

The Screens of *Inside Out*

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What does the existential mind of an eleven year old girl named Riley look like? How do you design a universe that's unfamiliar but instantly recognizable to the audience? While some exposition explains core components of our protagonist's mind, most of the world's functionality is subtly implied through it's design. This talk discusses the research and story needs that inspired the look of *Inside Out*'s screens, as well as the collaborative nature that guided their technical implementation.

1 Representing Consciousness

The sensory screens display Riley's state of consciousness, acting as the sole bridge her emotions have to the outside world. The challenge was to ensure the audience could immediately distinguish these four states visually.



Figure 1: Designs for *Inside Out*'s sensory screens. ©Disney / Pixar. All rights reserved.

The consciousness screen is the most prominent and featured of the four, displaying what Riley sees to her emotions. The wispy hairs pay homage to neural networks, complemented by a curved shape to reinforce the soft and playful nature of Headquarters. Peripheral vision is taken into account with a centrally focused projection, falling away softly at the edges of Riley's field of view. Memories are conceived as a projected image of an event tinted by the associated emotion's color. The softer quality of these projections is also a nod to the haziness of recalled memories. The edges of dreams are distinguished by an undulating separation of it's RGB colors and a rectangular shape to echo the feeling of watching an old CRT television. Imaginations are an alteration of what Riley sees and are presented as an overlay on top of the consciousness screen, much like a magic marker outlining and embellishing a picture.

2 Supporting The Story

We represent these abstract ideas of consciousness using familiar concepts to help the audience understand their purpose implicitly. For example, memories are spheres illuminated by a beam of light unto the screen. This is commonly associated with a projector or slideshow that displays images of past events, a subconscious association that helps us focus the audience's attention on the story instead of the world's mechanics.

The audience also experiences Riley's world through these screens, so controls for the clarity, placement, and color of the projected

image were critical for a shot's composition and emotional impact. The consciousness screen is intentionally neutral in color, allowing the projected shot's lighting to dictate the mood of the scene. Moreover, associating memories with the emotion's color was critical to the story, so a neutral tone helped to further distinguish consciousness from the other states.

3 Collaboration and Technical Approach



Figure 2: Final render of the consciousness screen in *Inside Out*. ©Disney / Pixar. All rights reserved.

Collaboration between the art, sets, and lighting departments played a key role in translating these concepts visually for the film. For example, as the story evolved we realized the screen should feel more like a portal to the outside world rather than a flat projection. Initial looks development experimented with particles and complex shaders but the need for quick iteration and control dictated a more streamlined approach. Since the screens play such a prominent role, appearing in over 100 shots with high rendering costs, our technical implementation favored two key principles: simplicity and flexibility.

Shading provided a base material, outputting key components of the look via AOVs for compositing in Nuke. Lighting created a series of Nuke macros so technical artists could easily maintain continuity. Low render times and macros allowed a wide group of lighters to iterate quickly and with flexibility to meet the needs of an ever changing story.

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