**Effects of image dynamic range on perceived surface gloss**

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One of the defining characteristics of glossy surfaces is that they reflect images of their surroundings. High gloss surfaces produce sharp reflections that show all the features of the surround, while low gloss surfaces produce blurry reflections that only show bright “highlight” features. Due to the presence of light sources and shadows, the illumination field incident on a glossy surface can have high dynamic range. This means that the reflections can also have high dynamic range. However, in a conventional image of a glossy object, the high dynamic range reflections are compressed through tone mapping to make the images fit within the output range of the display. While the utility of conventional images demonstrates that the general characteristics of glossy objects are conveyed by tone-mapped images, an open question is whether the tone mapping process distorts the apparent gloss of the imaged object. We have conducted a series of experiments to investigate the effects of image dynamic range on perceived surface gloss. Using a custom-built high dynamic range display, we presented high dynamic range (HDR) and standard dynamic range (tone mapped, SDR) images of glossy objects in pairs and asked subjects to choose the glossier object. We tested objects with both simple and complex geometries and illuminated the objects with both artificial and natural illumination fields. We analyzed the results of the experiments using Thurstonian scaling, and derived common scales of perceived gloss for both the HDR and SDR object renderings. Our findings are that 1) limiting image dynamic range does change the apparent gloss of depicted objects - objects shown in SDR images were perceived to have lower gloss than identical objects shown in HDR images; 2) gloss differences are less discriminable in SDR images than in HDR images; and 3) surface geometry and environmental illumination modulate these effects.