

Wurtz 1985) indicating a preferential effect on memory-guided eye movements, we asked whether electrical stimulation of the SNr would also have a preferential effect on memory-guided eye movements. A demonstration of this using a second technique would provide additional evidence that the BG are principally concerned with non-visually guided movements. Furthermore, with electrical stimulation we have control over the precise timing of the manipulation and therefore can present stimulation specifically during the preparation and initiation of the movement. Second, electrical stimulation of brain regions (DBS) is an increasingly popular treatment option for patients with neurological disease who are refractory to traditional medical therapies. Yet, neither the precise mechanism of action of DBS is known, nor are consistent results obtained from experiments assessing second-order effects of DBS on target structures (Anderson et al. 2003; Hashimoto et al. 2001; Hashimoto et al. 2003). How the effects of DBS translate to changes in behavior are even less well understood (Anderson et al. 2003; Ashby et al. 1999; Dostrovsky et al. 2000; Hashimoto et al. 2003; Larsy et al. 2003; Perlmutter and Mink 2006). In light of the well-established relationship of SC neuronal activity and eye movements (Moschovakis et al. 1996; Sparks 2004; Wurtz et al. 2000) and the fact that the SC is a major target of the BG (Gerfen et al. 1982; Gerfen and Wilson 1996), we reasoned that establishing the efficacy of electrical stimulation of SNr on eye movements might lead to insights into the mechanism of action of DBS as well as provide a framework for future experiments exploring the role of DBS on behavior.