

## Context Dependent Constraint during Interlimb Coordination

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In this talk, I will highlight the context dependent constraint during interlimb coordination. It may be stated that science is to look at some aspect of the world in detail. Thus, scientific results that were revealed through observation and experiment can be true at least in that limited specific world, but may not be true in the rest of the world. Accordingly, it should be important to identify what aspect of the world is looked at in each scientific procedure. In other words, I think that the obtained results cannot be understood properly until the context for that is identified correctly. The importance of identifying context will be introduced through findings from economics and psychology. Then I will discuss the controversial results about constraints during interlimb coordination (i.e., movement direction and muscle activation coupling) in the context of a movement's goal. Since Mechsner and colleagues published a paper entitled "Perceptual basis of bimanual coordination" in *Nature*, the question whether a predominant constraint during interlimb coordination is purely perceptual or not is hotly disputed. There is a general agreement that interlimb coordination is founded on a coalition of constraints of perceptual/cognitive and musculoskeletal/neural origins. Although previous

findings seem to indicate that what kind of constraint is predominantly working during interlimb coordination depends on the movements adopted in an experiment, I will try to show that perceptual/cognitive constraint always predominantly works. Next, what kind of reference frame is used in a directional constraint during interlimb coordination will be discussed. In motor control research, it has been intensively investigated in which reference frame neural activities encode spatial parameters. Though direct evidence about reference frame can be obtained mainly from animal studies, indirect information can be extracted from human studies by assuming that behavioral patterns reflect neural function. Through the methodology to find the reference frame for the directional constraint, I will propose a new context to be considered in determining intrinsic and extrinsic reference frame. Although we sometimes face unexpected or undesired experimental data against hypothesis, this is the chance to think about the context of experiments. Even when we obtain expected or desired experimental data, considering the context of experiments may help us to set more attractive research question.