



Abstract

To achieve skillful batting in ball games, batters have to accurately judge ball trajectory and impact time and quickly decide whether or not to swing, as well as flexibly control a bat. We are working to clarify these implicit (unconscious) cognitive processes in excellent batters through behavioral measurements in realistic environments. A field measurement revealed that skilled female softball batters adjust their swing timing according to the thrown ball speed (fast and slow ball) with accurate discrimination of these ball types. A separate measurement using virtual reality system for application to softball batting showed that they utilize information related to pitching motion when deciding swing timing. These findings will be useful not only for assessing cognitive features, such as judgement and prediction, in top athletes but also for developing novel feedback and training methods to efficiently improve their performance and underlying implicit brain functions.

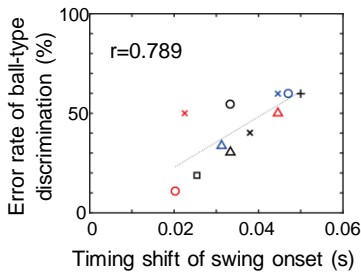
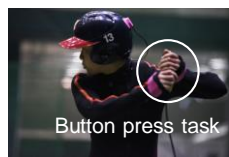
Clarify cognitive processes in excellent batters from behavioral responses to ball types (fast and slow balls)

1) Field batting measurement

Motion capture



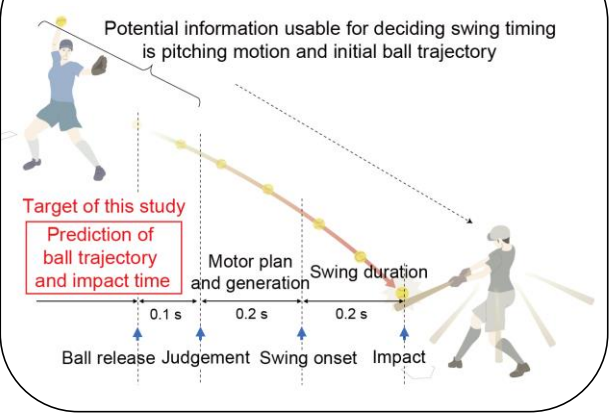
Ball-type discrimination



The more correct the discrimination, the more correct the swing.

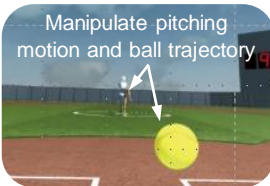
Brain processing in batting

Potential information usable for deciding swing timing is pitching motion and initial ball trajectory

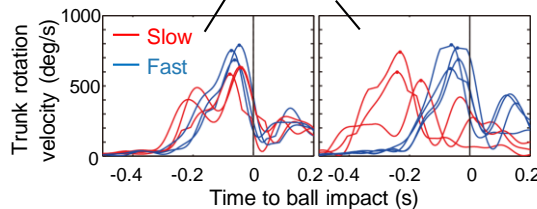


Target of this study
Prediction of ball trajectory and impact time

2) Virtual reality batting measurement



Matched combination of pitching motion and ball trajectory
Mismatched combination of the motion and the trajectory



Swing timing is disturbed when pitching motion is mismatched.

References

[1] D. Nasu, M. Yamaguchi, T. Fukuda, N. Saijo, M. Kashino, T. Kimura, "Perception-action linkage in top athletes during batting," In Proc. Society for Neuroscience 47th Annual Meeting, 2017.
 [2] T. Kimura, D. Nasu, M. Kashino, "Utilizing virtual reality to understand athletic performance and underlying sensorimotor processing," In Proc. the 12th Biennial conference on the Engineering of Sport on behalf of the International Sports Engineering Association, 2018.

Contact

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