



# CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

<b>Name(s)</b> <b>Dylan J. Karlsson</b>	<b>Project Number</b> <b>J0317</b>
<b>Project Title</b> <b>Exploring the Uncanny Valley: Stylized Animation vs. Computer Generated Imagery</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective was to see if the psychological theory of the uncanny valley (Freud/Jentsch), as applied to robotics by Dr. Masahiro Mori in the 1970s, is scientifically valid, does it apply to media images such as stylized animation and computer generated imagery (CGI), and do age differences affect how these images are viewed. The theory explains the uneasy feeling people get when seeing something that looks almost human, but has certain flaws, which make the non-human characteristics stand out. The debate as to media images grew with the release of The Polar Express (2004), using CGI photorealism to replicate characters, was viewed as discomfoting while The Incredibles, using stylized animation did not attempt to look like normal humans and was more appealing. It is hypothesized that subjects who view stylized images will have a more positive reaction than similar CG images, because if the image is more realistic, its non-human flaws will stand out and likeability will decrease.</p> <p><b>Methods/Materials</b> Using Moris graphing of the uncanny valley, 14 animated images and 14 similar realistic CG images, ranging from robotic to human, were gathered. A questionnaire was used for testing. Four age groups, and 28 subjects, 7 from each group, were surveyed. Each subject rated the image on a visual analog scale, from 0 (dislike the image) to 10 (enjoy the image). Controls were in place and variables were accounted for in the testing.</p> <p><b>Results</b> The scientific validity of the theory was proven and the curves on the graphs, especially for stylized animation, are for the most part the same as with Dr. Moris graph as distinct uncanny valleys were formed. Older subjects, aged 30 and above, rated more images as falling into the uncanny valley as compared to younger subjects. The subjects however actually had a slightly more positive reaction to seeing CGI, than with seeing stylized animation, and disproved that part of my hypothesis.</p> <p><b>Conclusions/Discussion</b> The uncanny valley does exist and applies to stylized animation and to a lesser extent computer generated images. The subjects had a slightly more positive reaction in seeing CGI than with stylized animation, and this was more so with younger people, a group exposed to CGI with videogames. Continuing technical advances in CGI technology such as in the movie Avatar will likely increase realism and viewer likeability with CGI and allow media producers to avoid the uncanny valley.</p>	
<b>Summary Statement</b> A study of the theory of the uncanny valley, using quantitative data from surveys, to prove or disprove if the theory is scientifically valid, does it apply to media images and do age differences affect how these images are viewed.	
<b>Help Received</b> My parents helped to find subjects for testing and my dad helped with some of the board layout.	