

# Move the Object or Move Myself? Walking vs. Manipulation for the Examination of 3D Scientific Data

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Physical walking is consistently considered a natural and intuitive way to acquire viewpoints in a virtual environment. However, research findings also show that walking requires cognitive resources. To understand how this tradeoff affects the interaction design for virtual environments; we evaluated the performance of 32 participants, ranging from 18 to 44 years old, in a demanding visual and spatial task. Participants wearing a virtual reality (VR) headset counted features in a complex 3D structure while walking or while using a 3D interaction technique for manipulation. Our results indicate that the relative performance of the interfaces depends on the spatial ability and game experience of the participants. Participants with previous game experience but low spatial ability performed better using the manipulation technique. However, walking enabled higher performance for participants with high spatial ability or without significant game experience. These findings suggest that the optimal design choices for demanding visual tasks in VR should consider both controller experience and the spatial ability of the target users.

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