We investigate here the implicit encoding of a temporal sequence of visual events and the expectation to complete the sequence. For this purpose, we tested the extent to which a series of non-rivalrous patterns can influence the dominant perception in binocular rivalry. We rely on and extend the pattern suppression phenomenon: when rivalrous oriented Gabors follow non-rivalrous Gabors, observers usually perceive the repeated orientation less often (Brascamp, Knapen, Kanai, van Es & van den Berg, 2007).

Methods

- Series are non-rivalrous Gabors oriented either to the left (L) or to the right (R).
- Series length varies from 1 to 4 items, for instance LLLL.
- Each series is followed by a pair of rivalrous Gabors.
- The spatial frequency of the Gabors when rivalrous is different from that of the Gabors within a series.
- Task: is the seen spatial frequency during the rivalrous stage higher or lower than the one seen during the series?

Results

Observer’s dominant percept was deduced from their spatial frequency response.

The dominant percept during the rivalrous stage was largely predictable from the current series. If orientation 1 was shown more often than orientation 2 during the series, then orientation 2 was seen more often in the rivalrous stage. This suggests that the visual system tries to complete the series by equalling the number of orientations 1 and 2. This behavior is referred as the gambler’s fallacy component.

Discussion

These results are partially consistent with the phenomenon of pattern completion discovered with the ambiguous motion quartet (Maloney, Martello, Sahm & Spillmann, 2005). In conclusion, binocular rivalry is not only influenced by adaptation of the perceived orientations, but also by more complex temporal structures.

Conclusions

- Expectancies play a role in binocular rivalry (by the gambler’s fallacy and alternation components).
- Since attention was drawn to spatial frequency instead of orientation, expectancies effects reflect more the implicit predictions of the visual system than some strategy of the observer.

References


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