

# Beyond Grasping – Back to Square One

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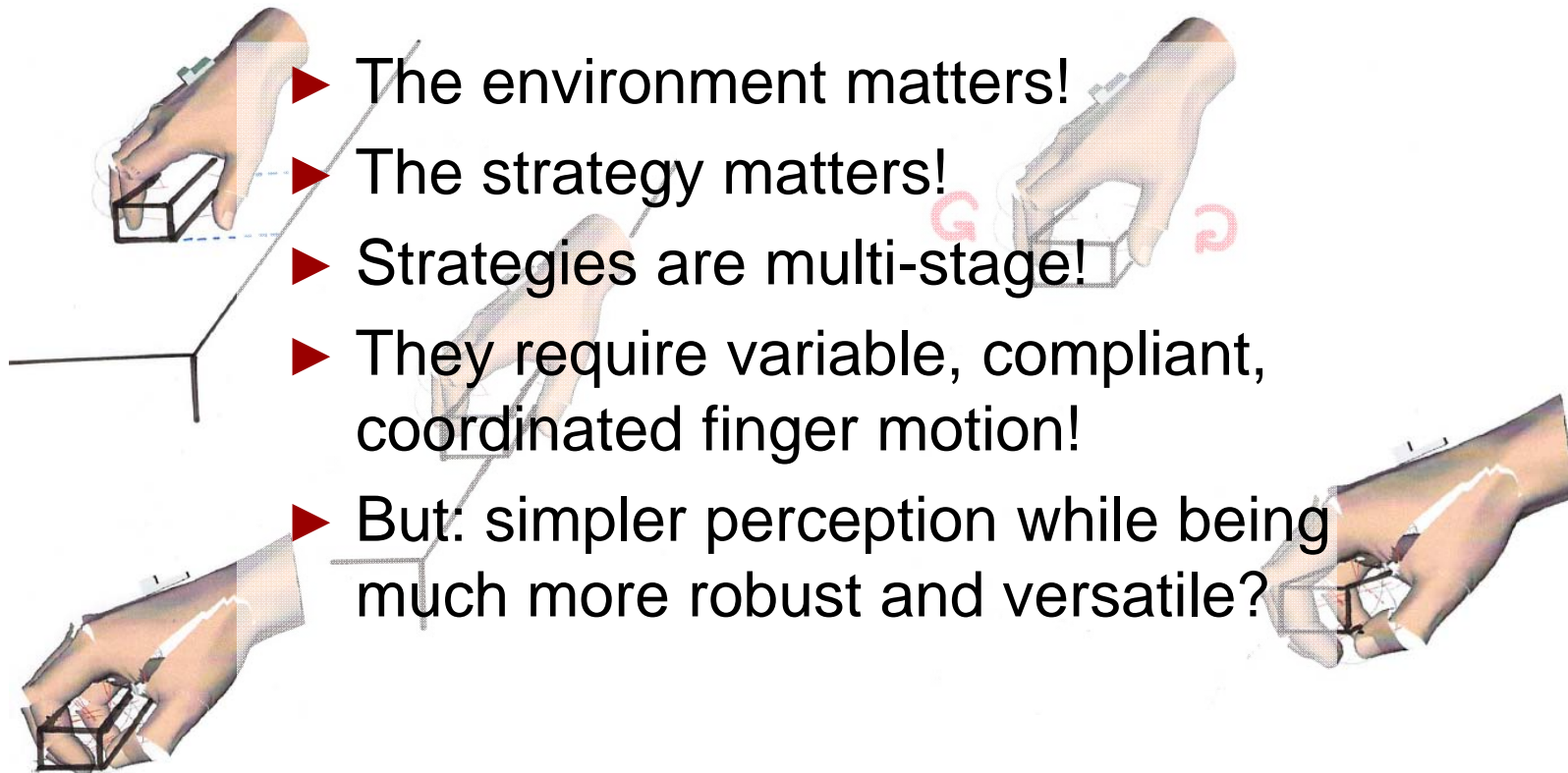


# Diversity of Human Grasping

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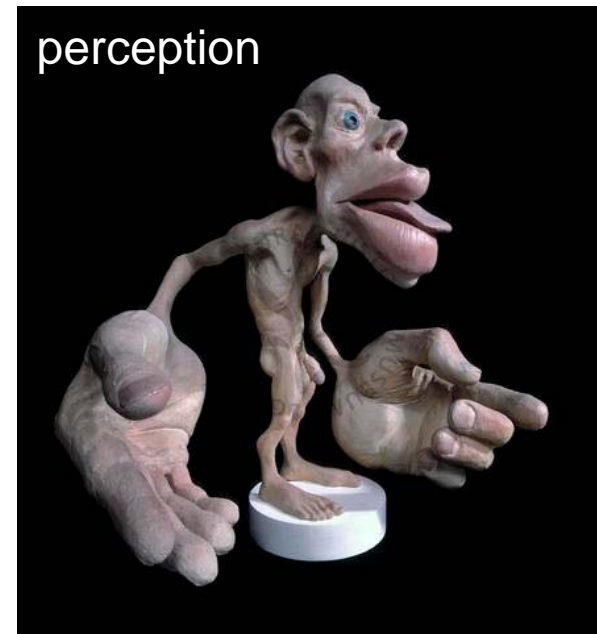
8: Power Pull Grasping

9: Scoop Grasping



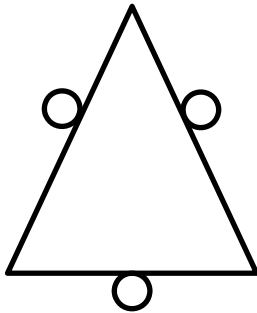
- ▶ The environment matters!
- ▶ The strategy matters!
- ▶ Strategies are multi-stage!
- ▶ They require variable, compliant, coordinated finger motion!
- ▶ But: simpler perception while being much more robust and versatile?

# Is There a “Beyond Grasping?”

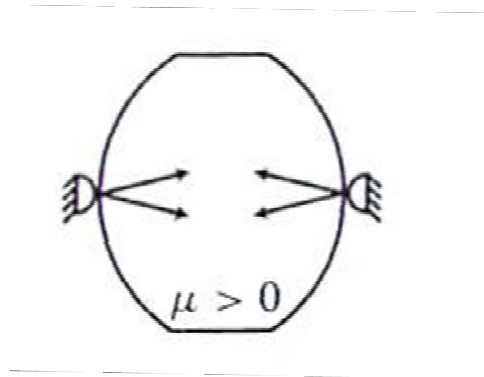


# Traditional Grasping Concepts

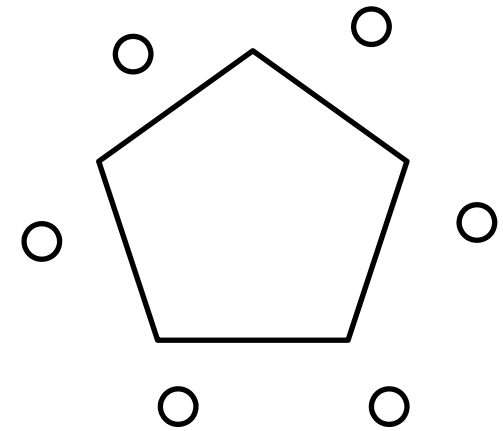
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Form closure

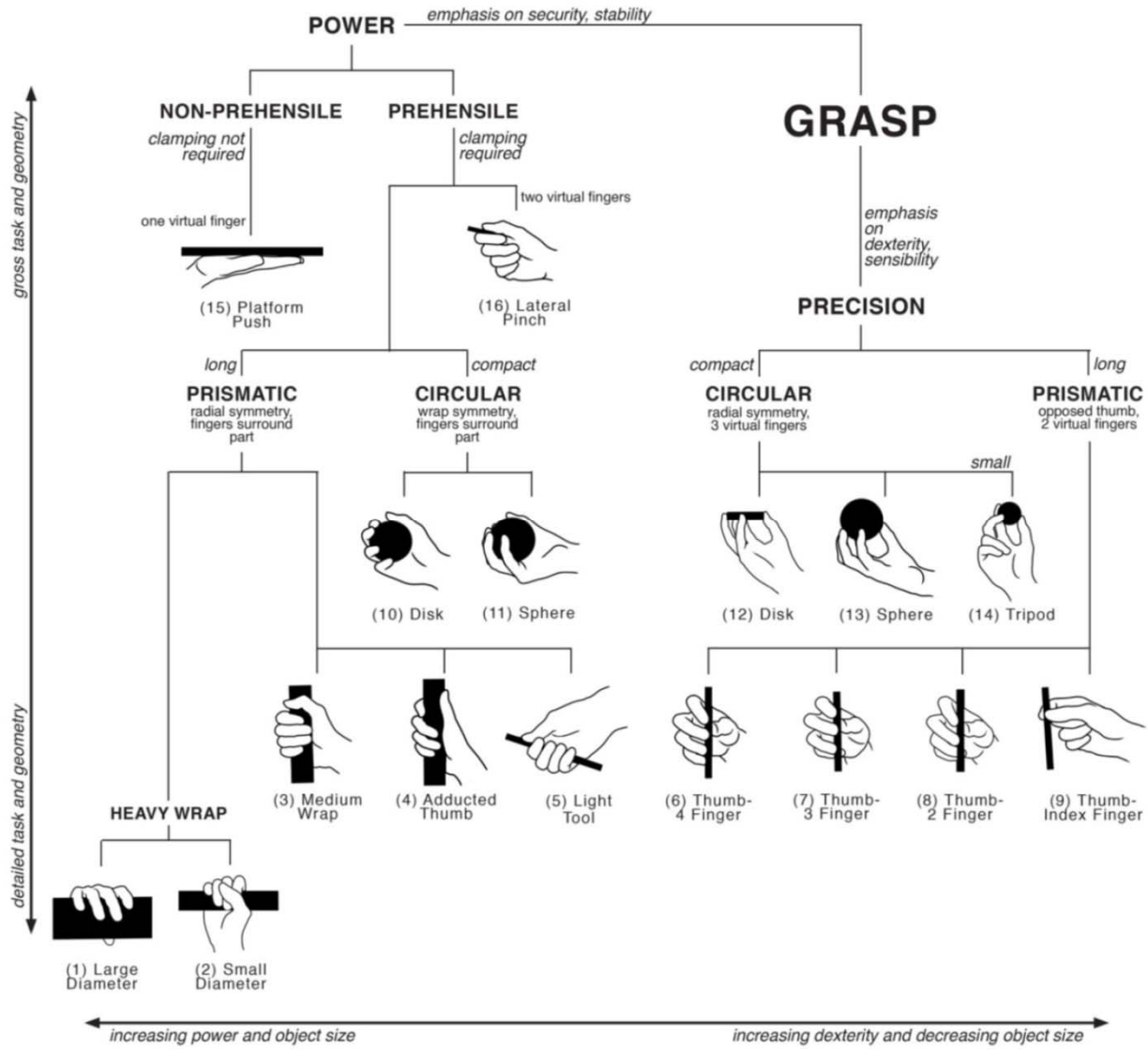


Force closure



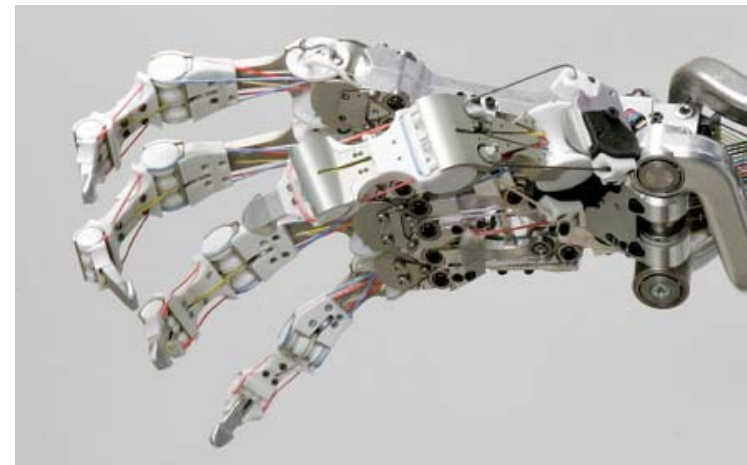
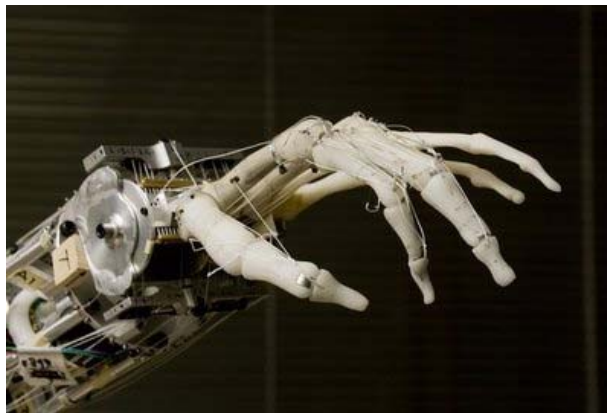
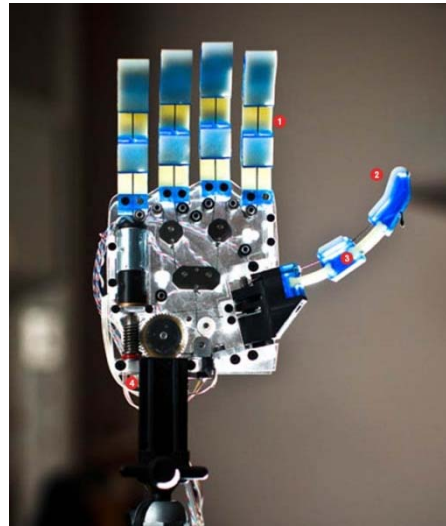
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# Traditional Grasp Taxonomy



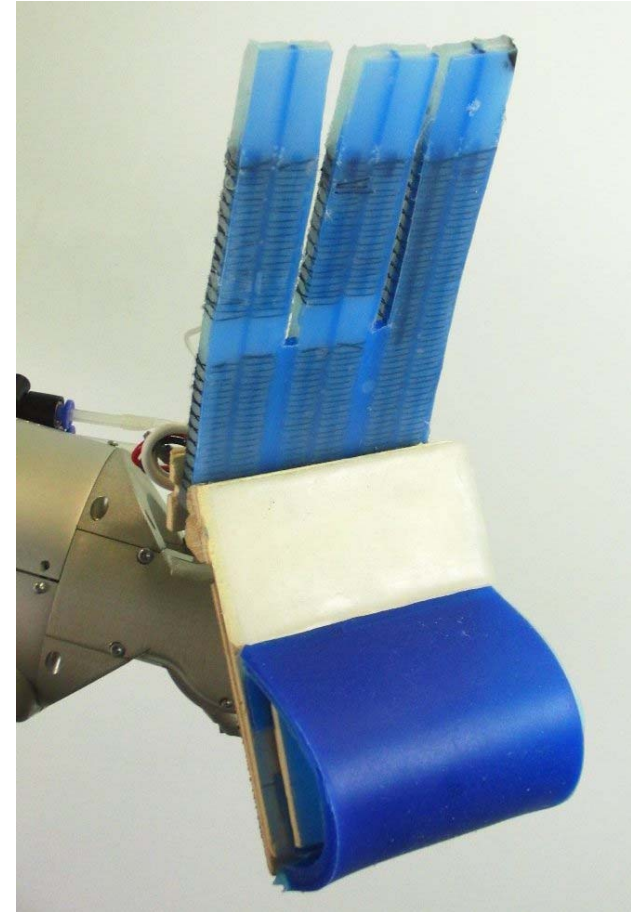
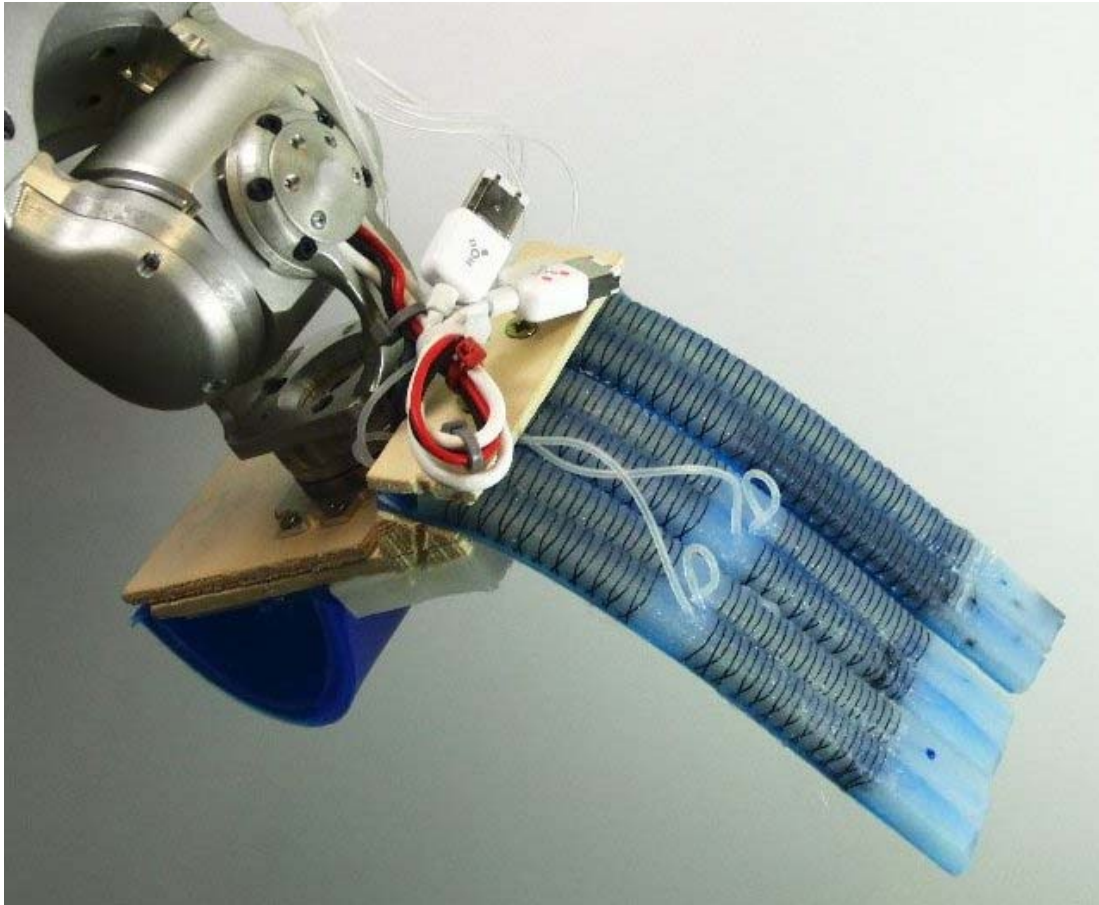
# Traditional Robotic Hands

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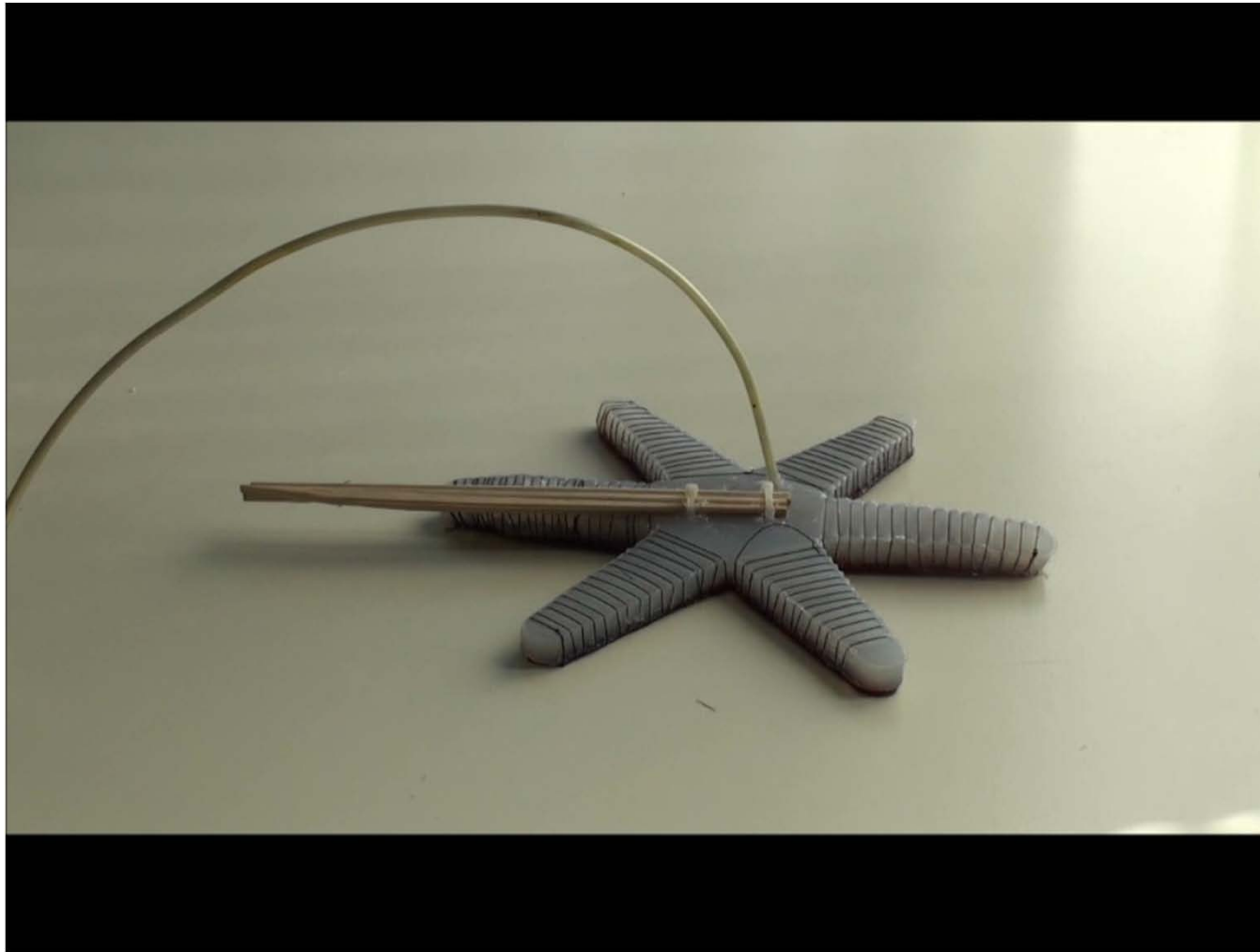
# RBO Hand

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# Starfish – Spherical Preshape

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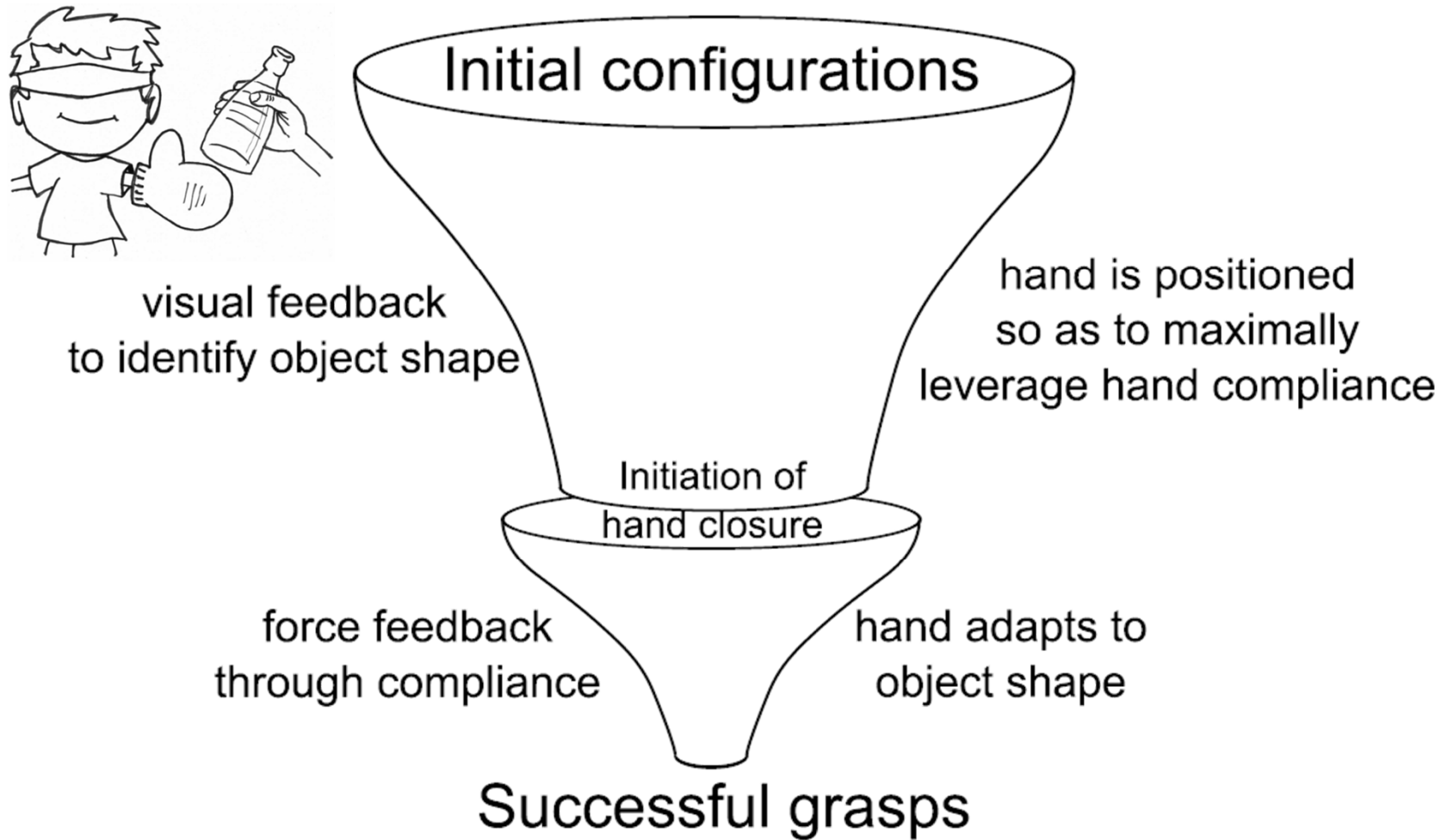
# Mitten Thought Experiment

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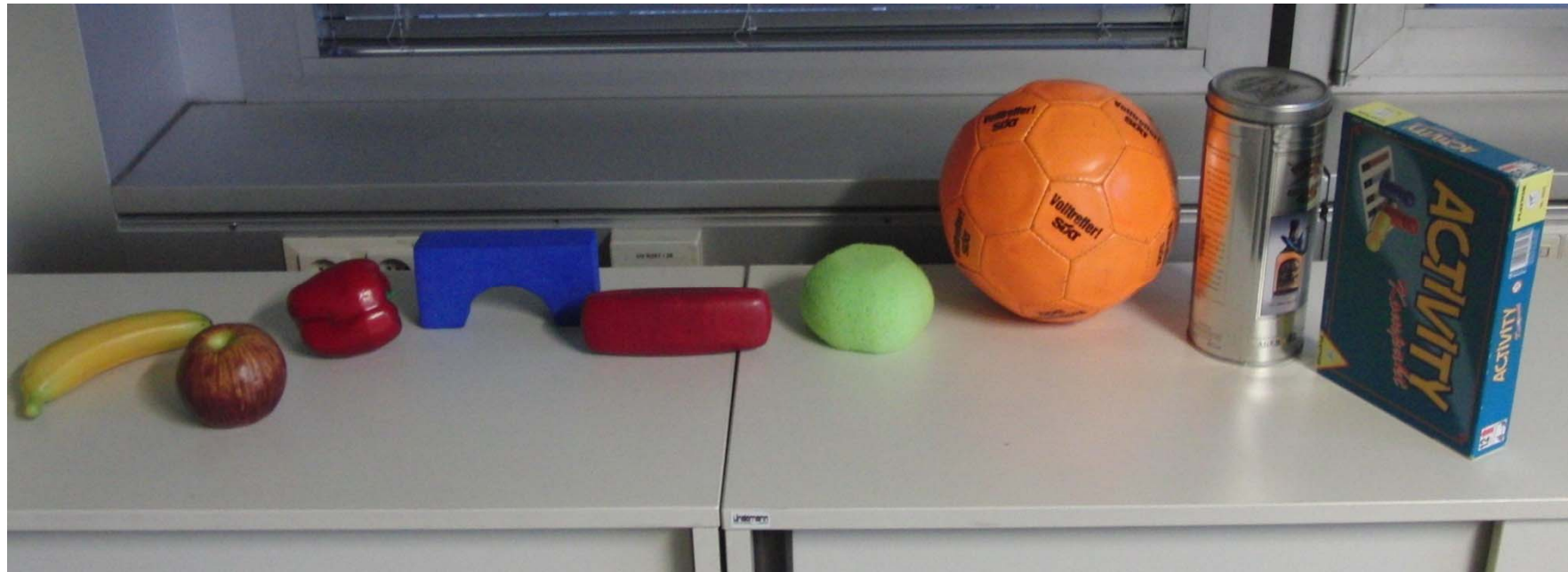
# A Compliance-Centric View of Grasping

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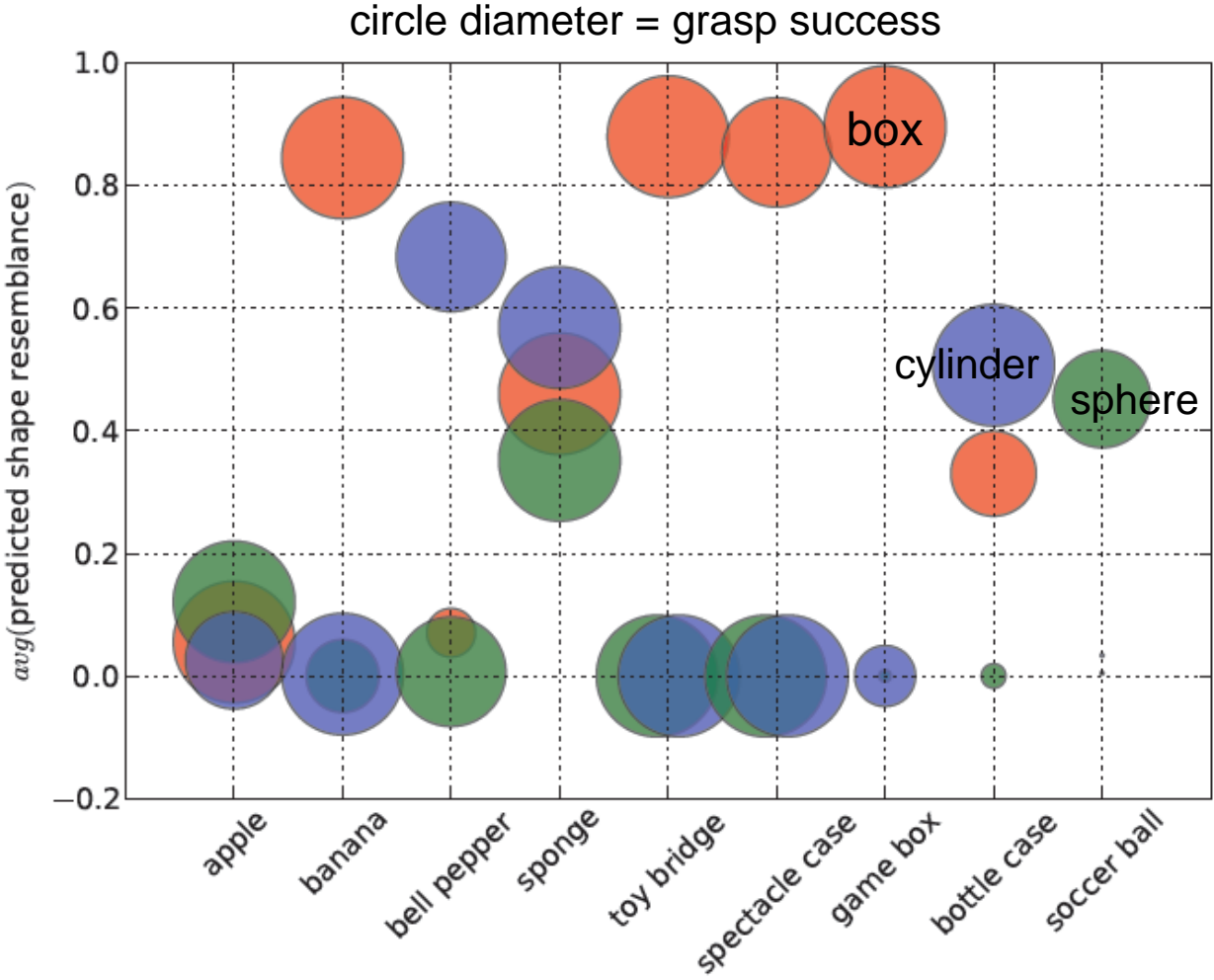


# Objects

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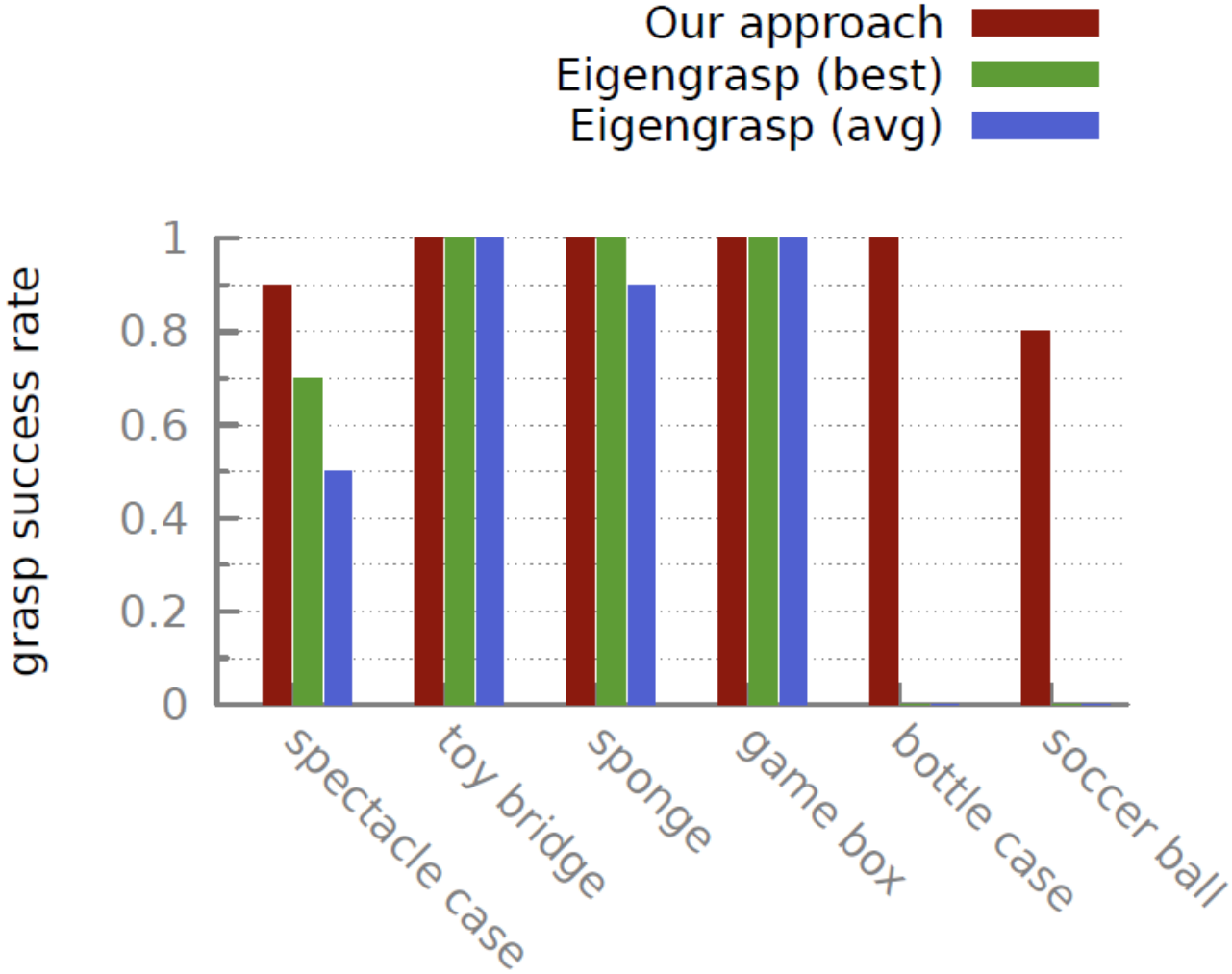


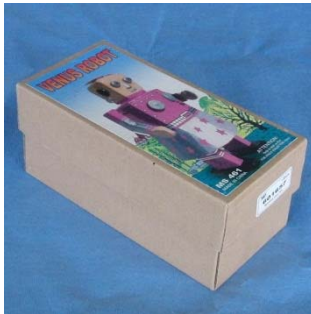
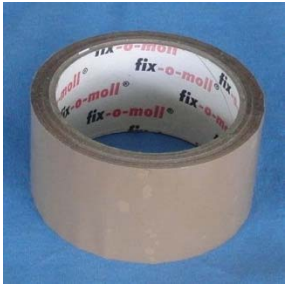
# Affordance Detection

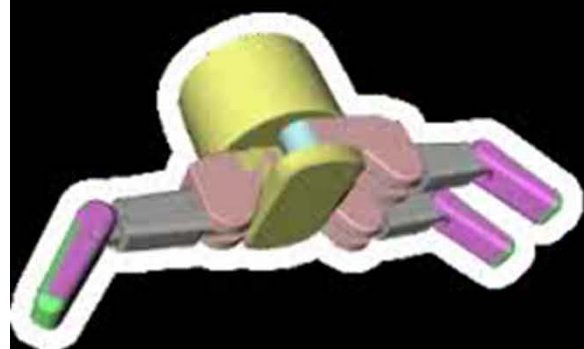


Clemens Eppner, Georg Bartels

# Does Accounting for Compliance Help?



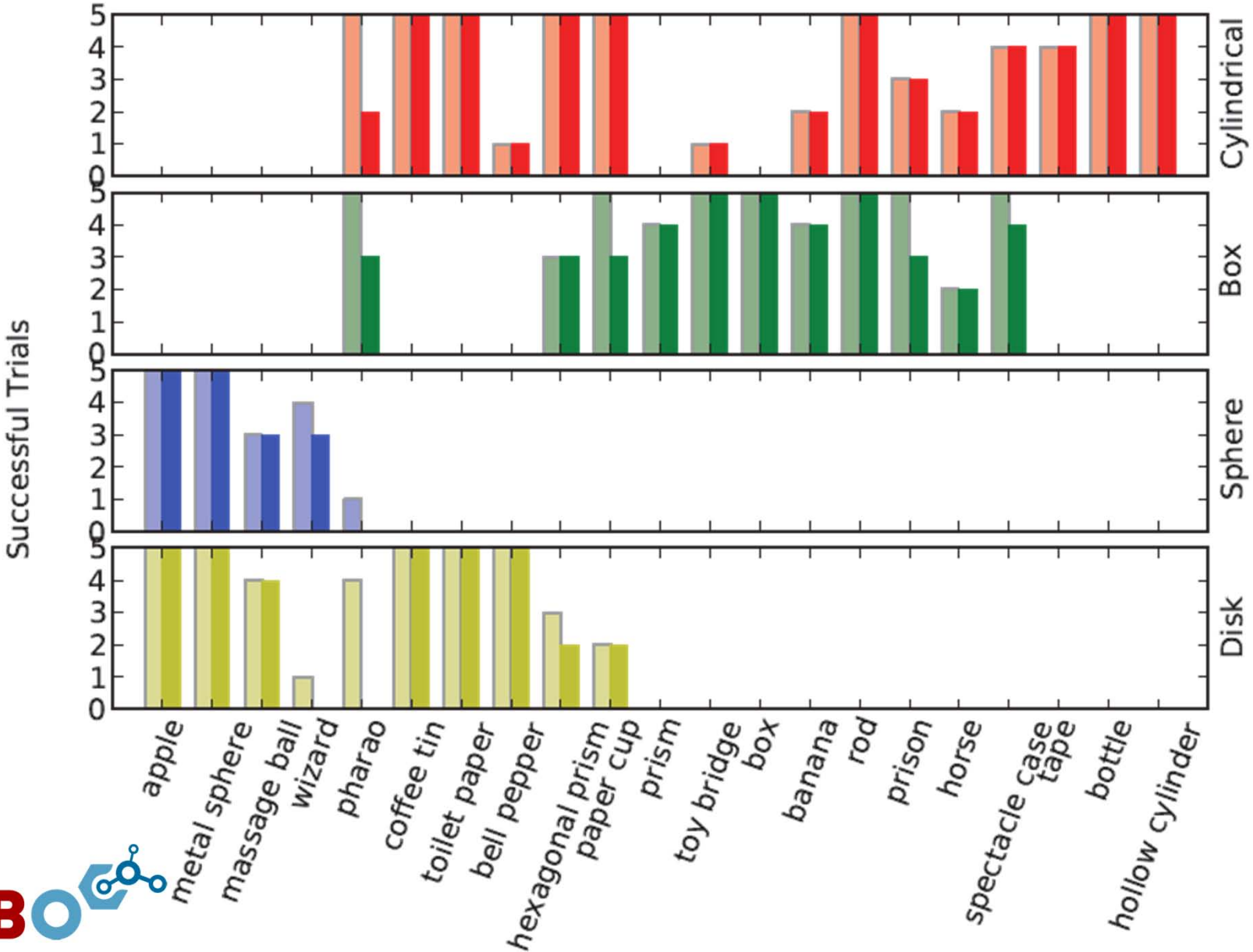




# Cylindrical Grasp



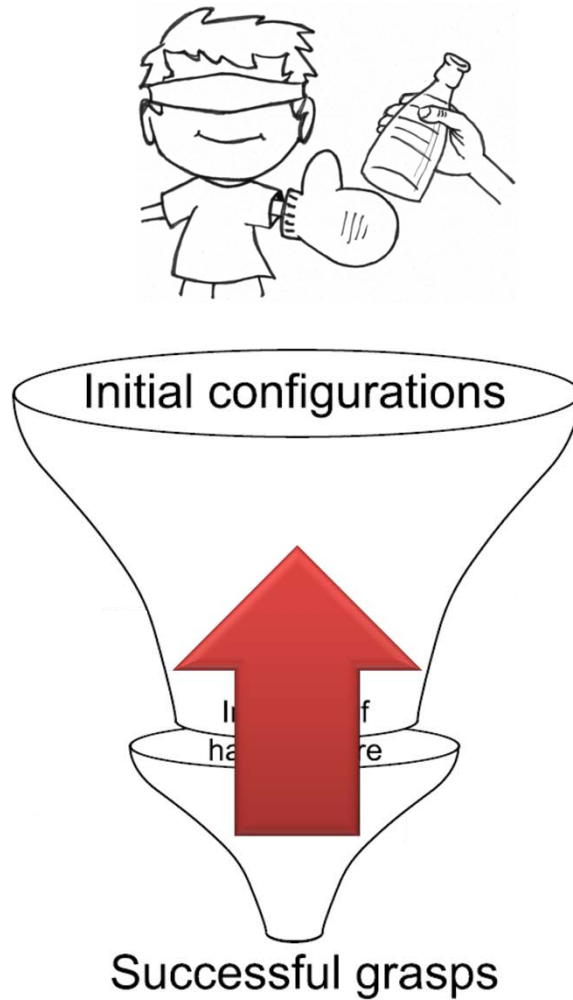
# Affordance Detection and Grasp Success





# Conclusion – Beyond Grasping

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- ▶ Human “grasping” is diverse
- ▶ Building hands is important (and can be cheap and easy)
- ▶ Perception needs to be tailored to hand
- ▶ Contact planning and control are eliminated