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Notes

1. Preparation of this paper was supported by NIMH grant MH-10711-01.
2. Helmholtz, in 1866, was apparently the first to describe adaptation to prisms, despite a footnote in his book ascribing the experiment to Czermak (Helmholtz, 1962, p. 246). Actually, Czermak (1855, pp. 575-576) discussed only the inaccurate reaching that prisms cause at first; he did not mention the subsequent adaptation.
3. More precisely, McLaughlin & Rifkin's Ss moved a pointer along a track until they felt it was directly beneath the target or exactly straight ahead.
4. Active movement may, however, be essential for producing adaptation, as Held and others have proposed.
5. However, Efsthathiou & Held also reported that adaptation had no effect on blindfolded Ss' reaching for the remembered locations of targets touched previously. This finding is puzzling, since the task is so similar to pointing straight ahead.
6. Even the slight movements allowed by a chin rest (which McLaughlin & Rifkin used) may suffice (Harris, 1963b, p. 32).

Reply

Harris' interpretation is based on a dichotomy between the "restricted adaptation" which results from adapting with head immobile, in which changes in apparent position of the visual target are "ruled out," and in which the adaptive effect does not transfer from one hand to the other; and a "more extensive kind of

adaptation" which occurs when head movements are allowed during adaptation. Thus, in comparing his 1963 experiment with ours, he ignores the many differences in experimental procedure and implies that, had we but used a bite board, our results would have been the same as his.

A more reasonable basis for the interpretation of prism adaptation experiments is that control of head position is only one of many ways in which the conditions of adaptation and measurement can be varied to produce different adaptive effects. From this point of view, the most noteworthy feature of Harris' experiment is that each S made 234 pointing gestures in a single experimental session. (Our Ss, by contrast, made only a few side-to-side arm movements and had a minimum of kinesthetic experience.) It is not surprising that Harris found the adaptive effect manifested as a change in felt position of the hand; but one may disagree with his conclusion that all prism adaptation with head immobile is a matter of proprioceptive change.

A second assumption which underlies Harris' interpretation is more subtle. In his last sentence, he accounts for the greater change in "line" settings than in "straight ahead" settings by attributing the difference to "a change in the registered position of the head or eyes relative to the rest of the body," the implication being that such a change would affect "line" settings but would not alter S's judgment of "straight ahead." This is clearly an unwarranted assumption. Furthermore, the phrase "or the eyes" is misleading, for Harris elsewhere makes it clear that he attributes the difference between "line" and "straight ahead" settings to the "slight movements allowed by a chin rest" (note 5; see also his second paragraph).

Harris' criticism of our statements about "apparent position" of the visual target is well taken. We now suggest that the visual target will change in apparent position only when it shifts with respect to "straight ahead"—i.e., only during the second of the two adaptive processes which we described.

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