

Object identification with a minimal sensory substitution glove

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Previous research on sensory substitution from an ecological approach has demonstrated the possibility of experiencing distal attribution and navigating towards a target using minimal devices. However, object identification remains largely unexplored within this framework. Our hypothesis posits that a minimal sensory substitution glove could effectively differentiate between a cube and a sphere when participants are allowed to explore through hand movement. To test this hypothesis, we asked 36 participants to complete 10 trials, identifying which of the two objects placed in front of them was the cube and which was the sphere. Participants used a glove equipped with a single tactor positioned on the index fingerprint, which vibrated while pointing to the objects (with intensity increasing as the distance to the objects decreased). Overall performance indicated a significant probability of success (0.714, $p < .001$), with six participants achieving a perfect score. Confidence ratings positively correlated with successful performance, suggesting that identification with the device provided a realistic perceptual experience. In conclusion, our findings suggest that basic object identification is achievable through minimal sensory substitution. However, the modest results observed prevent us from advocating for these systems as general-purpose devices.