When first learning to bimanually use a tool to strike a target (e.g., when hitting a golf or cricket ball), most people assume a stance that is dictated by their dominant hand. By convention, this means that a "right-handed" or "left handed" stance is adopted, generally placing the dominant hand closer to the striking end of the tool. Yet it is unclear why this is the case and whether doing so provides the best chance of acquiring skill. The aim of this study was to investigate whether the "conventional" stance provides the best means of achieving expertise in bimanual hitting. This was done in the sport of cricket by directly testing the batting stance, plus hand and eye dominance of 43 professional (international/first-class) and 93 novice (< .0001), independent of whether batting right or left-handed. The position of the dominant eye (at the front or back of the stance) played no role in the effect (p = .60), suggesting that the reversed stance advantage is underpinned by the dominant hand being further from (rather than closer to) the striking end of the bat. Findings were supported by additional analysis showing that almost one-third of the 100 highest- ranked modern-day international batters adopt a reversed stance (OR = 4.5 compared to novices; p < .001). The findings imply that batsmen who adopt a conventional stance may unintentionally be batting "back- to-front" as they have a considerable disadvantage in achieving expertise. Moreover, findings will be presented to suggest that the results could generalise more widely to question the way that other bimanual sporting actions are taught and performed (e.g., golf and baseball batting).