MATERNAL BEHAVIOUR IN DOMESTIC SHEEP (OVIS ARIES): CONSTANCY AND CHANGE WITH MATERNAL EXPERIENCE

by

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Summary

Individual differences in the way ewes behave towards their lambs may help to identify the sources of variation in maternal care. In this study we investigated how the pattern of maternal behaviour shown by an individual animal changed across parities in domestic sheep. The maternal behaviour of individual animals (Scottish Blackface and Suffolk sheep), in the first 2 hours after lambing, was compared when lambing as primiparous and multiparous ewes. More rejecting behaviours (e.g. withdrawal, aggression, lack of co-operation with lamb sucking attempts) were expressed by ewes in their first parity than in subsequent parities. Behaviours associated with affiliation and bonding (e.g. grooming attention) were not, however, significantly influenced by parity within individual ewes. Principal Components Analysis of maternal behaviours was carried out on behavioural data from primiparous and multiparous ewes. In common with studies in primates, behaviours in both primiparous and multiparous ewes were clustered on two main axes or Factors, labelled ‘maternal rejection’ and ‘maternal care/warmth’. However, in multiparous ewes, a third Factor, labelled ‘aggression’, was found whereas in primiparous ewes aggressive behaviours loaded on the same dimension as ‘maternal rejection’. Behavioural consistency was investigated by correlating the behavioural data from primiparous and multiparous individuals. There was a significant correlation between the scores received by primiparous and multiparous ewes.

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for both the ‘care/warmth’ and the ‘rejection’ dimensions of maternal behaviour. Our data suggest that, in sheep, maternal behaviours are segregated along the twin axes of ‘rejection’ and ‘care/warmth’. Although the frequency of rejection behaviours declined with maternal experience, individual ewes were consistent in their expression of maternal care across parities, suggesting that the maternal behaviour of a primiparous ewe is reasonably predictive of her behaviour in subsequent pregnancies.

**Introduction**

Individual differences in the relationship of a mother to her offspring, particularly in primates, have received considerable research attention in recent years. Quantitative studies demonstrate that some mothers spend more time grooming their young and are restrictive of the infants' attempts to break contact, whereas other mothers are relatively inattentive and rejecting (reviewed by Fairbanks, 1996). These behavioural differences have been described by the terms: protective, restrictive, laissez-faire and rejecting (Fairbanks, 1996). Studies using Principal Components Analysis (PCA) of maternal behaviours suggest that variation in maternal care can often be described by two dimensions, labelled maternal protectiveness and maternal rejection (Fairbanks & McGuire, 1987; Fairbanks, 1996). Some studies have also described a third dimension, labelled maternal warmth (Maestripieri, 1998) or infant activity (Schino et al., 1995). These PCA-based descriptions of maternal behaviour, that are based on correlation relationships between behavioural variables, are often referred to as different maternal ‘styles’. Maternal styles, therefore, can be defined as consistent clusterings of maternal behaviours within an individual that show long-term persistence over parities.

The study of individual differences in maternal behaviour has largely been in an attempt to identify the sources of variation in maternal care. Individual differences in maternal styles have been shown to be consistent with successive parities in primates (Fairbanks, 1989) and guinea pigs (Albers et al., 1999), and within families (Fairbanks, 1989; Berman, 1990) and to exist within many species of primate (Berman, 1990). Within the macaques, for example, the frequency of expression of different maternal styles within the population varies with species (Maestripieri, 1994). Several studies are supportive of a link between the temperament or emotional reactivity of a mother and her maternal style (Maestripieri, 1993, 1994; Schino et al., 1995), suggesting that anxious mothers are more protective of