we directly obtain

$$Y_{1/2}^{-1/2} = c_{1/2}' e^{-i\phi/2}\sqrt{\sin\theta} , \qquad (3.6.45)$$

in sharp contradiction with (3.6.43). Finally, we know from the Sturm-Liouville theory of differential equations that the solutions of (3.6.28) with l integer form a complete set. An arbitrary function of θ and ϕ can be expanded in terms of Y_l^m with integer l and m only. For all these reasons it is futile to contemplate orbital angular momentum with half-integer l-values.