1. **What is the difference between monocular and binocular rivalry?**

   With binocular rivalry two images are presented separately and simultaneously, one to each eye. With monocular rivalry two images are superimposed and then presented to both eyes. In both cases there is an alternating perception of each image, with one becoming more dominant than the other, though it is more pronounced with binocular rivalry.

2. **Why is binocular rivalry an important psychophysical paradigm for studying the neurobiology of conscious awareness?**

   By observing how static visual stimuli “enter” and “leave” conscious awareness at regular intervals, researchers are able to identify the differences between a neural signature that correspond to a stimulus when it is “in”, versus when it is “out”, of awareness. Because the stimulus does not change, when neural signals that are involved in processing that stimulus do change at the same time as awareness of it is reported as changing, then those signals can be interpreted as concomitants of awareness.

3. **How do stimulus strength, attention, and visual context similarity/differentially modulate the dominance and suppression in binocular rivalry? What does this imply about the underlying neural processes that give rise to binocular rivalry?**

   Increasing the strength of an already dominant stimulus over its rival positively influences that stimulus’s dominance, as will directing attention voluntarily to that stimulus. However, attention cannot be voluntarily directed toward the suppressed stimulus, though sudden changes to that stimulus can capture involuntary attention and cause the stimulus to suddenly become dominant. Furthermore, a dominant stimulus that becomes more contextually relevant will enjoy longer dominance phases, though similar modulations will have no effect on a suppressed stimulus. These differences between the way dominance and suppression respond to the same manipulations seems to imply that they are supported by different neural processes.

4. **EEG does not normally have the spatial resolution to resolve the individual competing images presented to the two eyes during binocular rivalry. What clever method was used by Brown & Norcia (1997) to identify the dominance/suppression phases of the competing stimuli in the steady-state visually-evoked potential (a component of the EEG signal)?**

   They developed a method to distinguish between EEG signals that encoded information about the different stimuli presented to each eye. By assigning different flicker rates to each grating stimulus they effectively “tagged” their corresponding signals with unique identifiers. Thus they could contrast the VER’s to each stimulus with the other.
5. Does binocular rivalry involve competition between the eyes, or between the images? Reference experimental evidence to support your answer.

Binocular rivalry involves competition between transformations of the information encoded about the images, taking place in the visual processing streams of each eye independently (up to a certain point in the visual hierarchy). Thus in this sense the competition takes place “between the eyes.” However, information from both eyes, and therefore both images, can compete and become resolved simultaneously, as is evident with the stimulus in figure 2c from the paper (Blake & Logothetis, P. 3). With this stimulus, the whole of one image can be dominant, or patches from each can share dominance. Even in this case though, the competition is between information sources that are dependent on a single eye.

6. What has been learned about the neural concomitants of binocular rivalry from visual adaptation experiments?

It is likely that the neural concomitants of suppression are involve in global processing of the stimulus. Adaptation was unaffected when the adapting stimuli were presented as locally constrained elements of the suppressed image, while adaptation to global properties of the suppressed image was attenuated.

7. Area’s FFA and PPA’s fMRI BOLD response to dominant-face and dominant-house during binocular rivalry where found to be similar to those evoked by non-rivalrous, alternating presentations of face and house images. What does this imply about the role that FFA/PPA play in binocular rivalry? i.e. Is rivalry resolved before, during, or after stimulus information processed through these two areas?

At the latest, rivalry is resolved while information is processed through FFA and PPA, and not after. However, the fact that the neural signatures in these regions are characteristic of non-rivalrous vision is also consistent with rivalry having been resolved prior to this stage of processing.