The initial period in skill acquisition has been referred to as the coordination phase (Newell, 1985), where the individual acquires the topological characteristics of the movement pattern, which may be illustrated by the shape of the associated angle-angle diagram. As skill learning progresses the movement patterns demonstrated may change, for example one of the qualitative characteristics of overarm throwing describes the change from a throw with no trunk rotation to a throw involving complex differentiated trunk rotation (Roberton, 1977), which can be represented by a new spatio-temporal pattern on an angle-angle diagram. Alternatively, as the individual develops their control of the movement pattern, changes in pattern amplitude may appear independent of changes in pattern shape (Haddad et al., 2006). It is important for any study that tracks changes in movement patterns over time to use a method that is sensitive to changes in both pattern amplitude and pattern shape.

Sidaway et al. (1995) proposed a method to quantify the variability inherent in angle-angle plots. This method was adapted by Horn et al. (2005) (labelled NoRM-D) to analyse the difference in amplitude between the relative motion of a series of trials produced by a participant and the target movement pattern demonstrated by a model. The normalisation function in the NoRMS method, and the adapted function presented by Mullineaux et al. (2001) and subsequently used by Horn et al. (2005) corrects for differences in amplitude between sets of data. With the NoRM-D variant, however, when the participant and target data differ considerably in amplitude, similarities in pattern shape are not detected.

The purpose of this presentation is to present sample data to illustrate this point, as well as a potential solution, termed RMSno-D. By first using a standard normalisation procedure (Burgess-Limerick, Abernethy, & Neal, 1993) differences in amplitude can be removed and the shapes of the patterns can be independently compared. The use of the proposed method in conjunction with NoRM-D allows for the changes in both pattern shape and pattern amplitude to be assessed.


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