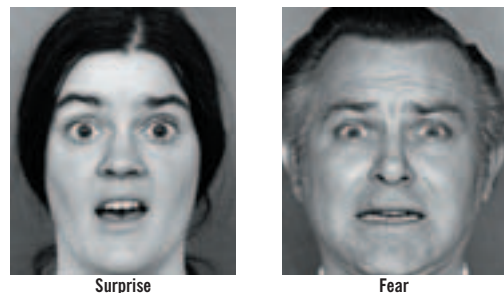


Valve knew early on that they wanted to spend a considerable investment in character facial expressions based on the relative success of the security guards and scientists in Half-Life.

“Once we had a plan for the art issues, we needed a way to do facial expressions. We looked at a lot of different methods; they were either really limited, really complicated, really expensive, or just really ugly. Sometimes, all of the above. Luckily we found a very simple method from outside of traditional computer graphics. In the early 70’s a Dr. Paul Ekman was looking to see if he could diagnose mental illness based on facial expressions. Before he could start, he needed a way to describe what the patients were actually doing with their face, not in terms of a high level expression, but some sort of clinical grammar he could use to describe the underlying movements. What he came up with was a set of about 40 or so different “Facial Action Units,” really simple things like ‘raise your eyebrows,’ ‘pucker your lips,’ ‘drop your jaw,’ ‘flair your nostrils,’ and so on and wrote clinical descriptions of exactly what each looked like, and more importantly, the rules about how they all combined together. His goal was so clinicians would score the same facial expression with the same Facial Action Units, but it turns out that if you reverse this and build the rules into a computer generated face, you can create a face that not only does the full range of human expressions, but it’ll never do something that’s physically impossible. This is critical for a game, where unlike a movie, if there’s some flaw in the computer generated character the animators can catch and fix the problem before it ever makes it to the screen. But in a game, we regenerate the scene from scratch subtly different and adjusted to all sorts of external events each and every time you play, so it always has to make sense.”

- Ken Birdwell



Faceposer

Valve’s Faceposer tool in action (right). Faceposer allows authoring not only of facial expressions, but also of body language, gestures, and stage directions for all the actors in a scene. All of these instructions are passed through the AI system so that the game can automatically adjust to changes in the game environment, as well as to actions of the player.

“We knew that the only way we had a chance to complete the nearly three hours of character acting without an army of animators was by developing a library of gestures and postures that we could layer in Faceposer. We developed smart blending rules and influence ramps that enabled us to reuse our library of gestures and postures over and over again without appearing redundant. Each of our main characters had their own unique library which established their personality. Not only was it essential from a production standpoint, but it was a great way to keep continuity.”

- Bill Fletcher

