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On the Subjective Extrapolation of an Arc

Keizo Hayashi

If a subject is required to judge whether or not a point at a certain distance from the terminal of a side of an angle lies on the subjective extension of the side, the subjective extrapolation of the side ordinarily deviates from its objective extension towards the outside when the angle is acute. This is the well known phenomenon to over-estimate an acute angle and, as a matter of course, the amount of the deviation depends upon orientation of the angle. The present study deals in the same manner with the subjective extrapolation of an arc in place of an angle. For example, in what way the subjective extrapolation differs from the objective extension and how the difference, if any, varies with orientation of the arc etc. were the problems at issue. The arc was drawn with black ink on a sheet of white paper.

Some of the results may be summarized as follows. The shorter the length of the arc, the more the subjective extrapolation deviated towards the outside and, at the extreme, the subjective extrapolation was made in the direction of the tangent line at the terminal of the arc. On the contrary, the longer the arc, the more the subjective extrapolation approached to the objective extension of the arc. And even the deviation towards the inside was observed under the conditions that the arc is longer than $\pi/4$ radian in its length and the point at which the subjective extrapolation is required lies on the horizontal or on the vertical axis of the visual space. The phenomena described above was most clearly observed when the subjective extrapolation was made at the distance of $\pi/4$ radian from the terminal of the arc.