**Comment on Yonas et al.
"Development of sensitivity to
information for impending collision"**

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It is some time since Yonas (Yonas & Pick, 1975) first announced that the defensive responses to approaching objects reported by Bower, Broughton, and Moore (1971) and Ball and Tronick (1971) were in fact postural changes produced by tracking of the top contour of a display. The claim at the time was intriguing enough that I was moved to have some control experiments performed. I will describe one of them below. Now that I have seen this paper, I am no longer sure the experiments are relevant. The procedure used by Yonas, Bechtold, Frankel, Gordon, McRoberts, Norcia, and Sternfels (1977) seems virtually designed to eliminate any possibility of defensive responses.

The obvious problem, of course, is that the babies were sitting on a stool supported by a parent. The support required for a 1-month-old must be quite considerable. If 1-month-old Scots babies are supported around the waist, they collapse in such a way that they cannot look straight ahead. To hold them so that they can requires support under the arms and possibly under the chin. Even assuming that Yonas' Minnesota babies were superior specimens, the degree of support must have been considerable. The fact that the parents were supporting the babies is not unimportant. Generally, it seems plausible that babies are less fearful when held by a parent than when not. Optical expansions during holding are a commonplace experience for all babies and rarely have any harmful consequences. This has always seemed to me the best explanation for the delay in visual placing (Walters & Walk, Note 1). Bower et al. (1971) and Ball and Tronick (1971) did not have parents holding the babies. Ball and Tronick did have some support, presumably purely to prevent lateral movement, since the babies were on a baby seat.

Holding babies is a skilled task. For example, the elicitation of neonate walking requires proper handling. Placing can similarly be abolished by incorrect holding. It seems that handling was a factor in these studies, judging by the results presented. Consider the differences between Experiments 1 and 3; unless the authors wish to maintain that infants are more sensitive to optical than to real information, they must admit some effect of handling. In addition, if we compare their results with others who did not

hold the babies, the effect becomes clearer. Bower et al. (1971) found violent upset when an object approached a baby on a hit path. Ball and Tronick (1971) found "stiffening" during hits but not during misses. Dunkeld and Bower (in press) (see below) also found fear responses. In none of these studies were the babies held. Yonas et al. (1977), with the parents holding the babies, report no fear responses at all. The holding does not seem unimportant.

As far as the specifics of the responses are concerned, the decision to hold the babies makes it pointless to measure at least one response, head withdrawal. Balinese dancers may be able to withdraw their heads without withdrawing their trunks. I don't think babies can, nor do I think the babies could have withdrawn their trunks without the cooperation of the holding parent, cooperation presumably forbidden by the experimenters. It is thus unfortunate that Yonas et al. take head withdrawal as *the* adaptive defensive response. By eliminating the possibility of head withdrawal, they eliminated the possibility of finding defensive responses. The withdrawals reported presumably reflect the parents' response rather than the babies'.

All of the above is a great pity, since Yonas' original claims raised an experimental problem of great interest. If we have an adaptive-seeming response to a natural stimulus and we then find the same response to a component of that stimulus, we have an interesting problem. It seems that we can say (1) that the adaptive-seeming response is not really adaptive, but nothing more than a response to . . . ; we might also say (2) that the stimulus component is a clue, cue, or specifying variable for the natural stimulus display; or else (3) we can look for some qualitative or quantitative difference between the responses elicited in the natural and experimental situations.

Yonas et al. seem to wish to assert the first of these. Dunkeld and Bower (in press) carried out an experiment designed to test this hypothesis. Babies between 1 and 3 weeks of age were shown an optical presentation of a rectangle rotating towards their faces. The control presentation was a parallel presentation of a rotating rectangle (Figure 1). In the polar presentation, the infants were conjugate with the point source, a precaution neglected by Yonas et al. The babies were firmly secured in a baby seat. Backward head movements were limited by the seat, and backward head pressure was recorded by a pressure transducer.

There are four critical display sequences. The polar rectangle is threatening as its top contour falls. It is not threatening as its top contour rises. The parallel presentation, given ecological optics (Gibson, 1966),

is not threatening as it changes in either direction.

It follows that if babies defend against the approach of threatening objects and if they are sensitive to the variables specifying a rotating rectangle, they should maximally withdraw as the polar presentation minifies. Yonas must predict the opposite. He must also predict no difference between polar and parallel presentation. The eye-neck reflex hypothesis likewise predicts no difference.

The results shown in Figure 2 indicate clearly that the ecologically valid, threatening presentation elicited the maximum head withdrawal, clearly indicating that the defensive response, of which this is a component, is not simply a response to a rising contour. The extent to which a rising contour specifies

Figure 1. The baby's view of the rotating rectangle when (A) polar projection and (B) parallel projection were used.

Figure 2. The changes in backward head pressure during the last 1.5 sec before maximal contour height or minimal contour height in the polar and parallel presentations.

approach is still an open question. However, given the sensitivity to form change shown in this experiment, it seems unlikely that it would be effective.

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