- Friday, May 22, 2009
  Visuomotor adaptation: The roles of optic flow and attention

  Visuomotor adaptation to errors in perceived direction takes two forms, adaptation of perceived visual direction and adaptation of perceived proprioceptive position. I will describe the results of a series of experiments in which we explored the influence of attention and visual information on the site and magnitude of adaptation using standard techniques: walking with prism glasses and measurements of proprioceptive and visual straight-ahead. We first examined the influence of attentional resources through use of a secondary counting task. We found that both visual and proprioceptive adaptation decline as secondary task difficulty increases, yet proprioceptive adaptation always remained greater than visual adaptation across secondary task conditions. We then examined the influence of visual information. Observers walked naturally ("full flow"), stopped after every step ("stop & go"), or only viewed the scene when they were stationary ("no flow"). The total amount of adaptation (sum of visual and proprioceptive shift) was approximately constant across conditions. However, when optic flow was continuously available the adaptation was primarily visual, when no flow was available, the adaptation was primarily proprioceptive. In a control experiment we examined whether the adaptation was due to the registration of a visual error (a discrepancy between perceived straight-ahead and visually specified straight-ahead) or just due to walking on a curved path (the characteristic consequence of wearing prism glasses). The results point to the importance of the former rather than the latter. In a final experiment we examine the time course of adaptation.

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