Recent interest has centred on the role of the Left Inferior Frontal Gyrus (LIFG) in the processes that operate on conceptual knowledge. Thompson-Schill et al (1997) have proposed that the LIFG is involved in selection of appropriate information among competing semantic alternatives rather than retrieval of semantic information. This hypothesis was supported by an fMRI study, in which LIFG activation increased as a function of high selection demands. However, it is possible that controlled retrieval processes may have also varied across conditions, so questioning this conclusion. Our study asks whether LIFG activation increases as a function of selection demands in a task that both minimises controlled retrieval demands and ensures that they do not co-vary with the high/low selection manipulation. In an event-related fMRI study, using a competition priming paradigm (Wheeldon & Monsell, 1994), subjects named pictures of familiar objects. In the high selection “competitor” condition, pictures were preceded by definitions of semantically related words. This condition increases selection demands because the previously activated related word competes with the correct name for output. In the low selection condition, no related competitor definition preceded the target. We found that the competition condition produced significant increases in LIFG activation, consistent with the selection hypothesis that this region is involved in selection among competing semantic alternatives.