

Getting past basketball defender is not just a matter of size

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Introduction:

Affordance theory (Gibson, 1977) has been promoted as a relevant framework for understanding information-movement coupling in sport (Fajen et al., 2009). With virtual reality, it is now possible to show how decision-making is shaped by the perception of affordance, notably in "duel" situations against a virtual opponent (Watson et al., 2011). We explored the perception of affordances in basketball, by scrutinizing the possibility to throw without being contested by a virtual defender. We investigated whether expertise, player size, and permission to jump, affect the throwing decision.

Methods:

20 experienced and 19 novice basketball players were divided into two comparable subgroups, tall and short, based on their median height. Participants had to decide whether it was possible to throw an instrumented ball into a virtual basket without the shot being contested by a virtual animated defender. We manipulated the distance to the virtual defender (0.755, 1.055, 1.3355, 1.655, 1.955, 2.255m) as well as the "permission" to jump for throwing.

Results:

Both experienced and novice players threw more frequently as distance to the virtual defender increased ($p < 0.05$). In the jump-allowed condition, all players also had 6% more throws ($p < 0.05$) as compared to the no-jump-allowed condition, shifting the threshold for triggering throws from 1.05 to 1.4m from the virtual defender. Finally, experienced short and tall players behaved similarly (64.58%), while tall novice players threw 20% more frequently than their short counterparts (68.40 vs. 48.93%; $p < 0.05$).

Conclusion:

These results suggest that the throwing decision is rooted in the perception of both body-scaled (Warren & Whang, 1987) and action-scaled affordances (Fajen & Matthis, 2011). With expertise, the action-scaled can override the body-scaled affordances, particularly by providing sufficient muscle power to propel the ball and compensate short height of release. This may have practical implications for coaches who wish to train their athletes specifically in "duel" situations.

References:

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