In the A* search algorithm, the choice of heuristic significantly affects the path count and explored count. The two heuristics under consideration are the Euclidean and Manhattan distance.

Differences in Path Count

	A* Manhattan	A* Euclidean
Path Count	59	72
Analysis	The Manhattan distance heuristic calculates how many horizontal and vertical steps are required to reach the goal from the current node. This heuristic perfectly aligns with the agent's movement since the agent can only move in straight lines. This accurate estimation allows the A* algorithm to efficiently prioritize the nodes that are actually closer to the goal. Consequently, it leads to a shorter path count of 59 steps.	This heuristic calculates the straight-line distance from a node to the goal, as if the vacuum agent could move freely in any direction, including diagonally. As it is not permissible in the given grid, this heuristic underestimates the actual cost more significantly than the Manhattan distance. So, A* using the Euclidean heuristic prioritizes nodes that appear closer under the Euclidean distance. However, it requires more steps to reach because of the grid's movement constraints and settles for a longer path of 72 steps.

Differences in Explored Count

	A* Manhattan	A* Euclidean
Explored Path Count	154	101
Analysis	Because the Manhattan heuristic is accurate for this grid, A* explores more nodes to ensure it finds the shortest path. It explores various branches whose total cost is minimal. This thorough exploration gives a higher explored count of 154 nodes. The consistent nature of the heuristic ensures optimality but at the expense of increased explored count.	As discussed earlier, the Euclidean heuristic is less accurate because it ignores the movement restrictions. This ignorance makes the algorithm overly optimistic, so it explores fewer nodes. But it can miss shorter paths. So, at the expense of not exploring alternative routes, this algorithm results in a lower explored count of 101 nodes.