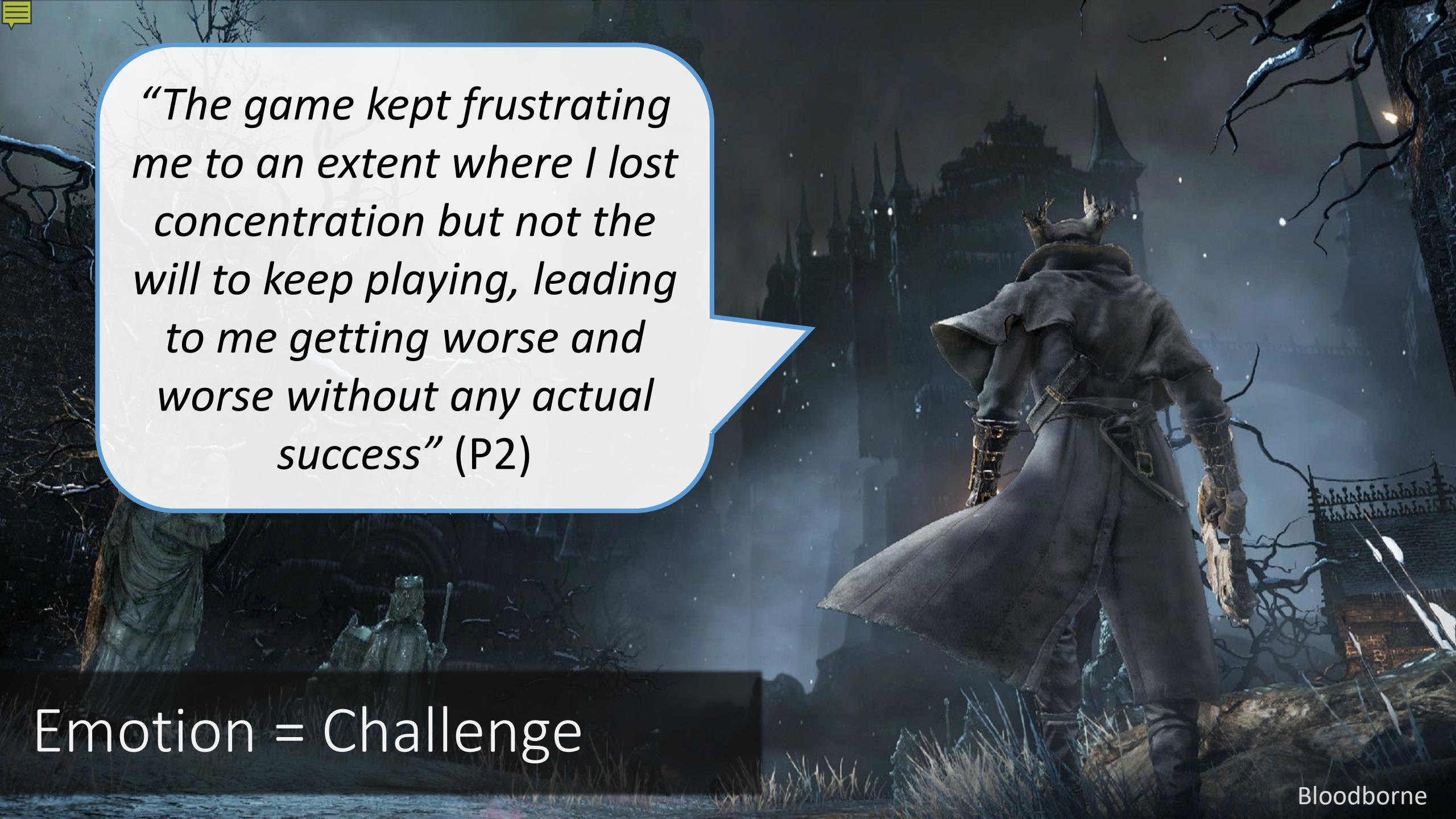
Gameplay vs Personal Convictions

Papers, Please



*“(It) is like having a known world become unknown and full of darkness. Like in the childhood, when you were alone at home. Everything in this level was a potential threat, therefore it was a very tense experience” (P59)*

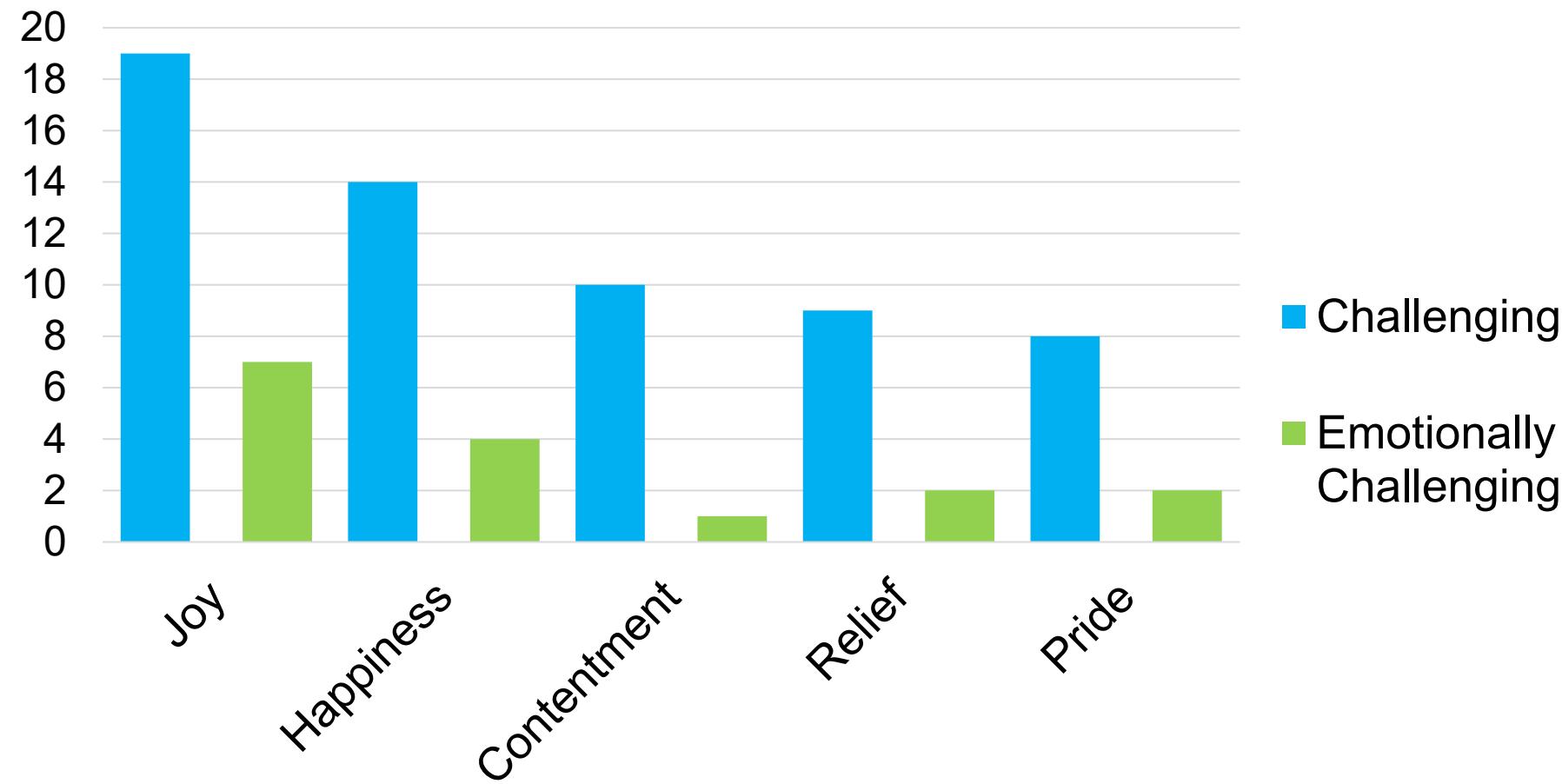
## Dealing with Intense Negative Emotions



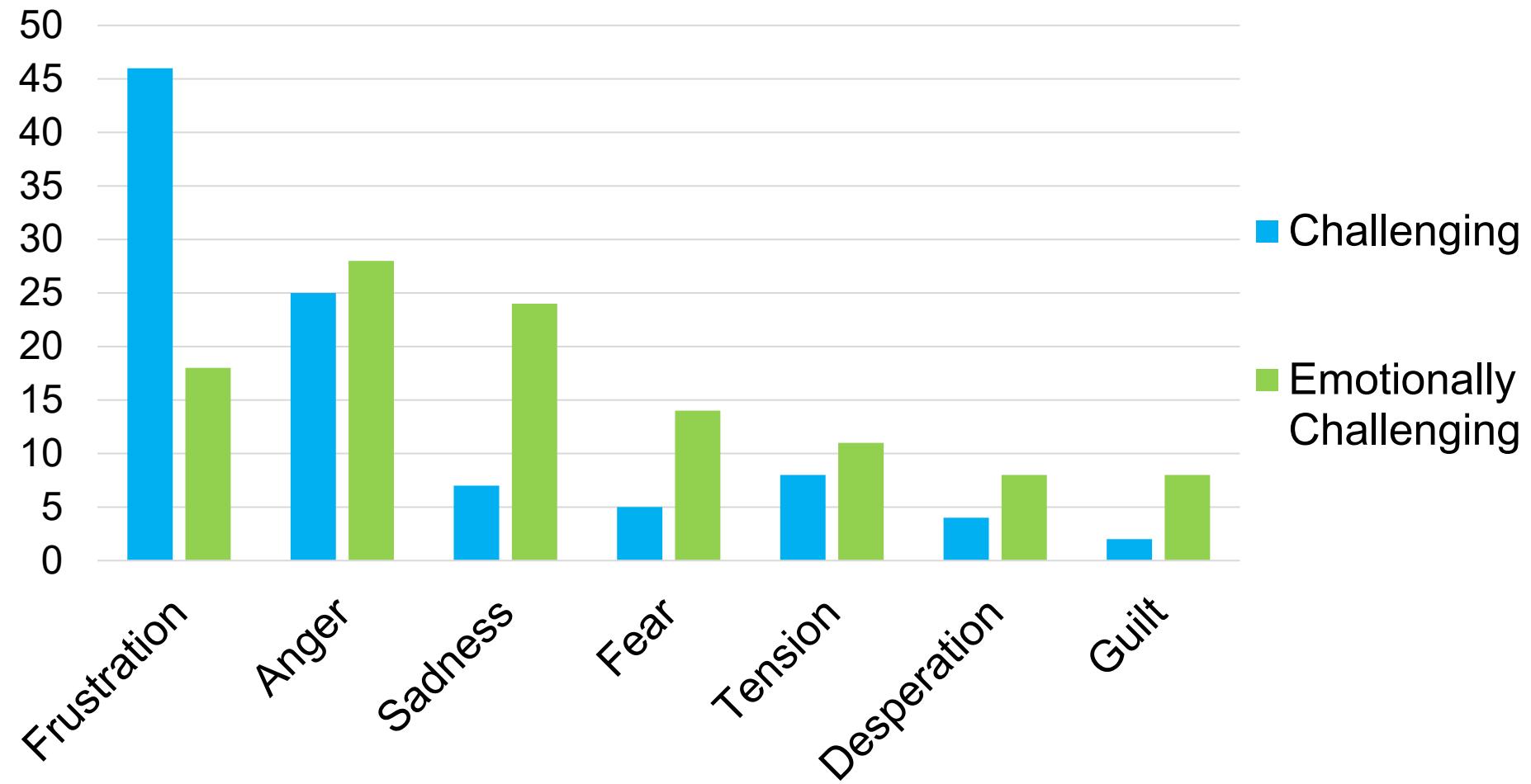
*“The game kept frustrating me to an extent where I lost concentration but not the will to keep playing, leading to me getting worse and worse without any actual success” (P2)*

Emotion = Challenge

# Challenging Experiences Evoke More Positive Emotions

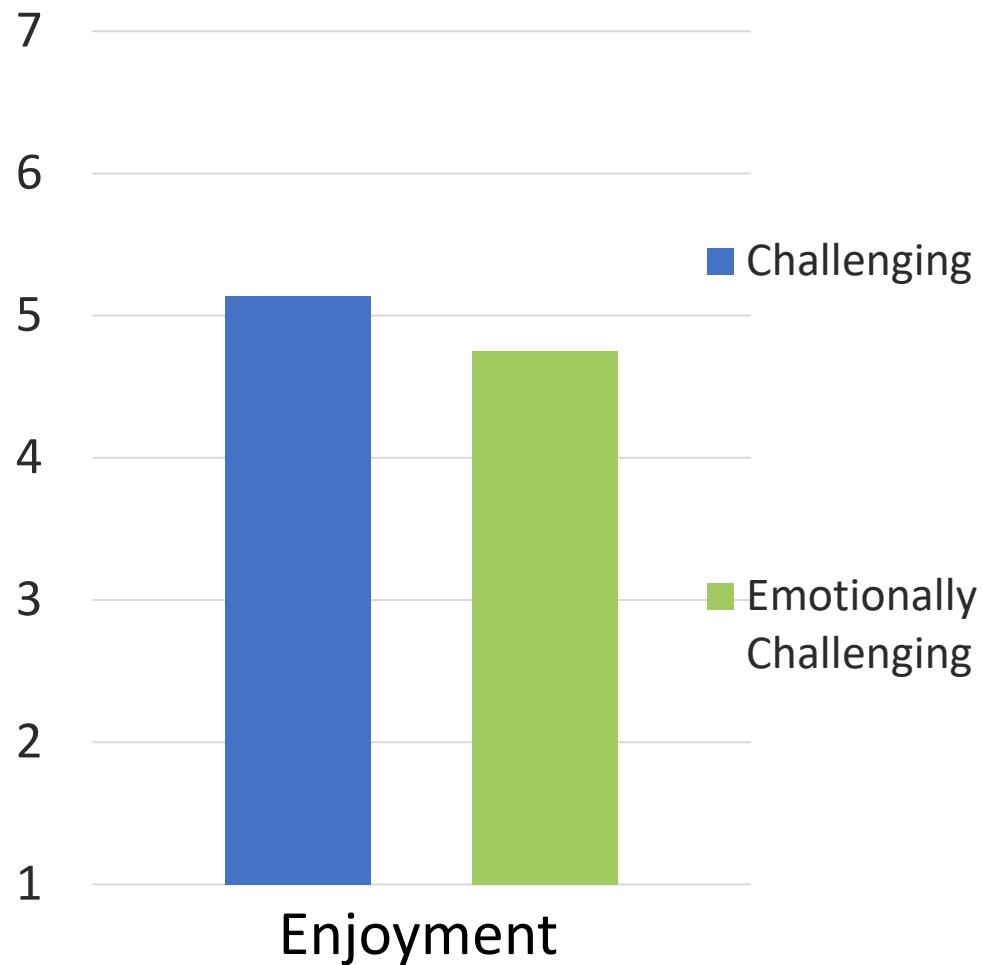


## Emotional Challenge Accompanied by Negative Emotions

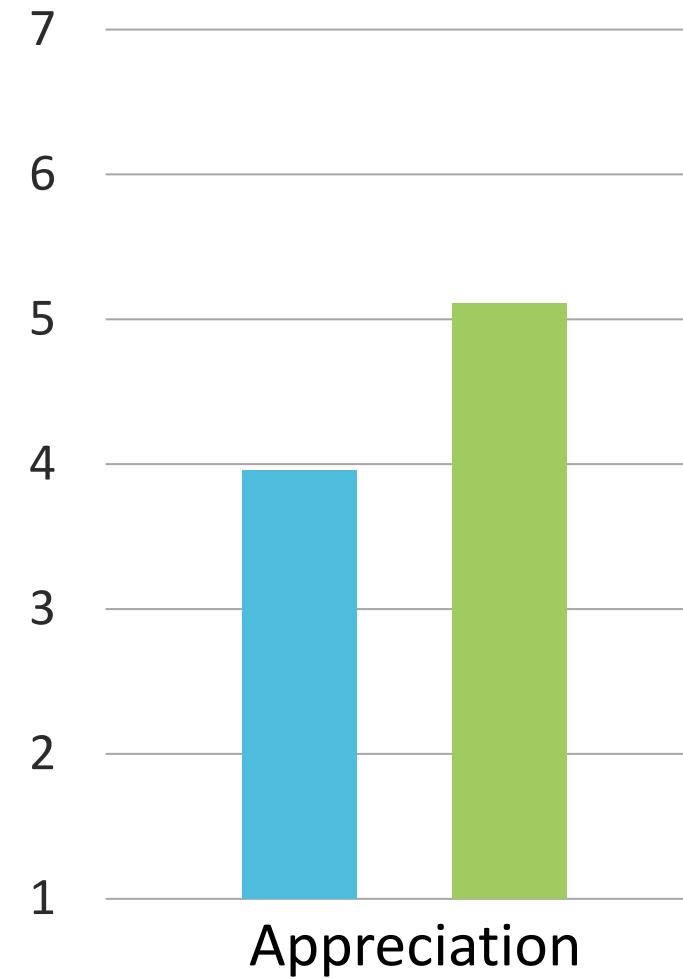


# Both Challenge Types Were Enjoyed, but Emotional Challenge Was Appreciated More

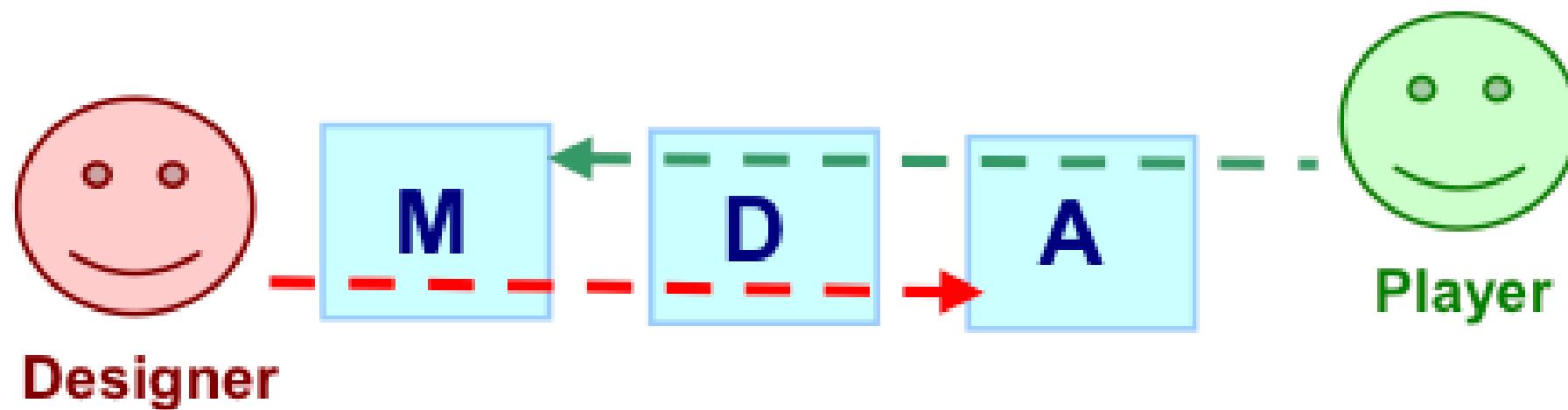
$t = -1.33$  n. s.



$t = 4.28$  \*\*



# MDA Framework and emotions?



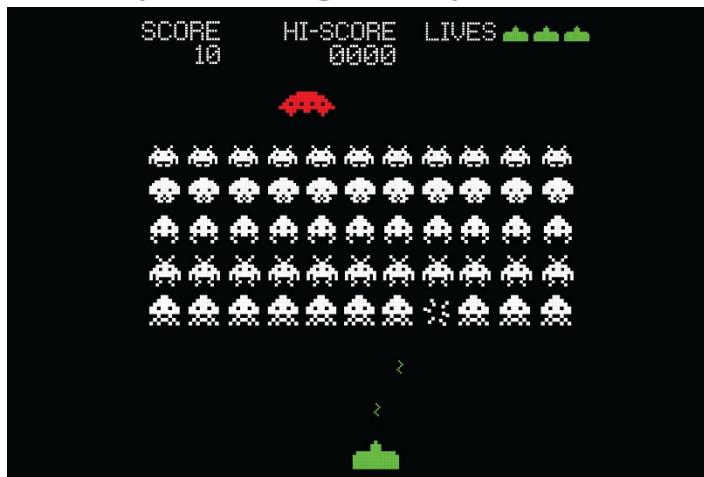
# MDA Framework – Space Invaders



- *Mechanics:* Move left/right, shoot, take cover, cover can be destroyed, aliens descend
- *Dynamics:* Distribute damage, duck and cover
- *Aesthetics:* «Last Stand», «Independence Day»

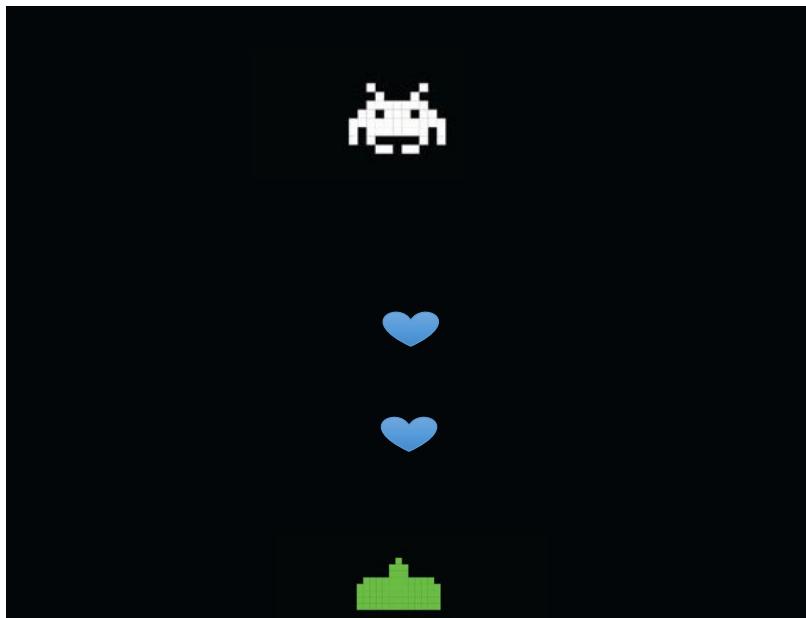
# Exercise - Emotional Game Design

- Randomize an emotion: <https://perchance.org/emotion>
- How would you revise the design of Space Invaders to afford that particular emotion?
- Add your design to a shared Google sheets: <https://urly.fi/2TAn>  
Include a screenshot mock-up.
- Alone or in pairs/groups



You can change both mechanics and dramatic elements of the game (e.g., graphics, sound, story)

# Space Invader – Love



- *Mechanics:* Move, »shoot heart»
- *Dynamics:* «sending words of love»
- *Aesthetics:* Love

# Space Invader – Remorse

- Same mechanics, but add back story for alien invaders



# Space Invader – Guilt

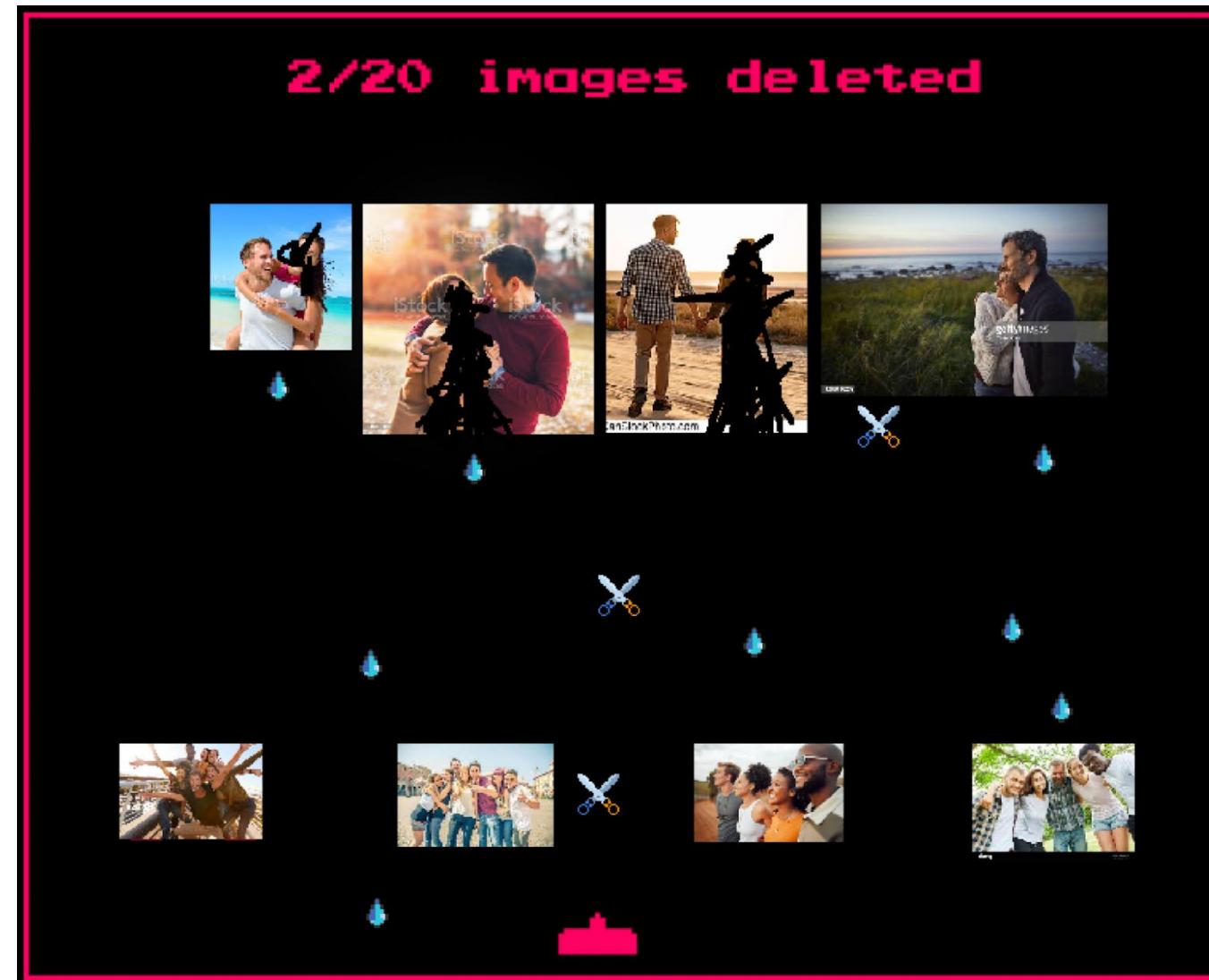


- Same mechanics, but instead of walls -> humans



# Heartsickness

- Concept: Shoot the photos of your broken relationship to forget or choose to embrace the pain
- The game pulls the photos from your personal image library. Whenever you shoot them, the actual photos are updated respectively.
- When shooting at the images, they will disintegrate bit by bit, starting with your ex.
- Shooting bound to a key as opposed to auto-shooting, so you can choose not to shoot. Scissors represent your bullets, tears represent the bullets of the photos.
- Shields are your common friends who are now collateral damage.



# Ecstasy – can AI solve the exercise?

In 2022, students generated the screenshots using the DALL-E 2 text-to-image generator, with the prompt: “An ecstatic moment in the video game space invaders, pixel art, aliens attacking, 100% enjoyment”





How Game Designers Create Meaningful Mechanics | Conveying Themes, Emotions and Ideas In Video Games

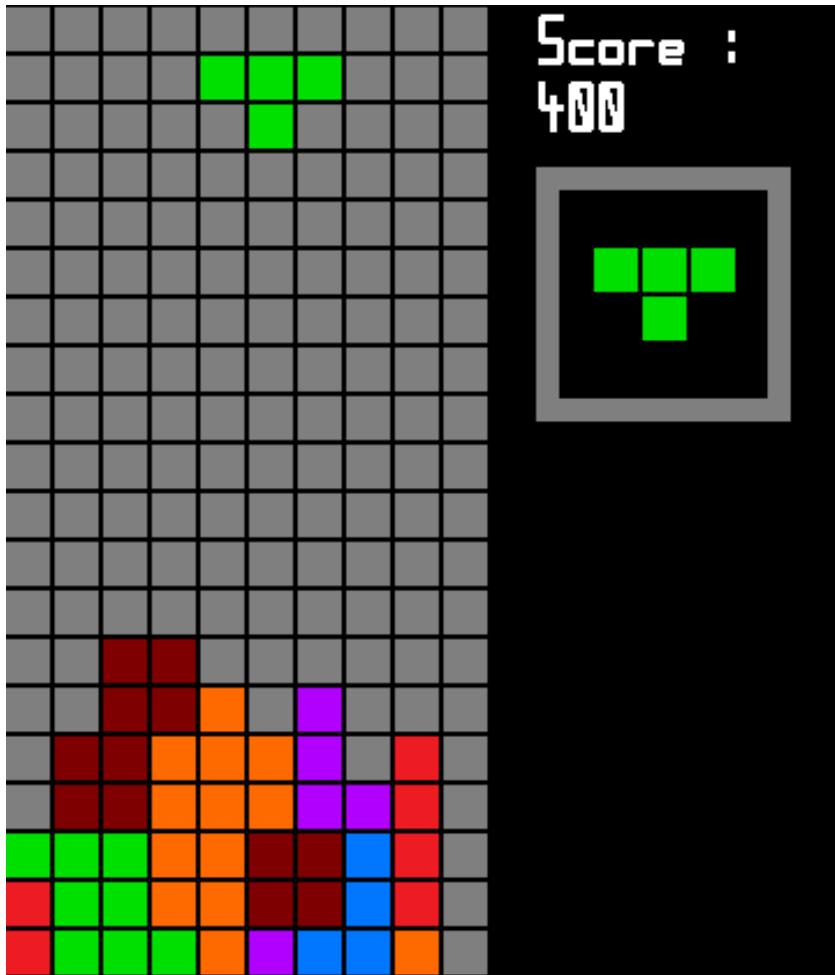


The Game Overanalyser

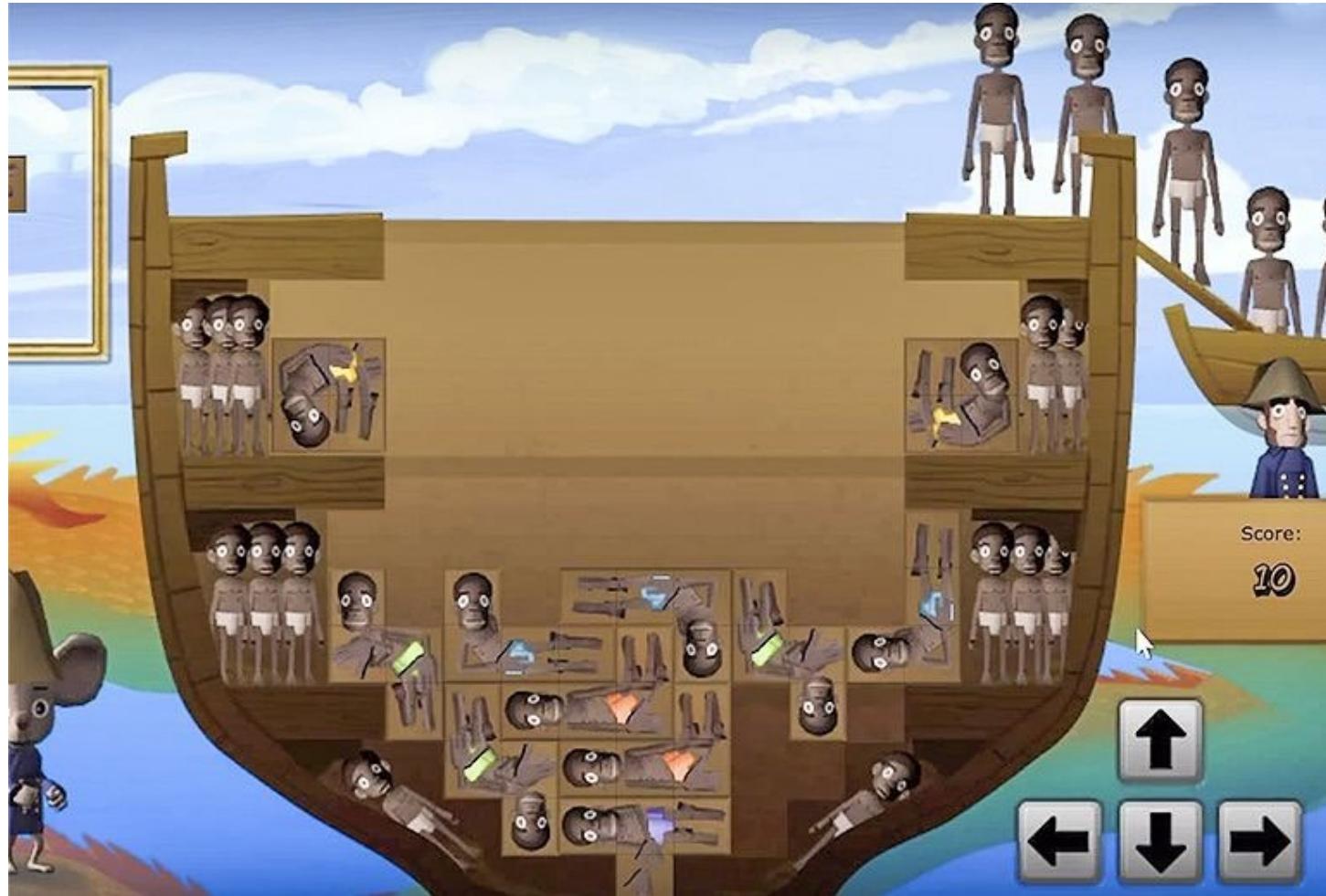
13,5 t. tilaaaja

<https://www.youtube.com/watch?v=KkdPxZbUNSw>

# Same Mechanics .... Different Meaning



# Same Mechanics .... Yikes



# Mechanics can create meaning and emotion even with abstract graphics

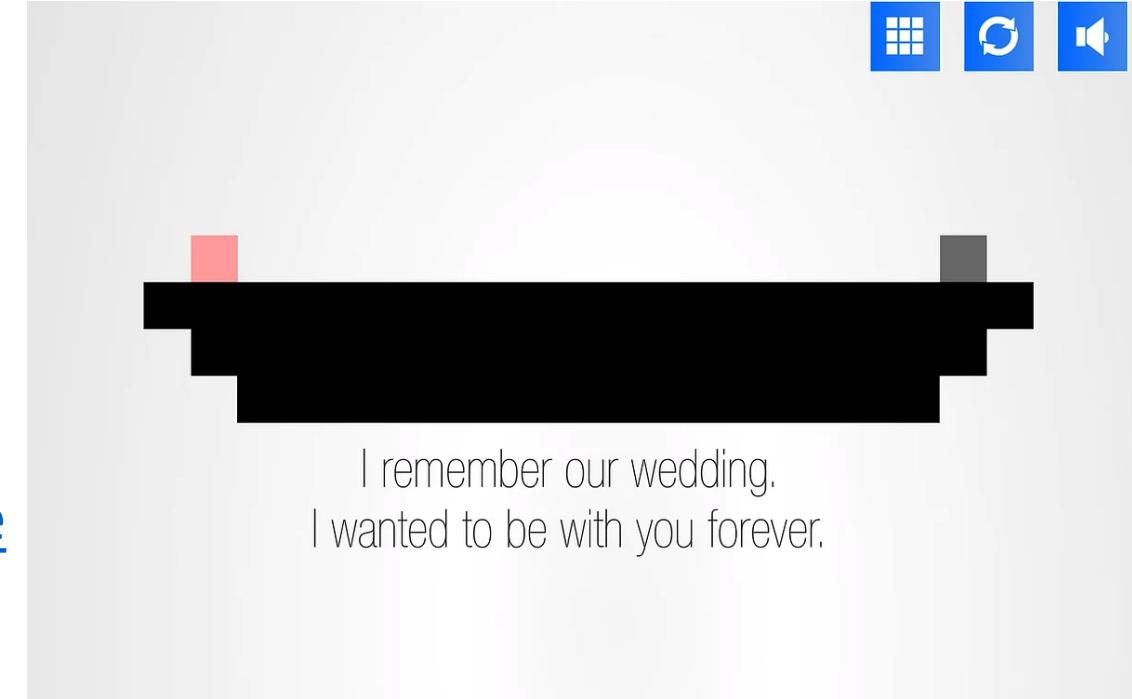
<https://www.necessarygames.com/my-games/freedom-bridge/flash>

<https://www.necessarygames.com/my-games/loneliness/flash>

[http://kyrie.pe/the\\_marriage/](http://kyrie.pe/the_marriage/)

<https://www.keybolgames.com/Games/Pretentious-Game> (does include text)

Exercise: Pick a random emotion, design a game with abstract graphics



# Interested?

- More on “Emotion in Games” course

