Introduction

• Early social loss is among the most commonly identified developmental factors promoting depression, both in humans and other primates. Primate infants upon separation exhibit an initial ‘protest’ phase, emitting loud distress cries in an attempt to reinstate social contact.

• When attempts are unsuccessful, infants enter a quiet, withdrawn ‘despair’ phase, equated to an affective state of depression (Bowlby, 1980).

• Like primates, socially isolated domestic chicks show a robust separation-distress response, followed by a depressive response that is alleviated by restoration of social contact (Panksepp et al., 1991; Wannick et al., 2009).

• Our hypothesis was that chicks separated from flock mates would initially exhibit ‘protest’ behavior characterized by active attempts to reinstate social contact, followed by a depressed state in which they would become quiet and lethargic, with depressive symptoms being more pronounced in females than males.

Methods

• Using a 2x2 factorial design, 40 Lohmann Brown chicks were randomly assigned to the factor Social Experience: (1) stable group housing and (2) social loss, within Sex: (1) female and (2) male (n=10 chicks/treatment combination).

• Chicks were tested individually in a set of 16 visually-isolated and sound-attenuated test arenas. Half the arenas were fitted with an acrylic mirror insert. Within treatments, each chick was randomly assigned to a mirrored or non-mirrored test condition.

• Each 20-min test comprised two cycles of 5 min light and 5 min dark. Video cameras with built-in infrared light recorded behavior of chicks (Figure 1). Instantaneous scan samples of behavior were made every 30 s.

• Separation distress calls were recorded on a digital voice recorder placed in each arena.

• Data were analyzed with SAS statistical analysis software. Repeated measures analysis of variance was conducted using the General Linear Model procedure, with pairwise means comparison based on differences in least-square means adjusted for multiple comparisons using the Tukey option.

Results

• As predicted, treatment differences in calling were detected as a result of differential social experience (social experience x period: F6,27=2.49, P=0.048), with these differences varying between the sexes (social experience x sex x period: F6,27=2.65, P=0.037).

• When kept in stable groups, females called more than males during testing whereas, when chronically isolated, females called and jumped less than males during testing, an effect that persisted through the first, but not to the fourth day after reunion (social experience x sex x period: P=0.05).

• Call rate was elevated during periods of darkness vs light in the test arena (P=0.05), an effect that declined with age.

• During light periods, the presence of a mirror suppressed protest behavior (calling and jumping; P<0.001), presumably because the chicks felt less alone when seeing their mirror image.

• Group-housed chickens, when briefly separated from their group, exhibit a robust protest response characterized by distress vocalizations and attempts to reinstate social contact.

• Chronically isolated chicks exhibit a profile of declining ‘protest’ and increasing ‘despair’, with depressive symptoms being exacerbated in females relative to males.

• Following re-grouping after four days of chronic isolation, chicks exhibit a rapid reversal of depressive symptoms but with residual differences in responses relative to those of chicks maintained in groups during the same period.

• Domestic chicks may, thus, provide an efficient model for the investigation of depressive states and the development of new treatment modalities for depression.

• The findings of this study have implications for the well-being of poultry when separated from the flock for veterinary care.

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Conclusions

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References

