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Abstract: The pattern of motion on the retina, or optic flow, during smooth pursuit eye movements is the difference between the instantaneous motion in the scene, caused for example by self-motion, and that of the eyes. Previous studies have shown that the optic flow component caused by pursuit is partially removed from the percept. In those studies the distorting effect of pursuit on the focus location has been attributed to the vector addition of the instantaneous pursuit velocity. For example, the expanding flow resulting from forward self-motion plus the laminar flow resulting from pursuit leads to a shift of the focus of expansion in the pursuit direction. However, during pursuit the focus also gradually moves over the retina in the direction opposite to the pursuit, and the potential effect of this on the perceived focus location is disregarded in the instantaneous vector sum account. In a different field of study, it has been shown that the momentary position of a moving target is misestimated in the direction opposite to the direction of target motion, probably because observers report the target's average position over a time interval prior to locating the target. Here we present evidence that this temporal integration effect also plays an important role in locating the focus. We presented expanding, contracting and rotating flow fields during pursuit and asked observers to report the position of the focus. We found that the mislocalization pattern bore signatures of both the vector sum account, which predicts shifts in different directions for each flow type, and the temporal integration account, which predicts shifts in the pursuit direction for all flow types. Additional experiments, in which the presentation duration, flow speed, and uncertainty of the focus location were manipulated, consolidated the idea that this novel component of focus shift indeed reflected temporal integration.