

Game Experience Design

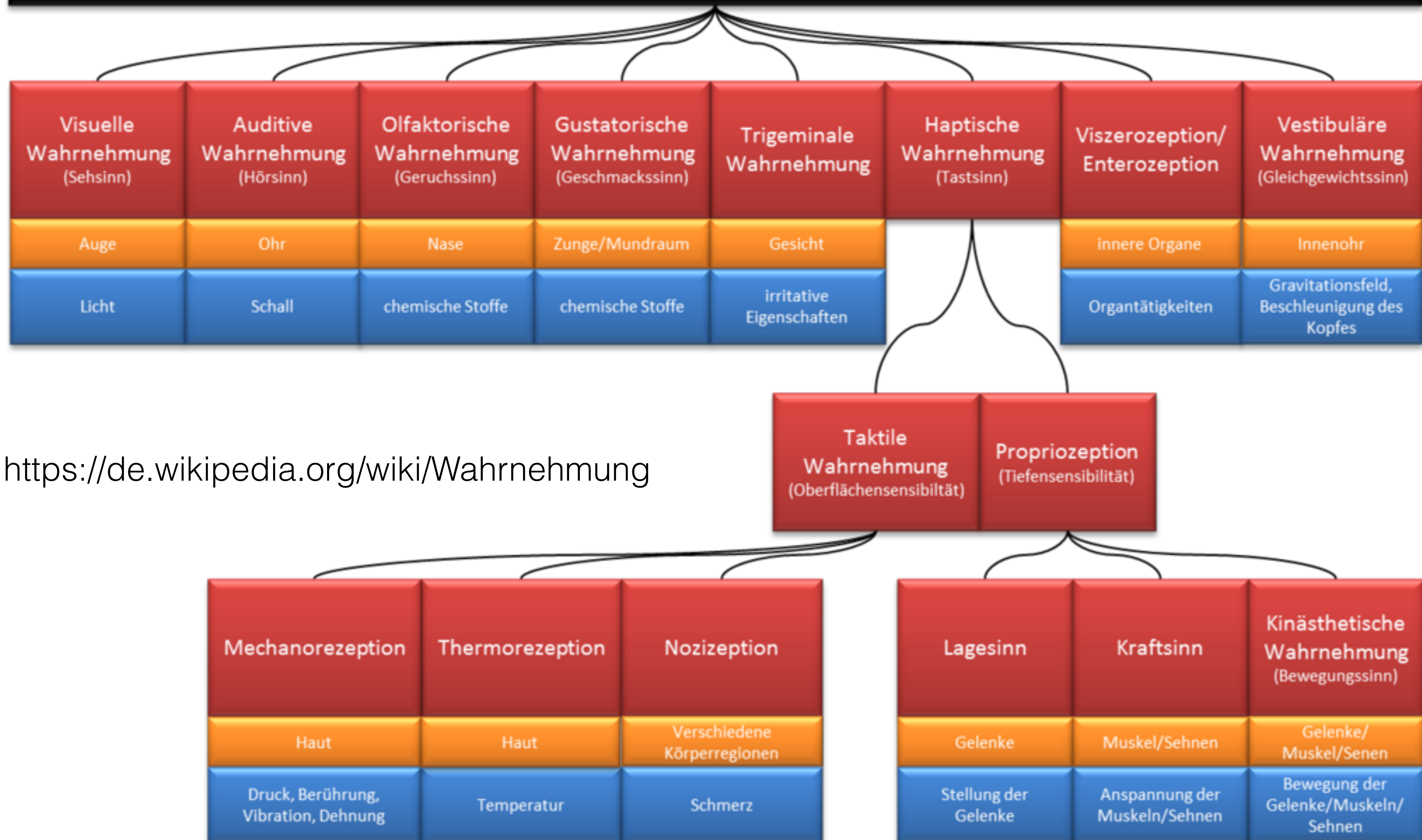
08 Sensory Design

Prof. Dr. Jochen Koubek

20.06.2017



Wahrnehmung des Menschen



<https://de.wikipedia.org/wiki/Wahrnehmung>

Sehen: Farben



Das Auge

s. VL Die Farben der Medien. Physiologie der Farben (passwort: medien)

<https://medienwissenschaft.uni-bayreuth.de/lehre/vergangene-semester/wintersemester-2012-2013/farben/>

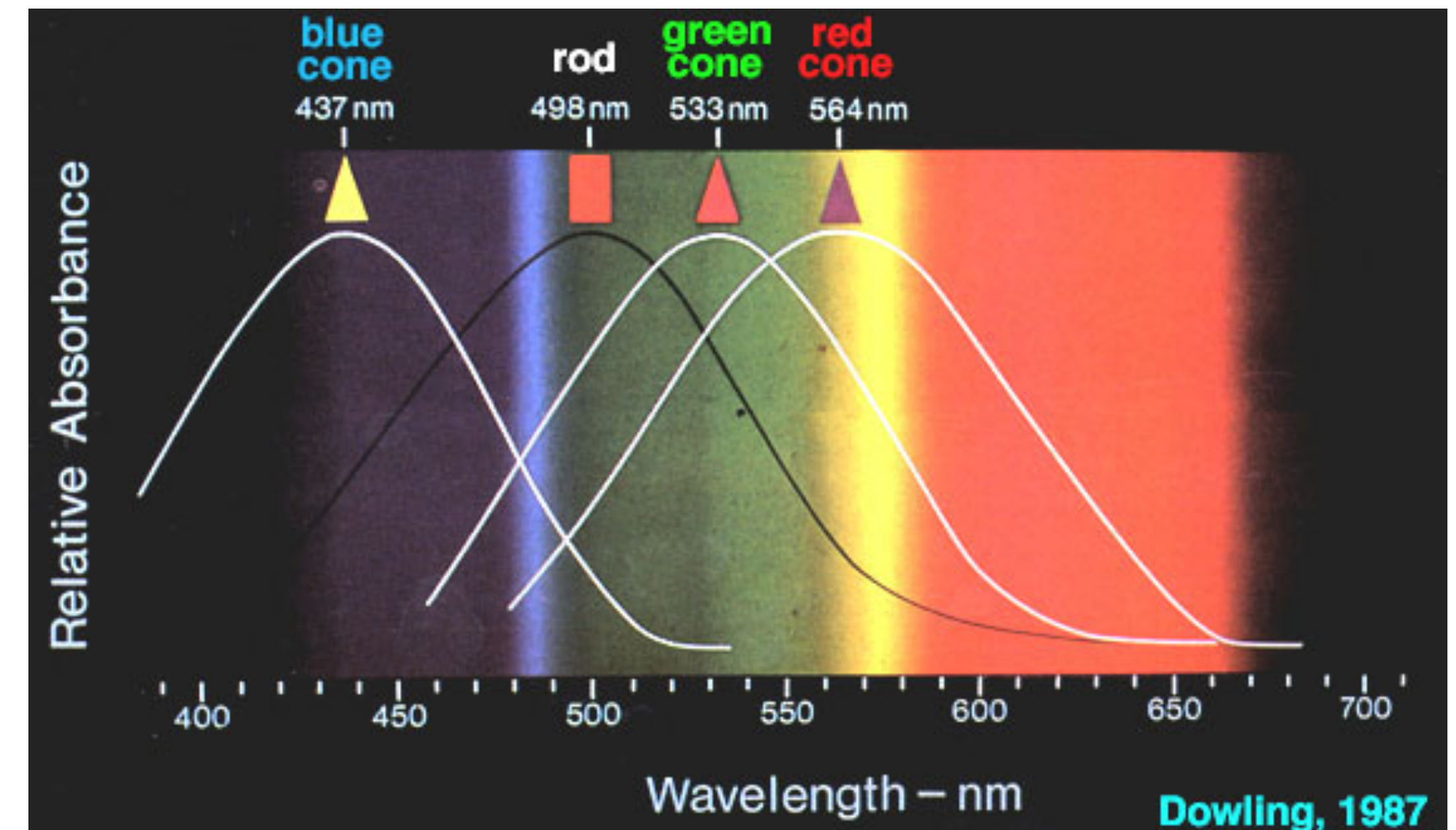
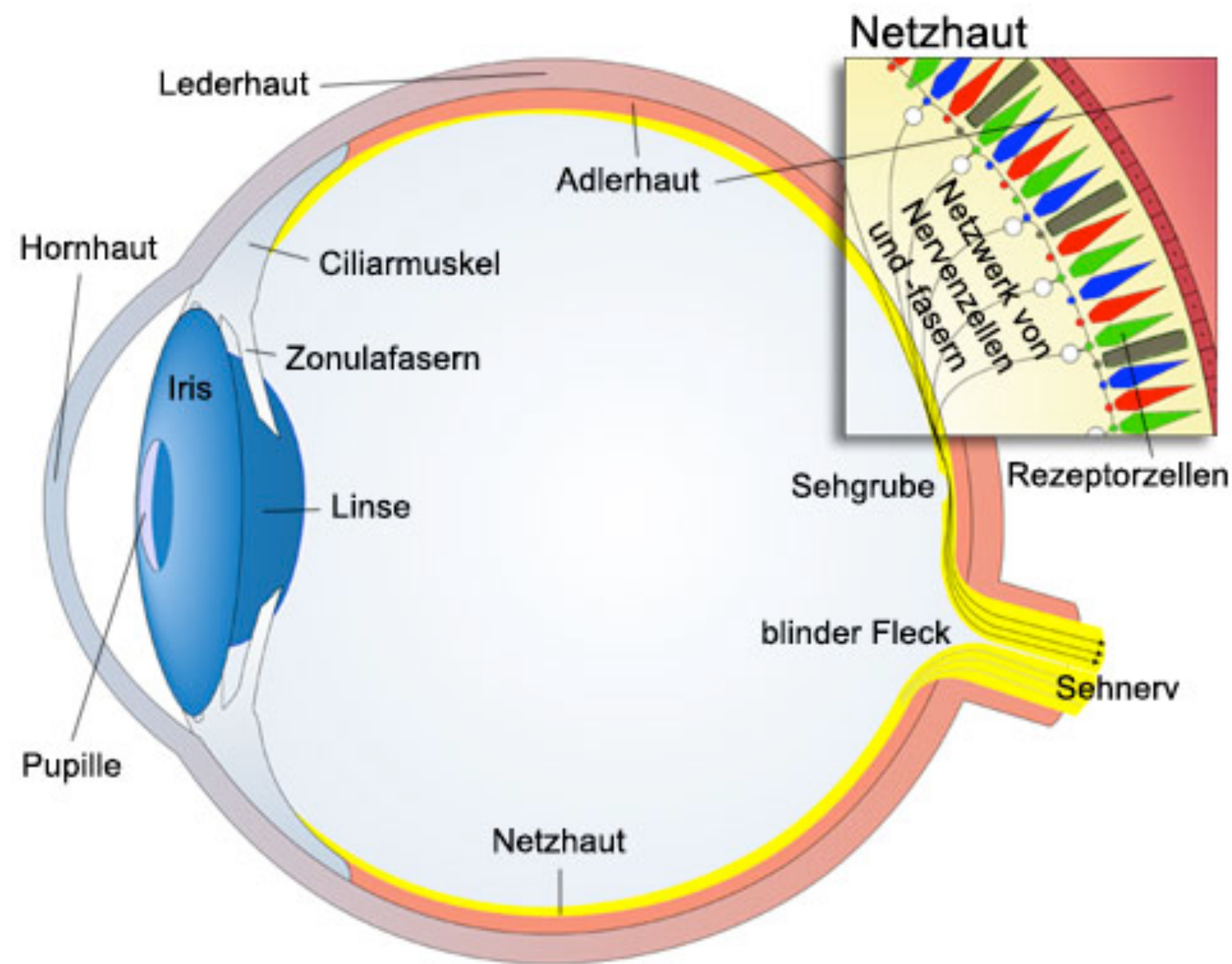
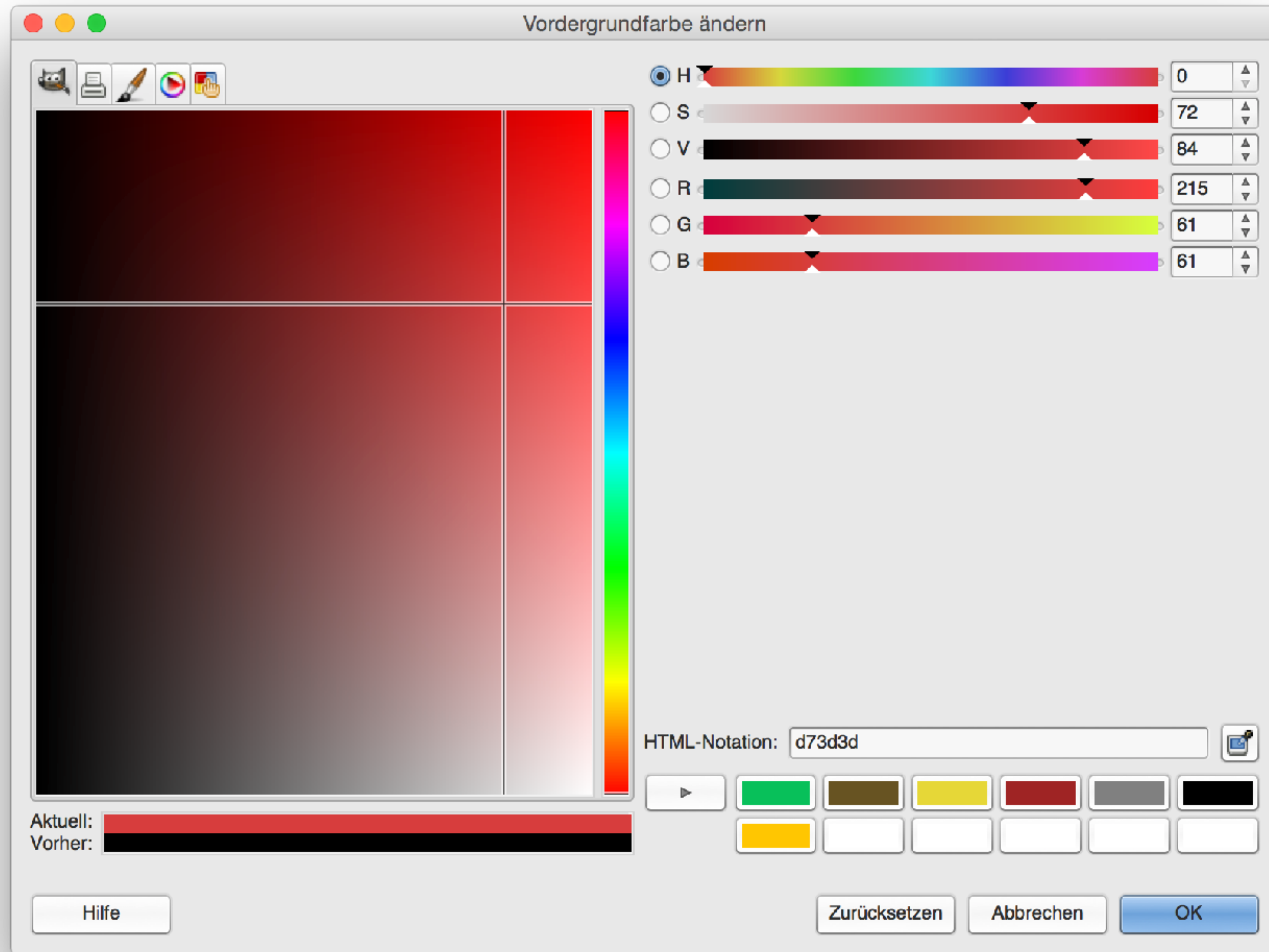


Fig. 14. The peak spectral sensitivities of the the 3 cone types and the the rods in the primate retina (Brown and Wald, 1963). From Dowling's book (1987).



Farbräume

HSV

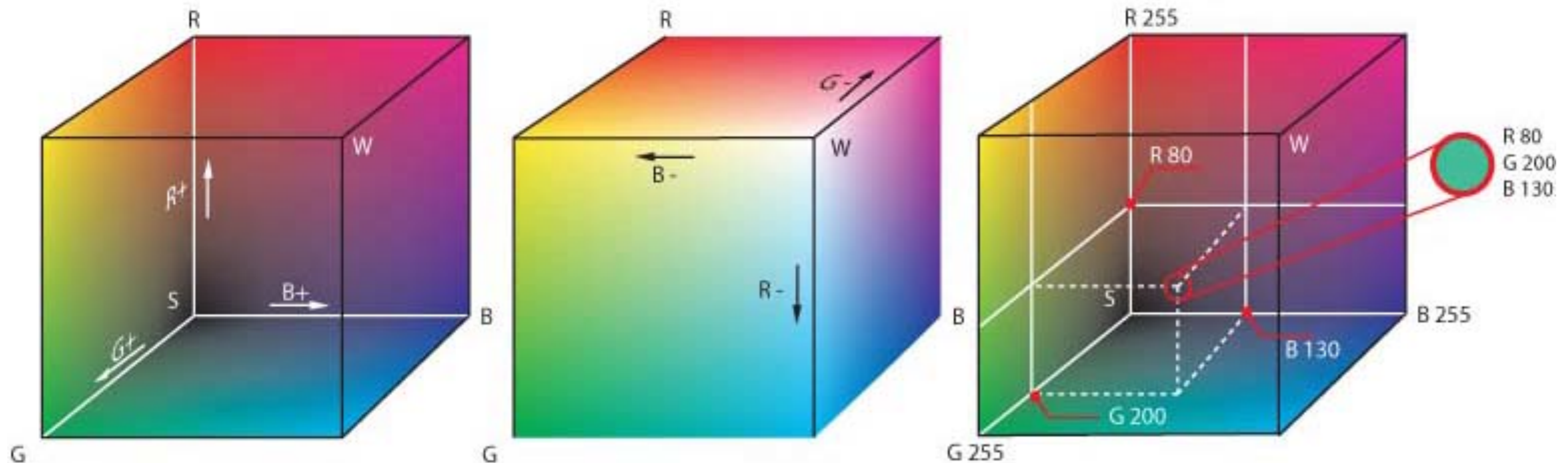
RGB

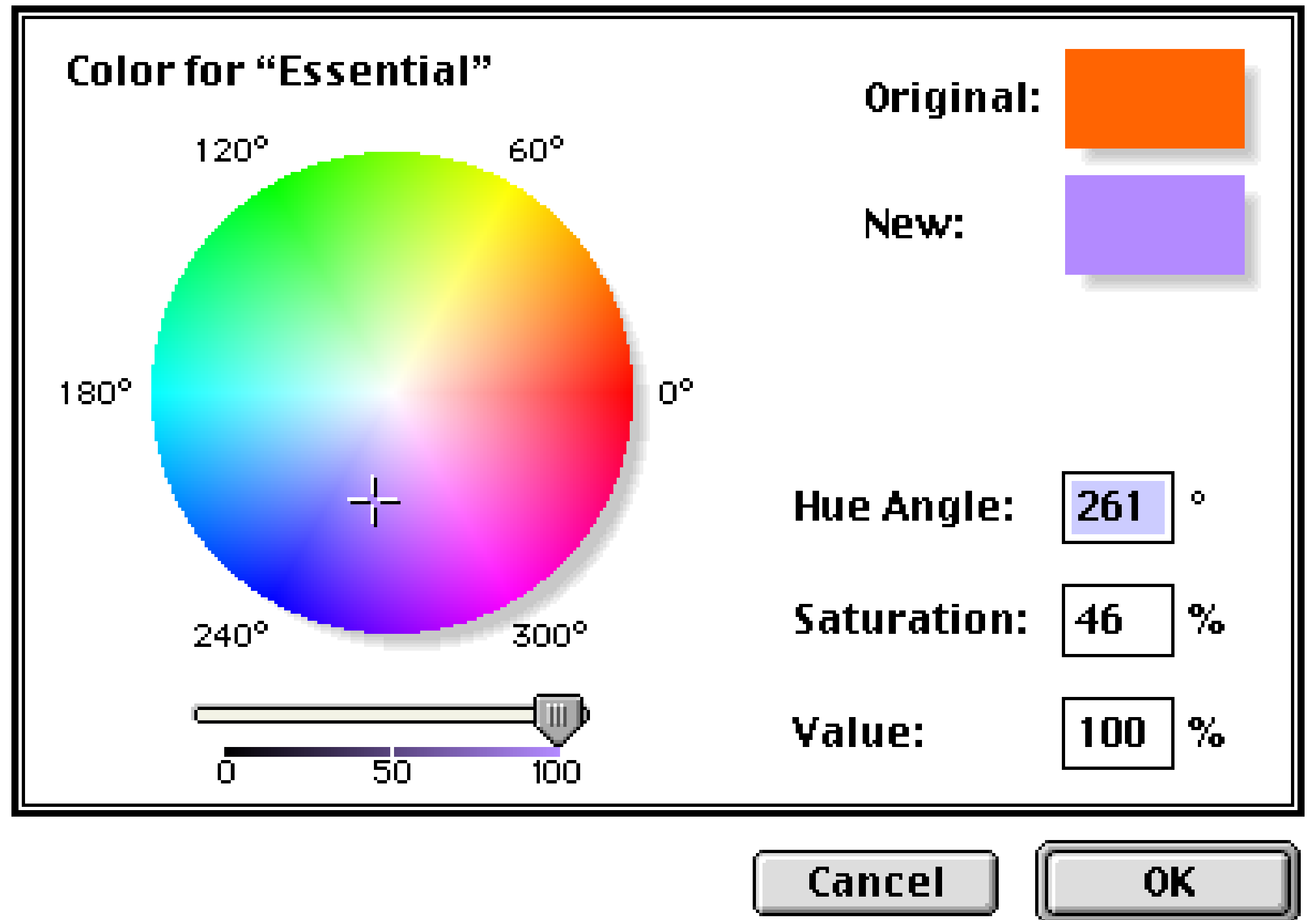
HTML

Hex: #RRGGBB

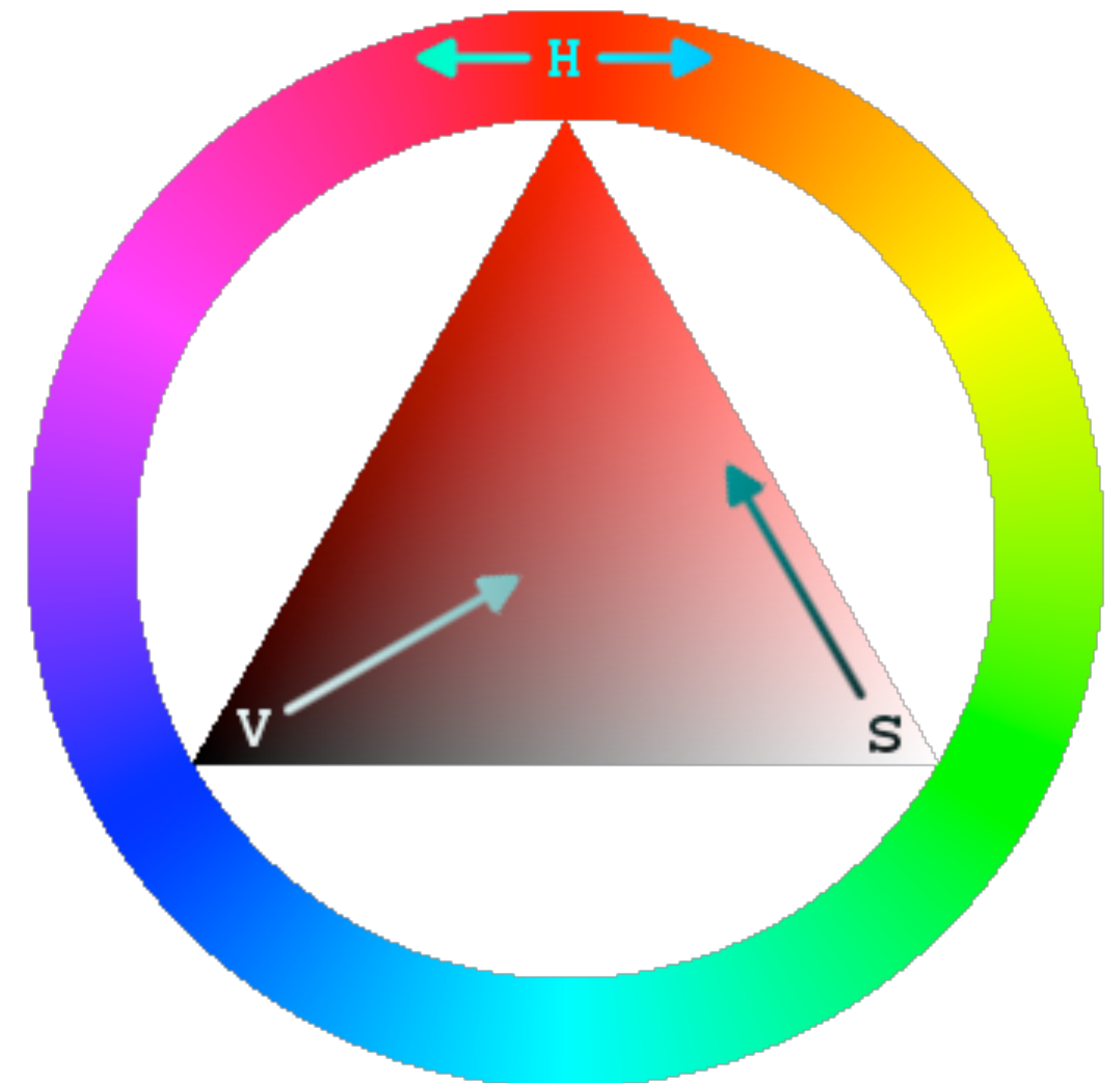
RGB-Würfel

RGB-Farbräume sind geräteabhängig

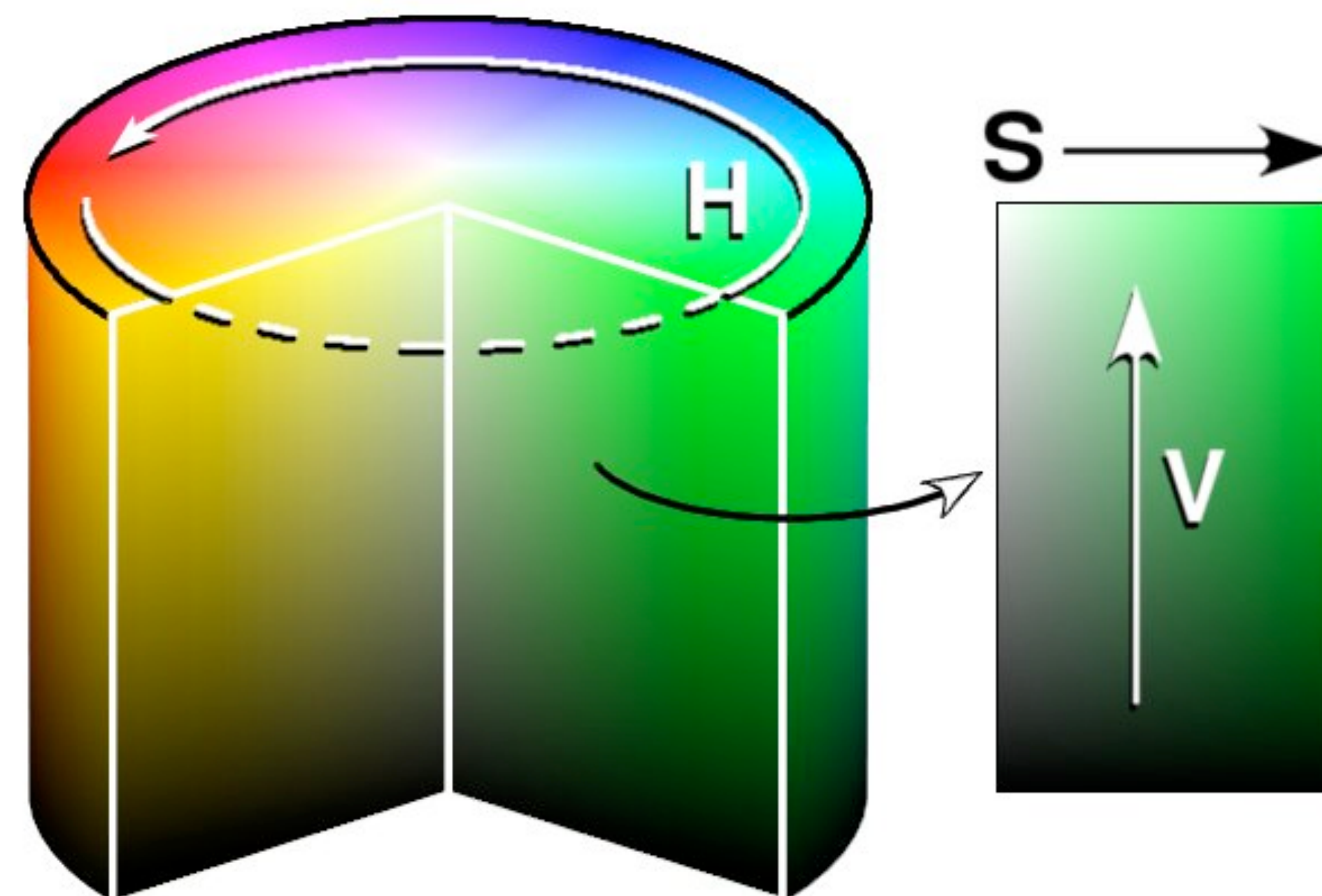
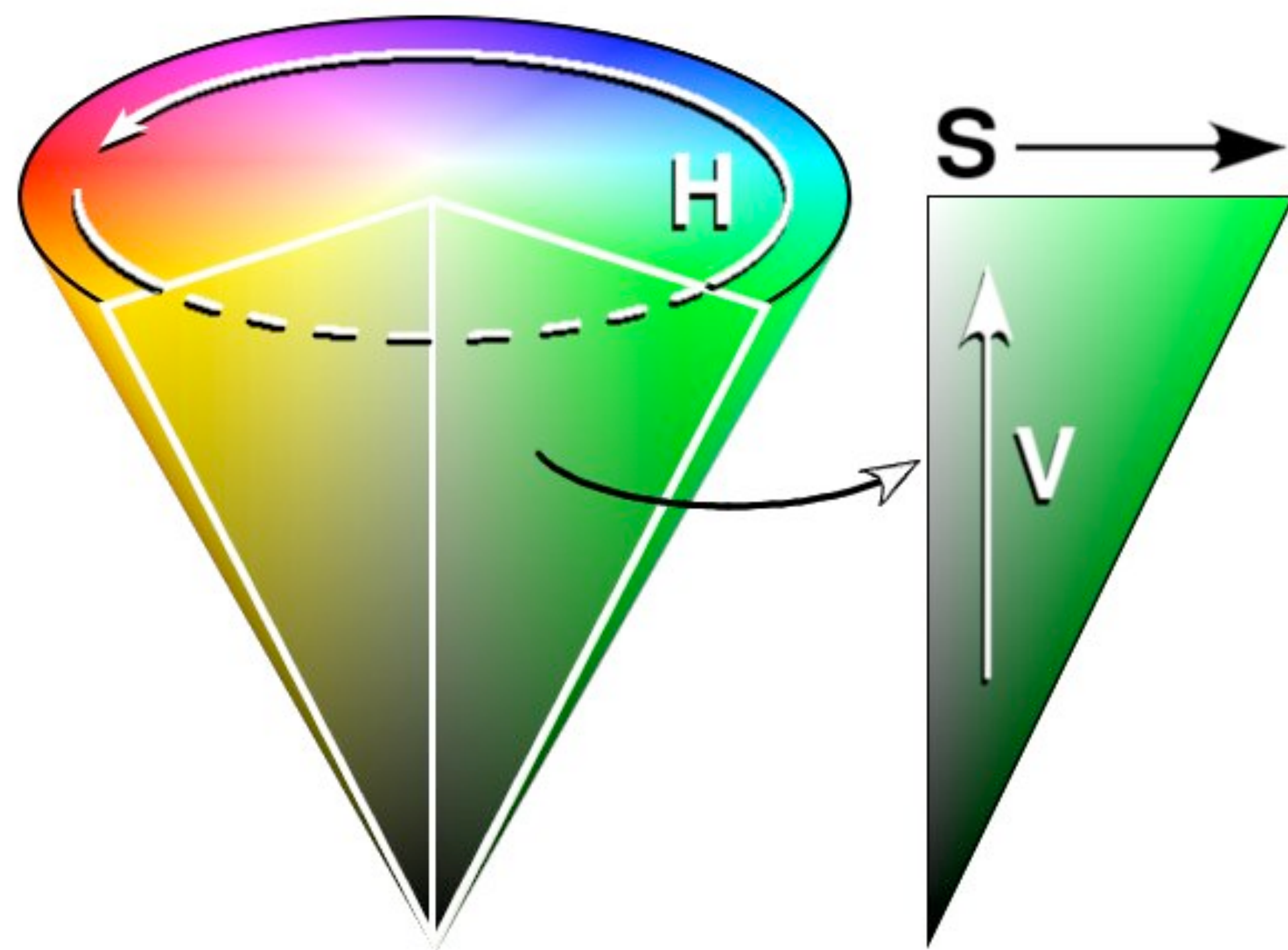




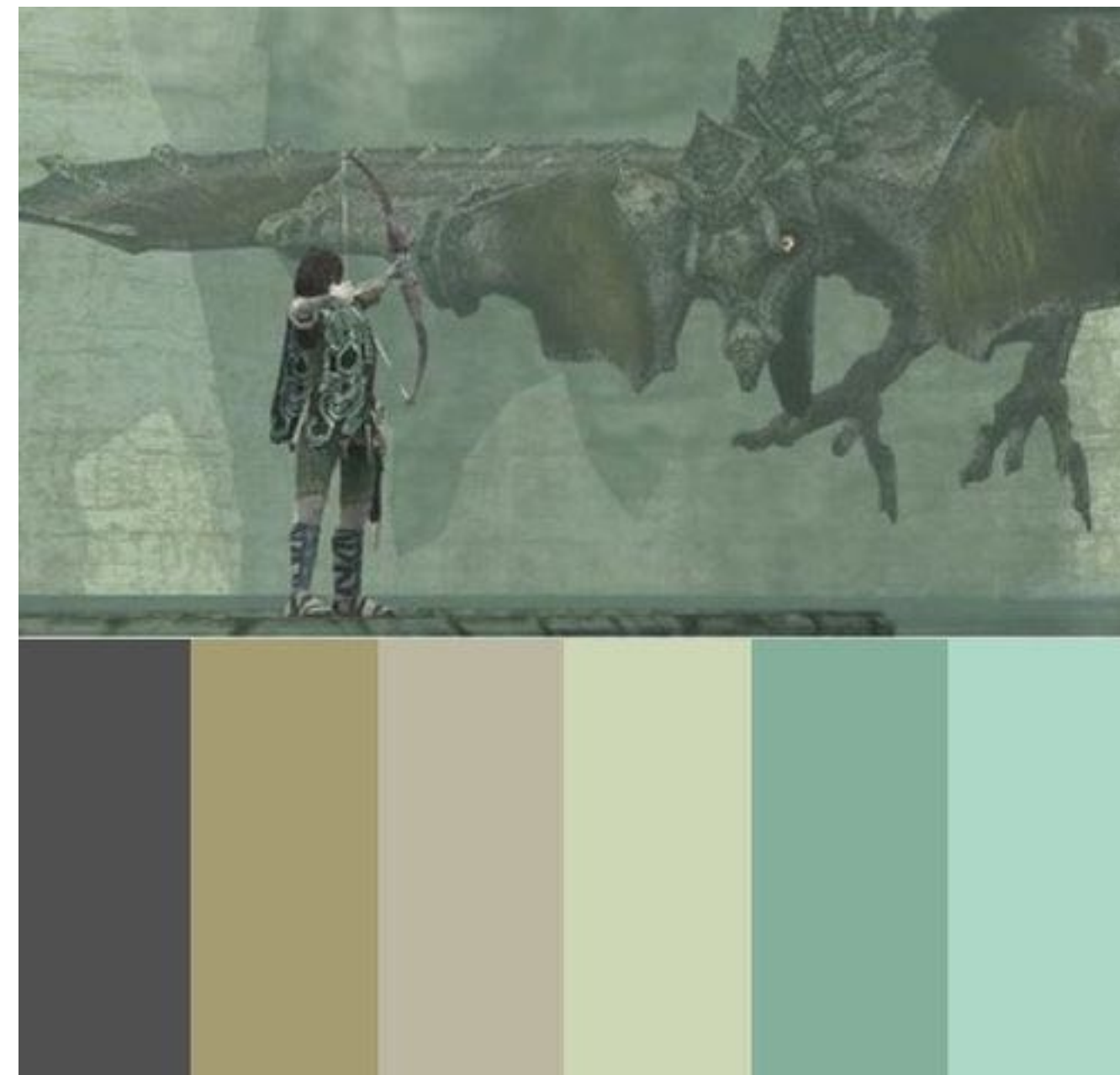
HSV



HSV



Farbpaletten

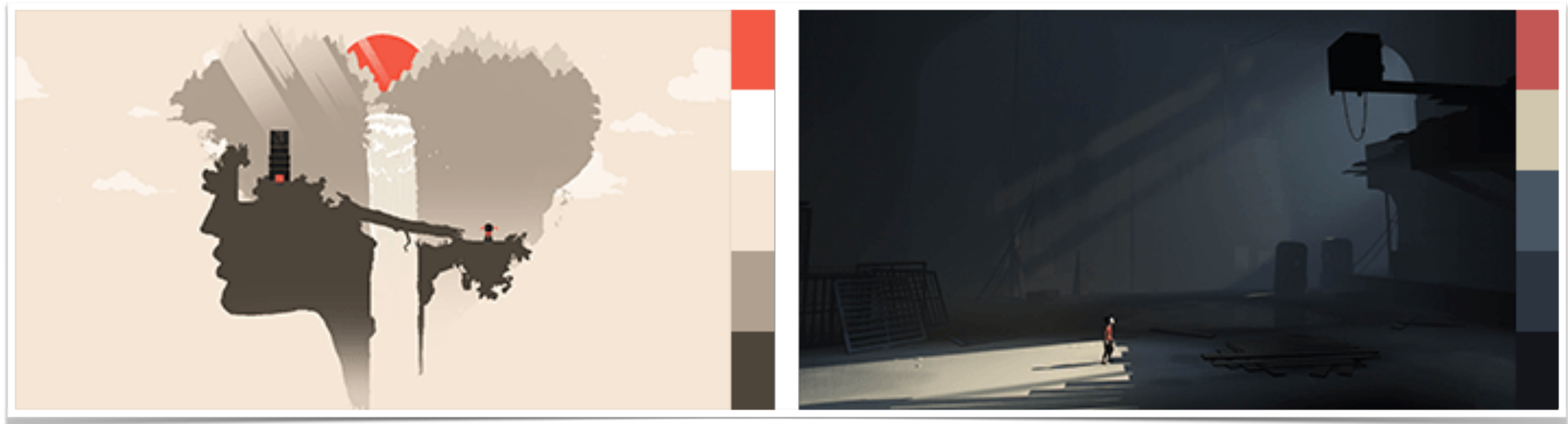


<http://fashiontribes.typepad.com/fashion/2014/01/influence-of-video-game-aesthetics-style-20-gorgeous-fashion-color-palettes-from-the-pinnacle-of-g.html>

Color Palettes

http://www.gamasutra.com/blogs/DougStewart/20170411/295806/Color_in_Video_Games_How_to_Choose_a_Palette.php

Monochrome / Limited



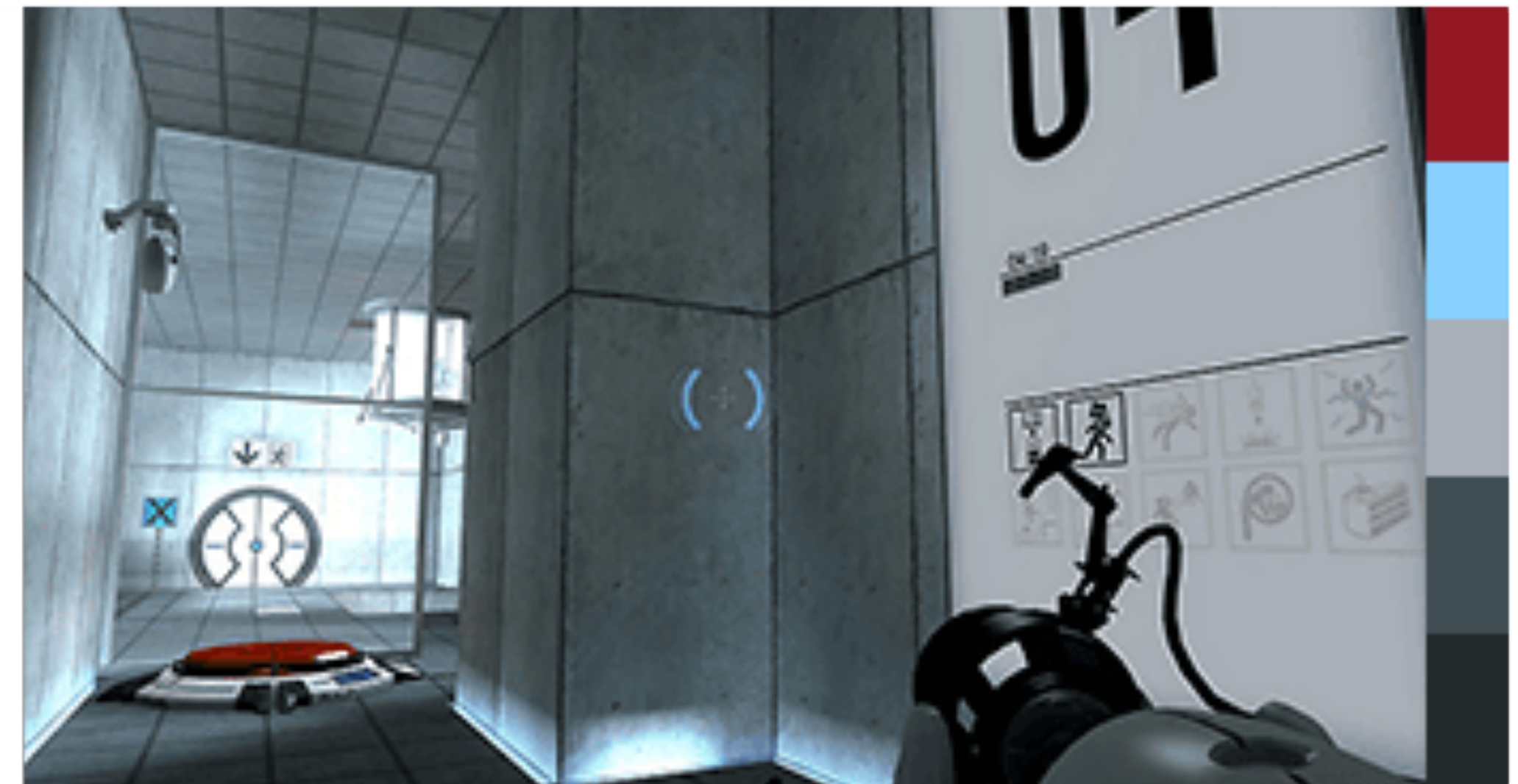
Left: “Dolly,” Right: “Inside”

Warm Tones



Left: “Firewatch,” Right: “Team Fortress 2”

Cool Tones



Left: “Mirror’s Edge,” Right: “Portal”

Western / Dystopian



Left: "Red Dead Redemption," Right: "Metro 2033 Redux"

Noir / Cyberpunk



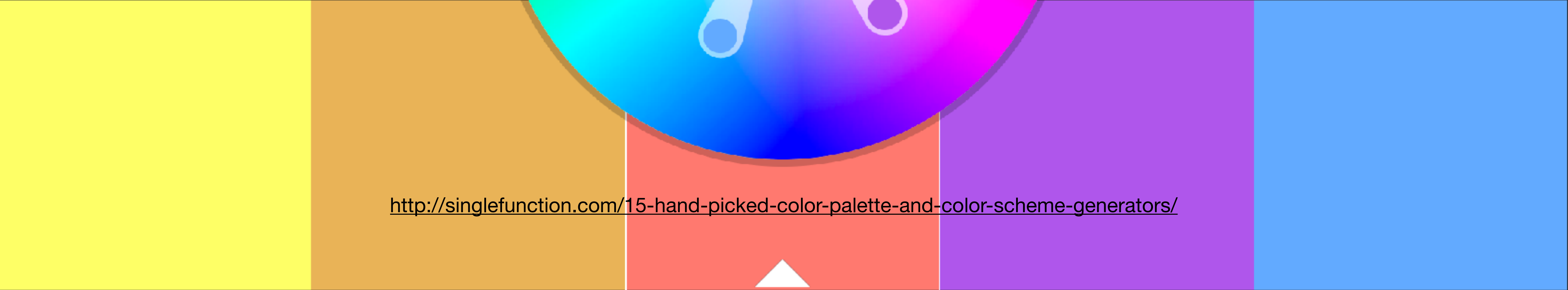
Left: "Batman: Arkham City," Right: "Far Cry: Blood Dragon"

Speichern



Farbregel

Ähnlich



RGB	254	255	114	RGB	232	178	95	▶ RGB	255	122	114	RGB	174	92	232	RGB	101	172	255
HEX	FEFF72			HEX	E8B25F			HEX	FF7A72			HEX	AE5CE8			HEX	65ACFF		

Color in Games

[http://www.gamasutra.com/blogs/HermanTulleken/20150729/249761/Color in games An indepth look at one of game designs most useful tools.php](http://www.gamasutra.com/blogs/HermanTulleken/20150729/249761/Color_in_games_An_indepth_look_at_one_of_game_designs_most_useful_tools.php)

The Function of Color in Games

Emotion

Branding and Fashion

Visual Hierarchy

Progression

Mechanics

Signifiers and Identifiers

Content Variation

Technology

Palette

Increase the Number of Perceptual Colors

Dithering

Color Biology

Color Blindness

Impossible Colors

Funktionen

http://www.gamasutra.com/blogs/DougStewart/20170411/295806/Color_in_Video_Games_How_to_Choose_a_Palette.php

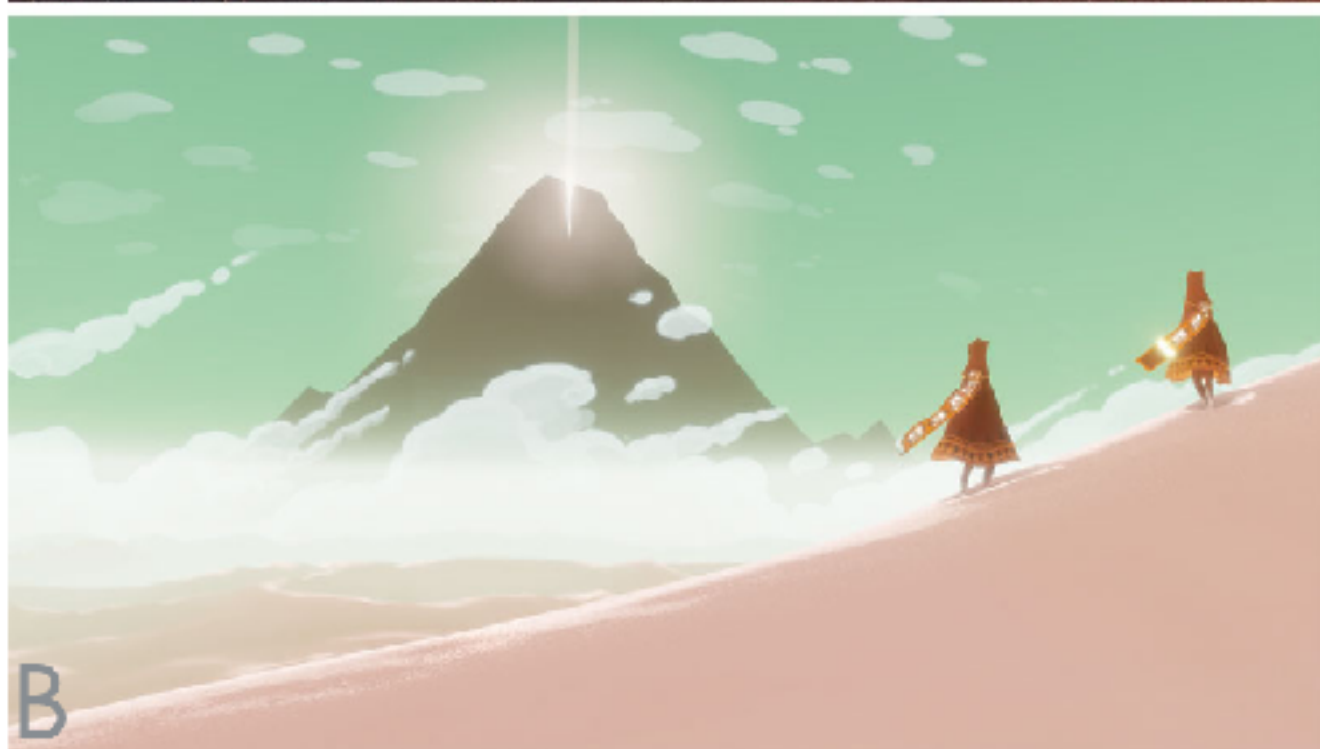
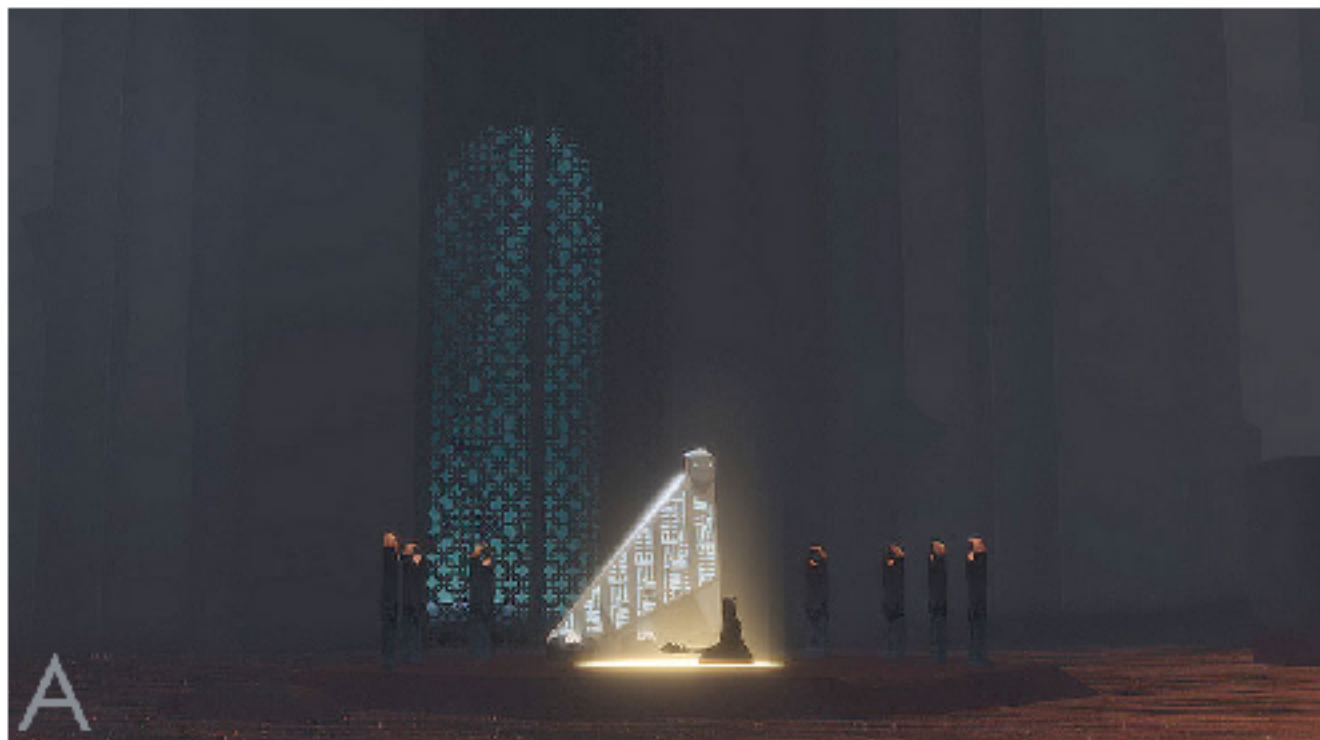


Signal Detection: Wayfinding

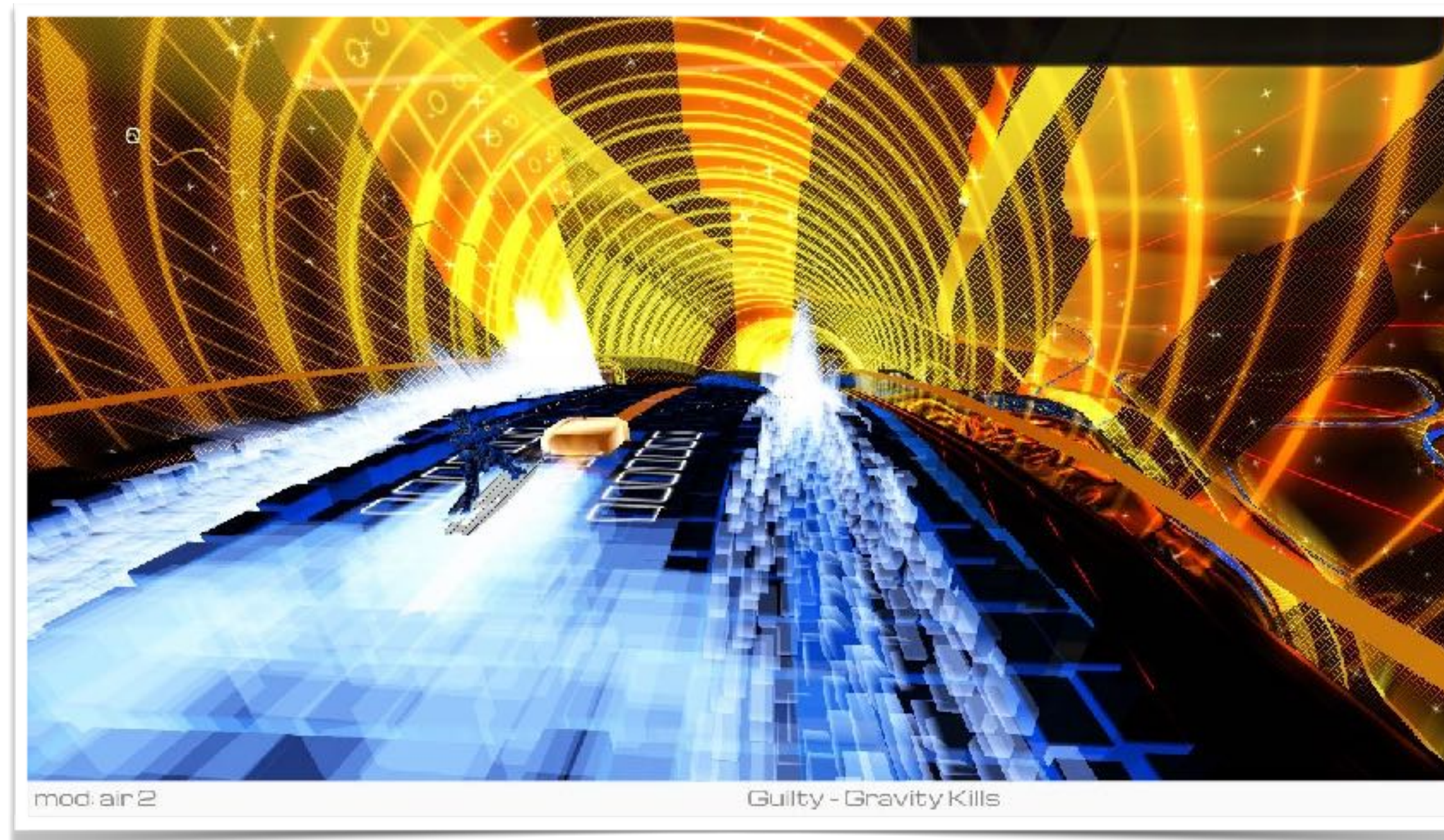


Modal Color Grade: Combat / Stealth

Visual Pacing



Hören: Audio



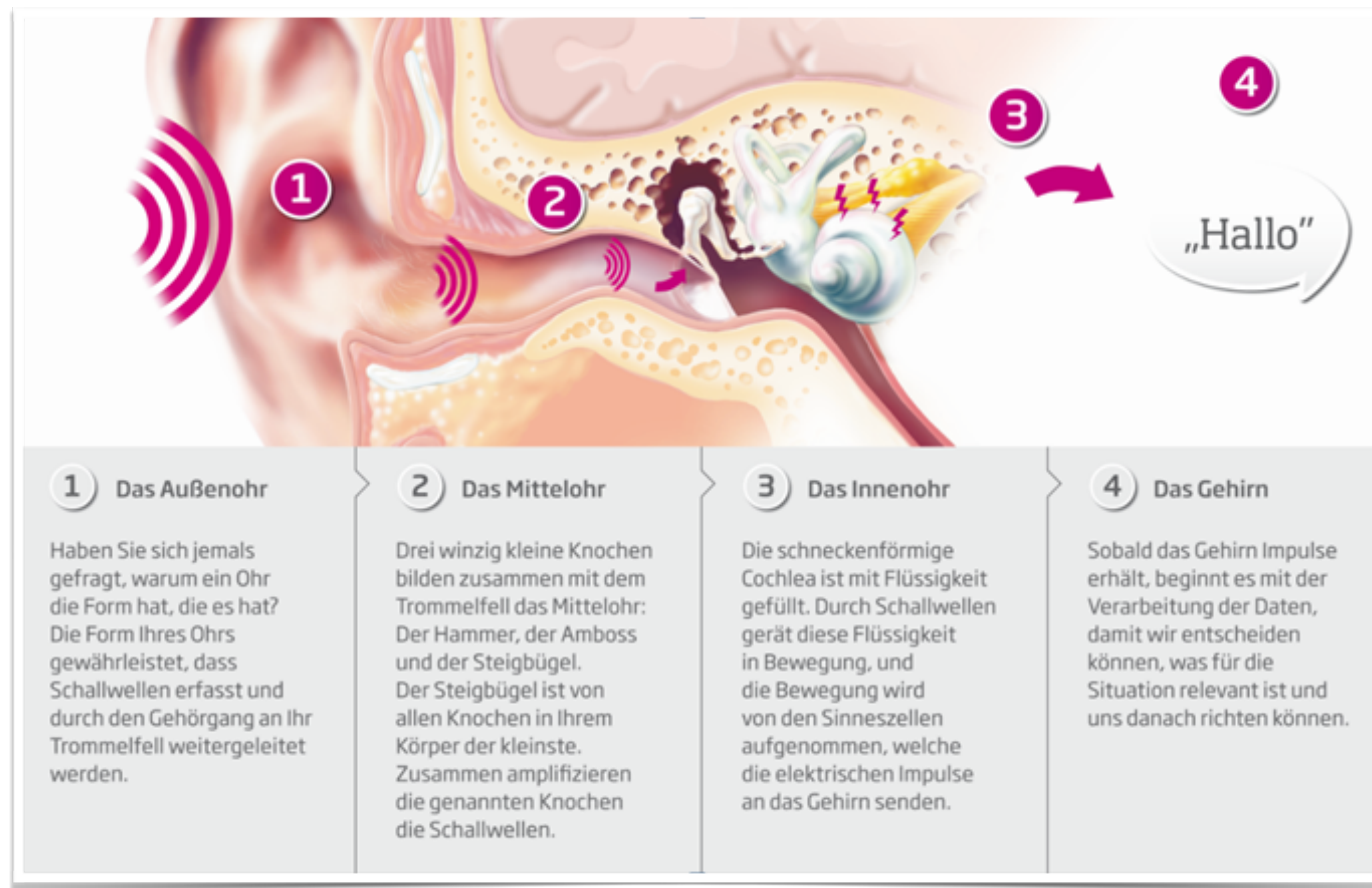
S. VL Ästhetik – Sound

<https://medienwissenschaft.uni-bayreuth.de/wp-content/uploads/04-Sound.pdf>

Das Ohr

s. VL Einführung in die Ton- und Musikbearbeitung.Akustik (passwort: medien)

<https://medienwissenschaft.uni-bayreuth.de/lehre/vergangene-semester/sommersemester-2012/musik-und-tonproduktion/>



https://www.youtube.com/watch?v=tVEe_dXamtQ

Funktionen von Musik im Film

Matthias Keller: Stars and Sounds

Atmosphäre schaffen

Bewegung illustrieren

Bilder integrieren

Erzählerische Bezüge herstellen

Emotionen abbilden

Soziale und kulturelle Hintergründe vermitteln

Zeitgeschichtliche Zusammenhänge klären

Irreal machen

Räume vermitteln

Zeitempfinden relativieren

Bilder kommentieren

Bilder interpretieren

Widersprüche erzeugen

Parodieren und Karrikieren

Personen und Gegenstände dimensionieren

Physiologisch konditionieren (Priming)

Publikum kollektivieren

Ende einleiten

Sound



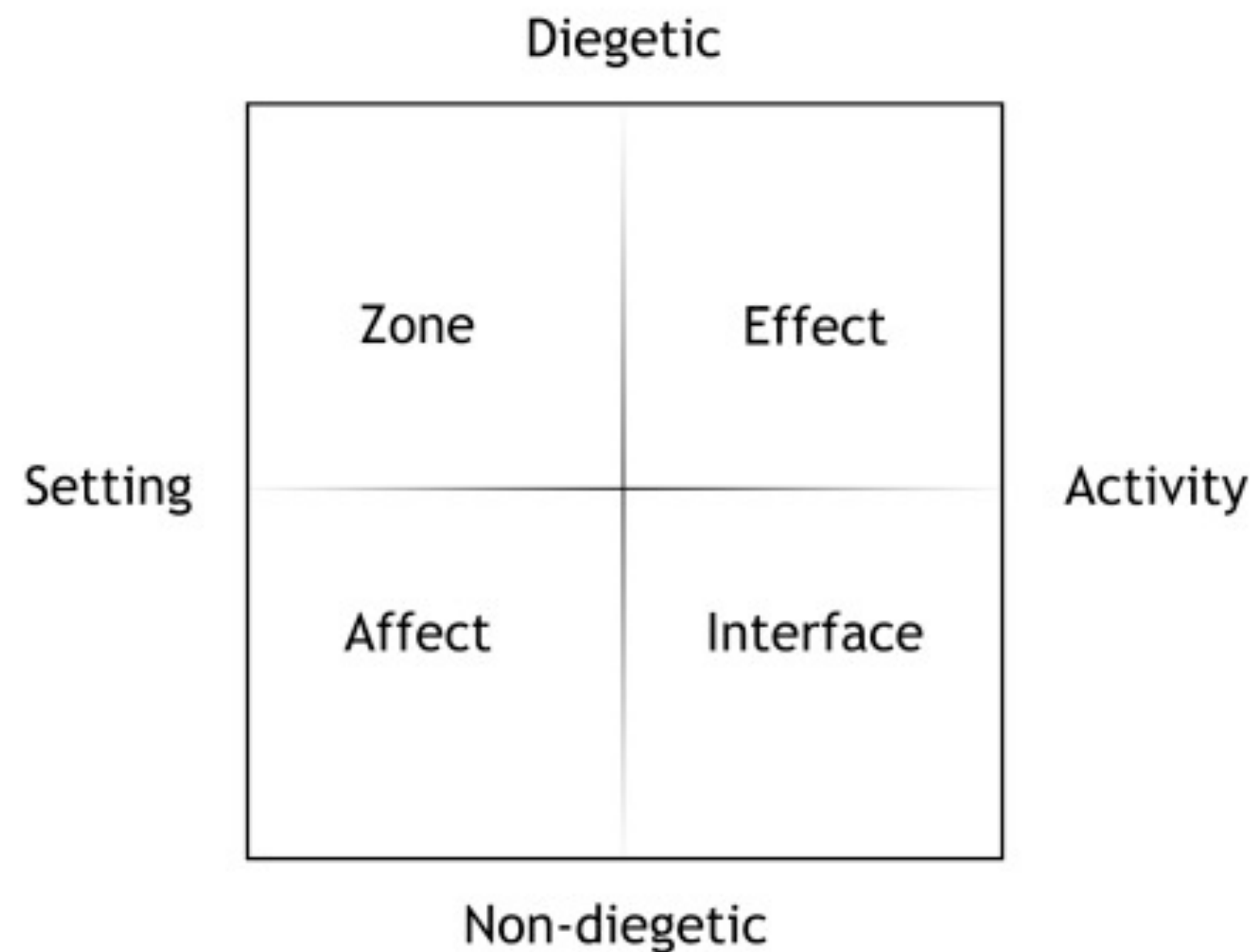
In Half-Life 2 machen die Combines charakteristische Sounds

To determine what does/does not need a sound effect:

- Does it move?
- Does it draw attention to itself?
- Does it tell the player something they can't see visually?
- Could it set a mood?

If the answer is yes to any of these questions, that object needs a sound.

Sound-Arten



<http://creativehero.es/IEZA>

+Dialogue

DX = Dialogue - any verbal speech in the game.

MX = Music - any non-diegetic music. (Affect)

SFX = Sound Effects (Hard Effects) - any sound from an real-life object. (Effect)

FOL = Foley - any sound effect that the player makes. (Effect)

BG = Backgrounds (ambience) - noise from the environment (Zone)

<http://frost.ics.uci.edu/ics62/BasicsofSoundDesignforVideoGames-MichaelCullen.pdf>

+Interface

Schlechte Beispiele



<https://youtu.be/UGaU2TFmFJU?t=4m30s>

- DX - no character DX (from soldiers)
- MX - has vocals
- MX - too loud
- BG - no ambient BGs whatsoever
- SFX - same russian lines while adding vehicles
- SFX - most SFX repetitive (vehicles moving and firing)
- SFX - chaotic, not responsive to players current actions



<https://youtu.be/1DDHWKXvj8Y?t=1m54s>

- BG Music - drops out unexpectedly
- BG Music - too loud
- BG - no ambient sounds whatsoever (doesn't distinguish sand/mountain)
- SFX - motorcycle has no variety
- SFX - wood hits no variety
- SFX - no tire skids for dirt vs. metal vs. wood
- SFX - no human breaths/grunts
- SFX - no "level up / success" SFX after finishing level



<https://youtu.be/gt6MDmU44dw?t=8m6s>

- DX - no breathing, grunts, other character's yells
- MX - too loud
- BG - no ambient sounds
- FOL - no sound of player weapon hitting
- SFX - motorcycles have no variety
- SFX - wood hits no variety
- SFX - no tire skids for slides/spinouts
- SFX - no "level up / success" SFX after finishing level

Gute Beispiele

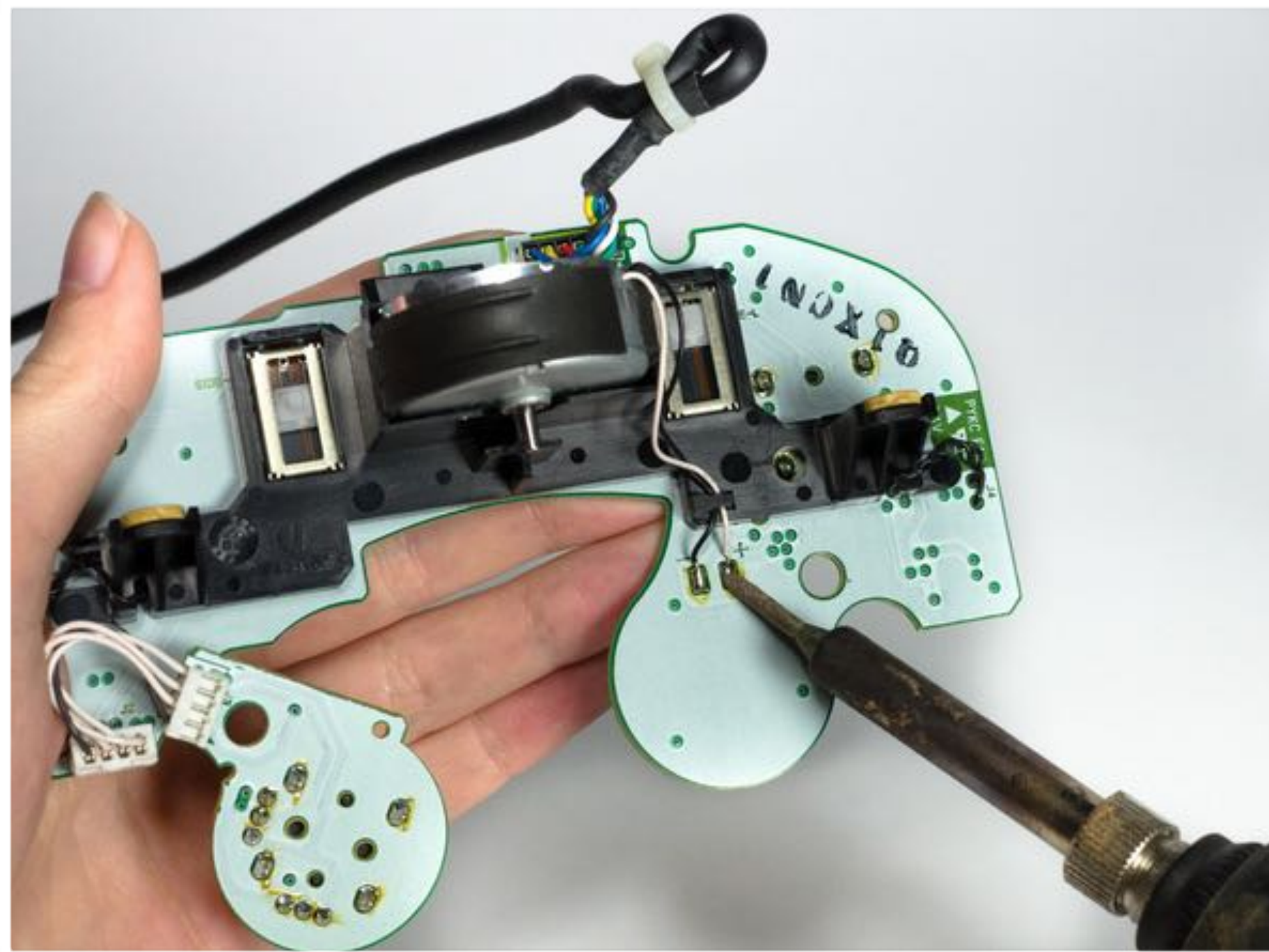
Game Developers Choice Awards: Audio



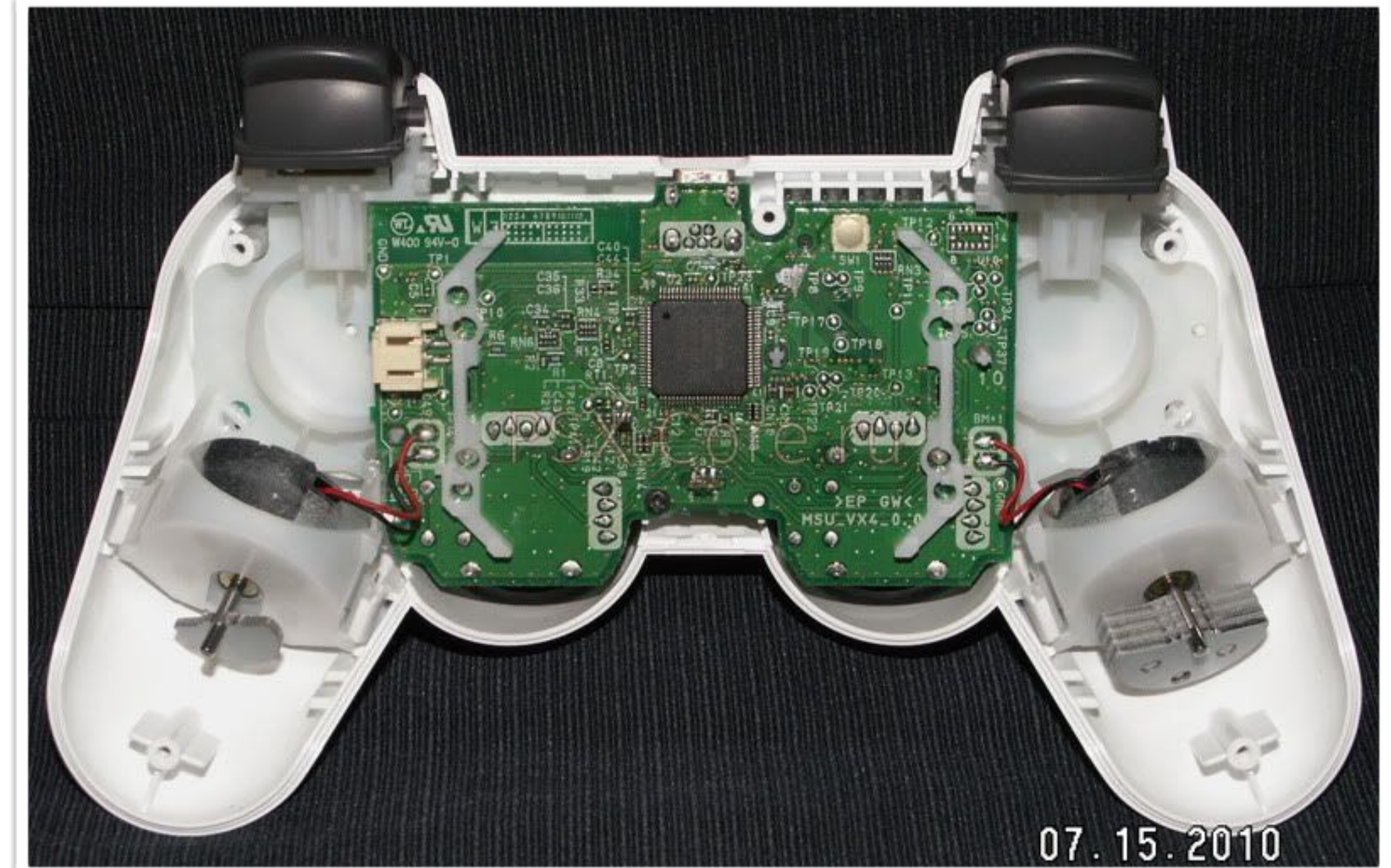
2000: Diablo II
2001: Halo: Combat Evolved
2002: Medal of Honor: Allied Assault
2003: Call of Duty
2004: Halo 2
2005: Guitar Hero
2006: Guitar Hero II
2007: BioShock
2008: Dead Space
2009: Uncharted 2: Among Thieves
2010: Red Dead Redemption
2011: Portal 2
2012: Journey
2013: BioShock Infinite
2014: Alien Isolation
2015: Crypt of the NecroDancer
2016: Inside

Fühlen: Haptisches Feedback

Rumble



GameCube Controller



Playstation-Controller

3RD Space Vest (2008)



Call of Duty 2 and Call of Duty 4
Turning Point - Fall Of Liberty
You Are Empty
Blacksite
Bioshock
Frontlines: Fuel Of War
Rainbow Six Vegas 2
Turok
Mass Effect
F.E.A.R.
Prey
TimeShift
Crysis
Unreal Tournament 3
Clive Barker's Jericho
Halflife 2: Episode 1 and 2
Medal Of Honor Airborne
Enemy Territory Quake Wars
Quake 4
Doom 3
Farcry 2
Mercenaries 2
Fable
World of Warcraft

Why Manus VR

Full hand presence



Arm tracking



Washable product



Haptic feedback



Affordable



Wireless & realtime tracking



Low computational requirements



Unrestricted FOV



Open-source SDK



Unity sample project

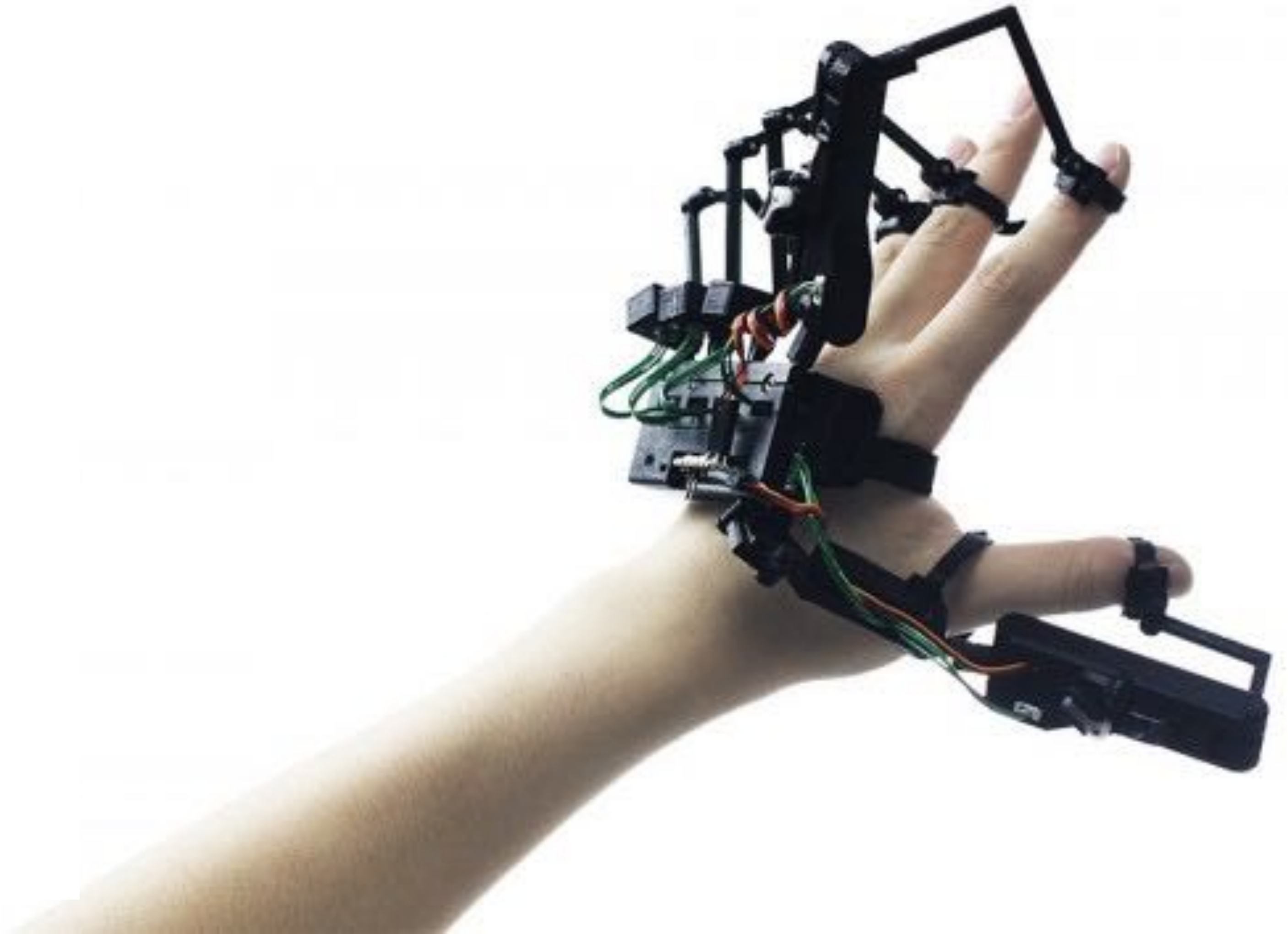


No calibrations



Compatible with main VR platforms

Exoskeleton Glove



Dexmo



<https://blog.arduino.cc/2017/02/07/unlimitedhand-joins-atheart/>



<https://www.youtube.com/watch?v=dTpOG4ZYrXU>



ARENA Infinity Haptic VR Gun



Cyberith Virtualizer





AxonSkin interior lining
• Thermal and tactile feedback

Two-piece suit with gloves and boots
• Full-body coverage

Quick “snap” connectors
• Pair AxonSuit with AxonStation

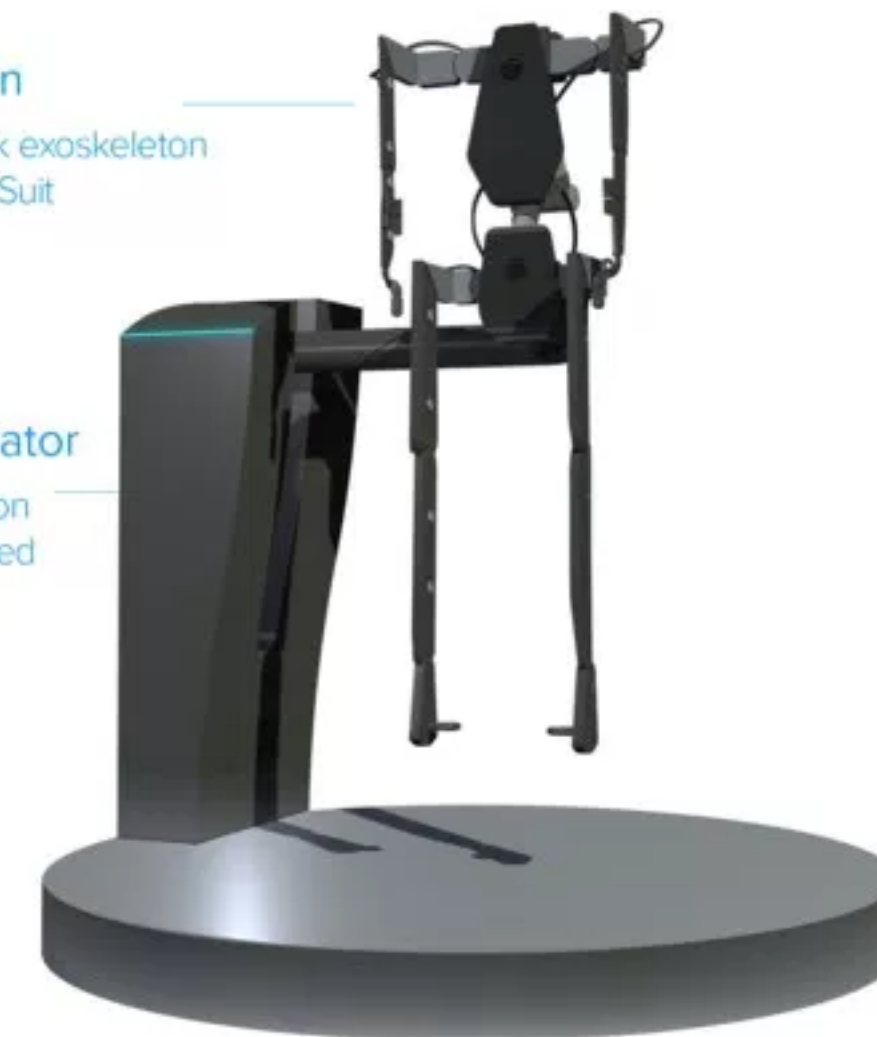


AxonSkeleton

- Force-feedback exoskeleton
- Pairs with AxonSuit

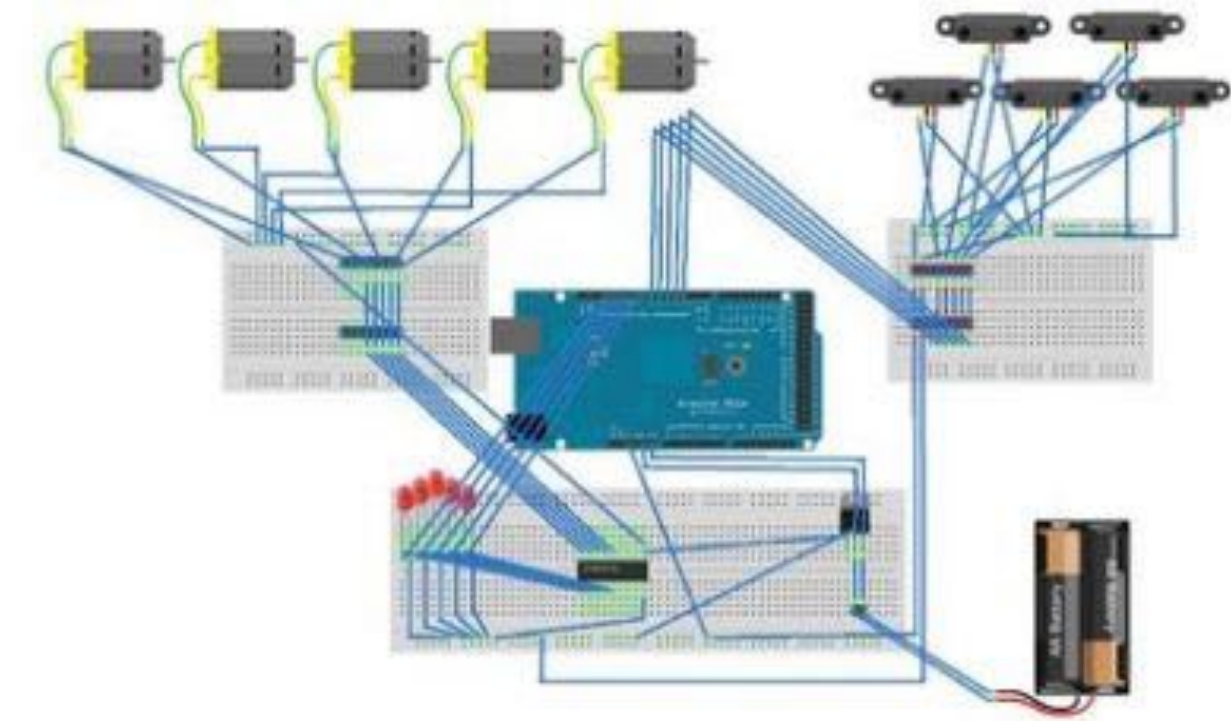
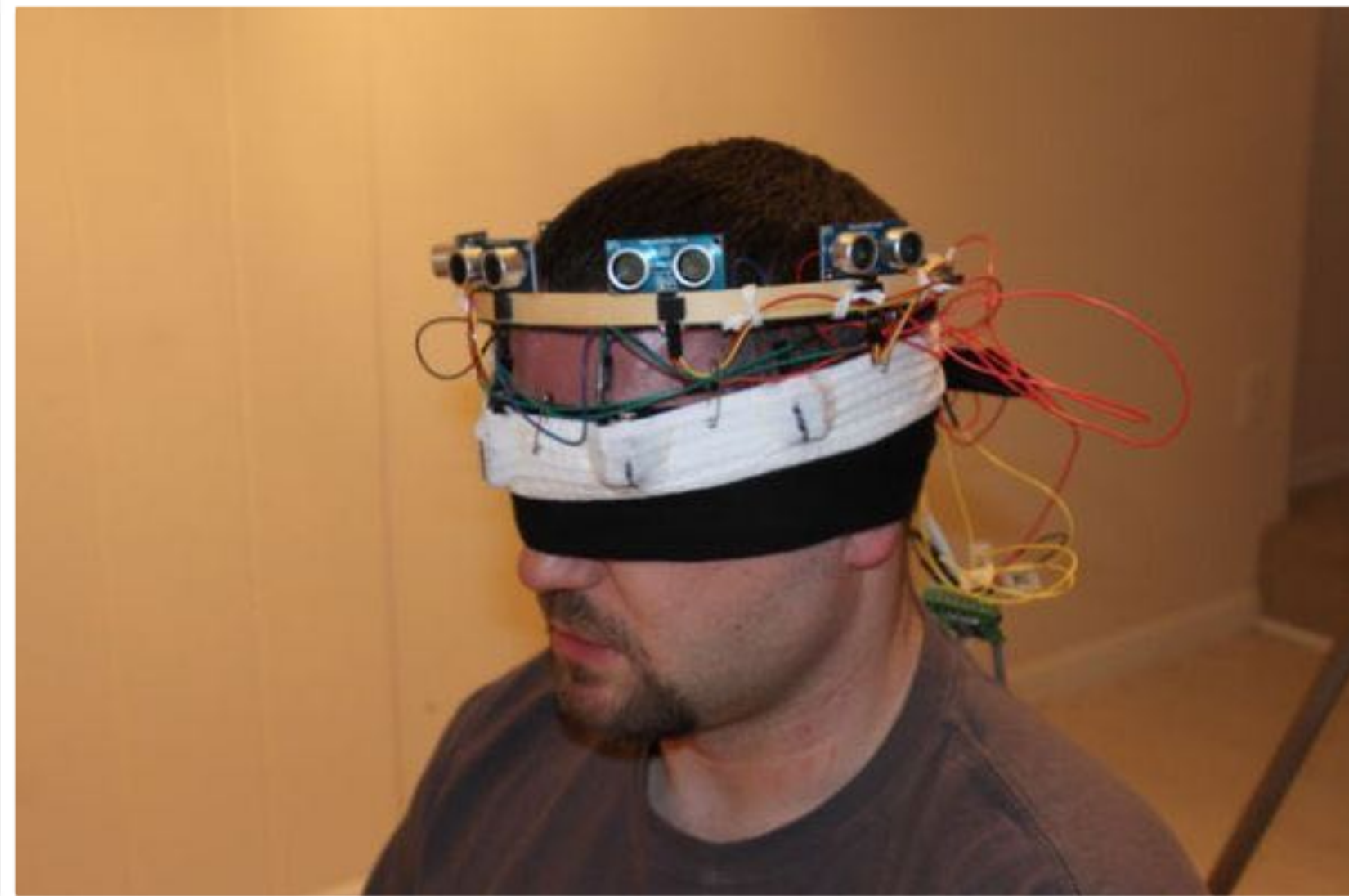
Motion simulator

- Four-axis rotation
- Enables unlimited locomotion



<http://axonvr.com/>

Experimentelle Interfaces



<http://duino4projects.com/haptic-feedback-device-visually-impaired-project-halo-using-arduino/>

Riechen

**WE USED SPECIAL TECH TO
ACTUALLY SMELL A VIDEOGAME**



**AND IMMEDIATELY
REGRETTED IT**



Nosulus Rift

Spiele zum Anfassen: Retail-Vertrieb



Jewel Case Hülle

Datenträger-Bedruck

Booklet

Verpackung

Website

Poster

Aufsteller



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Just the thing for attacking microscopic civilizations.



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ONE HUNDRED ALTAIRIAN DOLLARS?
TWO HUNDRED? THREE HUNDRED?!**

**** Not recommended for driving.

Feelies

Sammler-Editionen

Verpackung

Artwork

Poster

Kleidung

Figuren

Soundtrack

DLC

Sammelkarten



Preorders

Features [hide]		Standard Edition	Special Edition	Vigilante Edition	Uplay Exclusive Edition	Limited Edition	Dedsec Edition	Digital Deluxe Edition	Uplay Deluxe Edition	Gold	Season Pass
Exclusivity				Europe, Middle-East, Asia and Australia	Uplay Store (Ubishop)	North America	Europe, Middle-East, Asia and Australia	Only PC and Playstation	Only PC, Uplay Store (Ubishop)	Playstation Store	
Game Disc		Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Digital Download		No	No	No	No	No	No	Yes	Yes	Yes	Needs basic game
Additional content	White Hat Pack	Only Playstation	Only Playstation	Only Playstation	Only Playstation	Only Playstation	Only Playstation	Yes	Yes	Only Playstation	No
	Breakthrough Pack	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
	Palace Pack	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
	Signature Shot Pack	No	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
	Untouchables Pack	No	No	No	Yes	No	No	Yes	Yes	Yes	Yes
	Cyberpunk Pack	No	No	No	Yes	No	No	Yes	Yes	Yes	Yes
	Blume Agent Pack	No	No	No	Yes	No	No	Only Playstation	Yes	Yes	Yes
	Dedsec Pack	No	No	No	Yes	No	No	No	Yes	Yes	Yes
	T-Bone's Single Player Campaign DLC	No	No	No	No	No	No	No	No	Yes	Yes
	Conspiracy Mode Digital Trip DLC	No	No	No	No	No	No	No	No	Yes	Yes
Watch Dogs Map of Chicago		No	No	No	No	No	Yes	No	No	No	No
Exclusive Packaging		No	No	Yes	No	Yes	Yes	No	No	No	No
Original Soundtrack		No	No	Yes	No	Yes	Yes	No	No	No	No
Aiden Pearce's iconic cap		No	No	Yes	No	No	No	No	No	No	No
Aiden Pearce's Vigilante mask		No	No	Yes	No	Yes	No	No	No	No	No
Steelbook		No	No	No	Yes	Yes	Yes	No	No	No	No
23 cm (9 inch) Aiden Pearce Figurine		No	No	No	No	Yes	Yes	No	No	No	No
Artbook		No	No	No	No	Yes	Yes	No	No	No	No
4 Augmented Reality Cards		No	No	No	No	No	Yes	No	No	No	No
3 Exclusive Badges		No	No	No	No	No	Yes	No	No	No	No

Barrierefreiheit

<http://gameaccessibilityguidelines.com/full-list>



General

Motor Control / Mobility

Cognitive

Vision

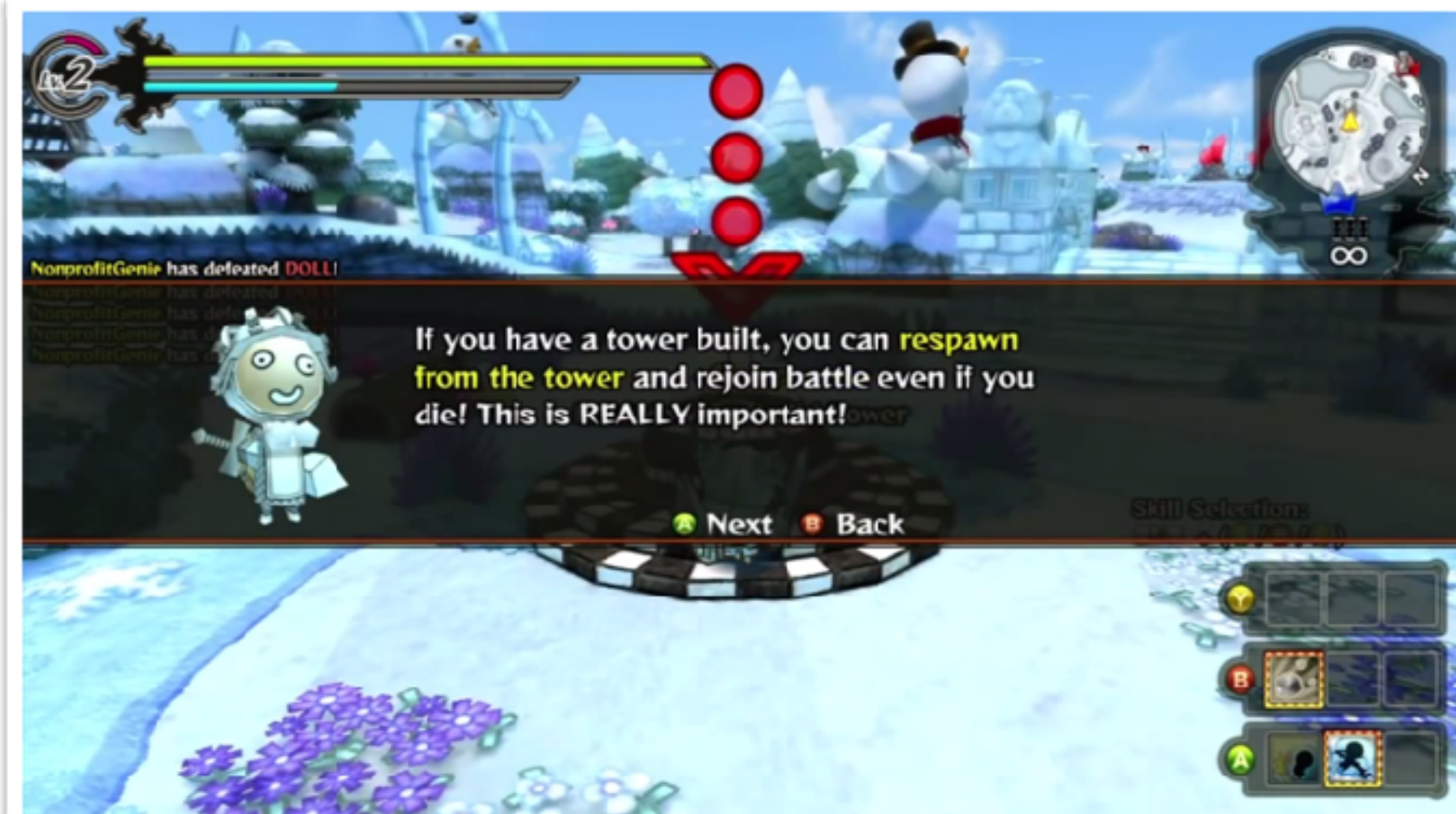
Hearing

Speech

Game Accessibility



Counterstrike: Global Offensive control options



Happy Wars instructions

Allow all controls to be remapped

Add closed-captioning for all dialog and important sound effects

Provide documentation in an accessible format such as HTML or plain text

Provide assist mode such as auto-targeting, training options, etc

Provide a range of difficulty levels

Make interface fonts scalable

Allow for high-contrast color-schemes

Add audio tags to all significant elements including actors, doors, items, user interface elements, etc

Allow for a varied range of control over play speed

Announcer accessibility features on the packaging and website

http://www.gamasutra.com/blogs/BenLewisEvans/20170601/299072/Game_Accessibility_An_Epic_Primer.php

Farbfehlsichtigkeit

<http://www.color-blindness.com/coblis-color-blindness-simulator/>



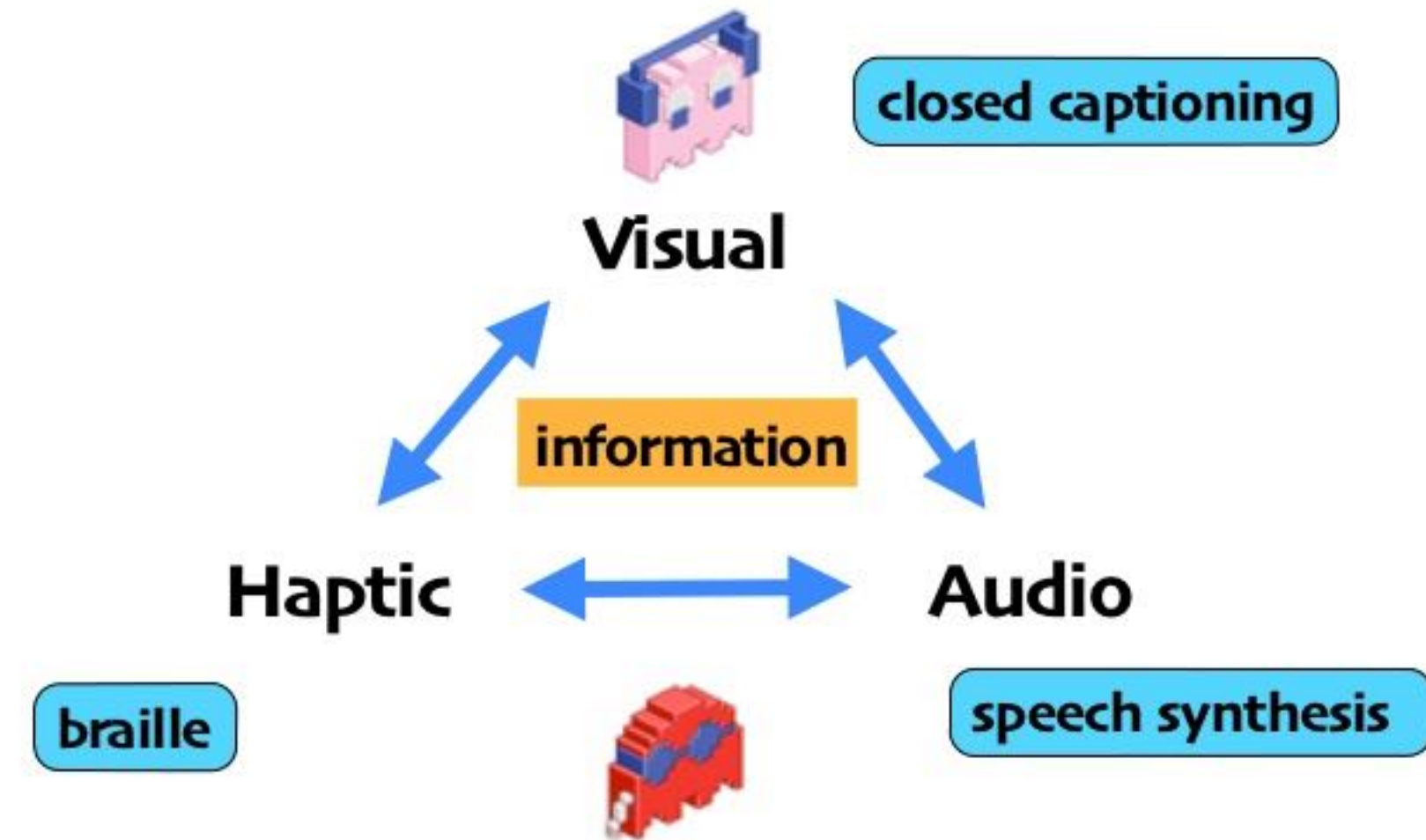
Real Time Sensory Substitution

Real Time Sensory Substitution



Thursday, June 30, 2011

Sensory Substitution



Player-Game Interaction Research
University of Nevada, Reno

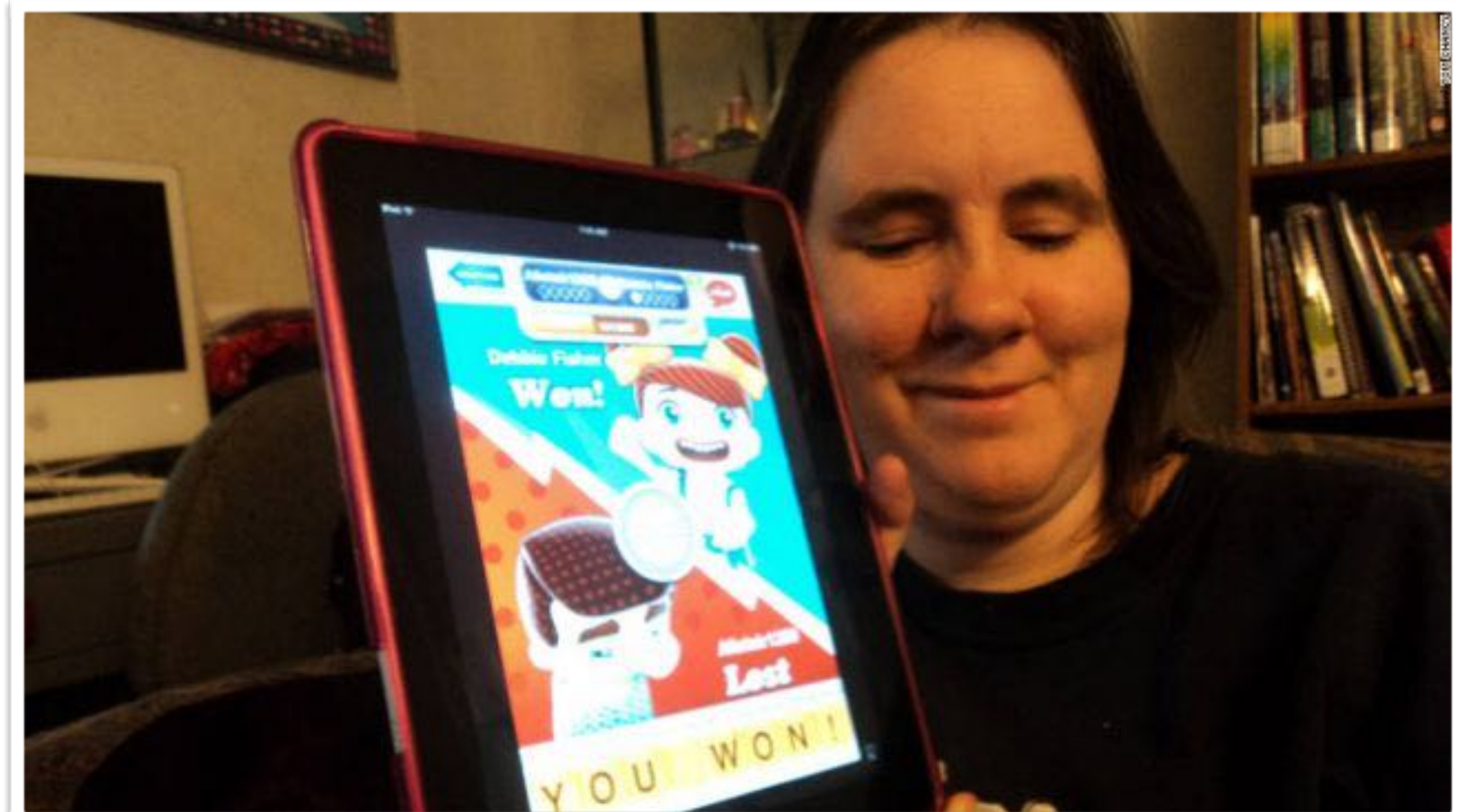
Thursday, June 30, 2011

Spiele für Blinde

http://www.gamasutra.com/blogs/IanHamilton/20170515/298020/The_rapidly_changing_landscape_of_accessibility_for_blind_gamers.php



Blind gamer Carlos Vazquez (OBSKHRattlehead) competing at EVO, playing Mortal Kombat X through good sound design alone



Blind gamer Debbie Fisher with Hanging with Friends, a game that she was able to play using a screenreader without developers having put in any blind-specific dev time