

1 **Supplementary Material 1**

2 *Perceived rigidity*

3 Observers in *Experiment 1* reported that specular objects occasionally appeared  
4 non-rigid or even fluid like. Thus we investigate whether there was a systematic rela-  
5 tionship between perceived rigidity and perceived bumpiness for specular objects.

6 **Methods.** In a separate experiment we used a subset of stimuli from *Experiment*  
7 *1*. Specifically specular and matte-textured objects of bumpiness levels 1, 3, and 5.  
8 Objects either rotated either in depth around the vertical axis or around the viewing  
9 axis. All other presentation details are as in *Experiment 1*. Six observers compared  
10 test objects to a mixed-material reference object of the same bumpiness. On a given  
11 trial observers saw two objects (one test, one reference) on the screen and they had to  
12 indicate which of the two objects looked more rigid.

13 **Results.** A 2 (material) x 3 (bumpiness level) x 2 (rotation axis) ANOVA showed:  
14 even though specular objects are perceived as less rigid than matte-textured ones  
15 ( $F(1,5) = 55.68, p < 0.001$ ), this was true at all levels of bumpiness magnitudes  
16 (no main effect of bumpiness, no interaction between material and bumpiness), and for  
17 both rotation axes (no main effect of rotation axis, no interactions). Also see Fig. 1.

18 We conclude that perceived rigidity can not explain the perceived bumpiness of  
19 specular objects (no interaction between material and bumpiness).

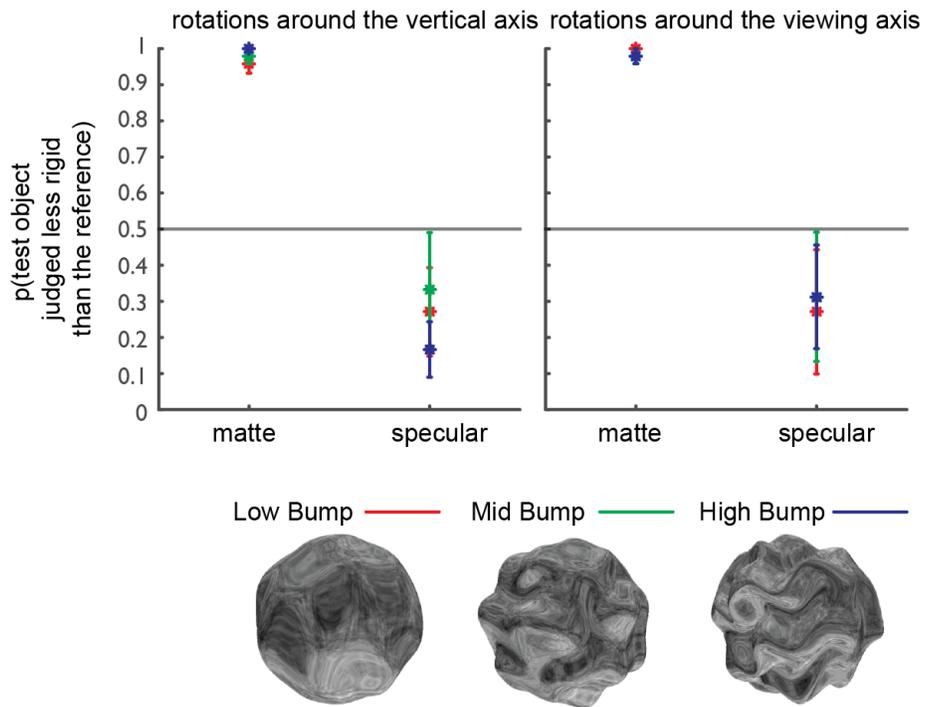


Figure 1: **Perceived rigidity.** Shown are the proportions of the test object perceived more rigid than the reference object for matte-textured and specular objects. The left and right panels show results for in-depth and viewing axis rotations, respectively. Colored lines depict data for three different bumpiness levels. Errorbars are 2SEMs.