

**Table 3.** Procedure for calculation of standardized interval scale

	HAL	RIP	TAI	SAM	OLI	MAX	ERO	URS	QUI	BER
$d_a$	9.00	5.18	2.51	1.11	0	2.78	8.00	6.75	5.67	4.00
$d_{aa} = d_a + 0.5$	9.50	5.68	3.01	1.61	0.50	3.28	8.50	7.25	6.17	4.50
$p$	0.95	0.57	0.30	0.16	0.05	0.33	0.85	0.73	0.62	0.45
$z$	1.64	0.18	-0.52	-0.99	-1.64	-0.44	1.04	0.61	0.31	-0.13
Scale score	3.28	1.82	1.12	0.65	0	1.20	2.68	2.25	1.95	1.51
Rank	1	5	8	9	10	7	2	3	4	6

score in Table 3). These scale scores can be used to obtain an interval scale (Figure 1).

Some problems with the procedure are as follows:

1. Non-transitivity: In a situation where  $A$  dominates  $B$  dominates  $C$  dominates  $A$ , it may appear that the predicted values for empty cells may not be correct. It is not the case since lack of linearity will automatically make the predicted scores close to 0.5 for animals in the pair. It may be noticed from Table 1 and from the dominance ranks assigned in Table 3 that there is no transitivity in the dominance relationship of the group members in the present study. This is actually the case with most socially living species.

2. Protected threat, proximity effect: These situations do influence the outcome of an encounter. However, such effects are only temporary and such data may not be included in the first table of interactions. Pair-wise encounters should be considered only when these are independent.

With slight modifications in the list of behaviours considered 'dominant' or 'subordinate', the method described above can be used to determine strength of hierarchy in any animal species living in social groups. The procedure of preparation of a matrix for agonistic interactions may vary for different species; however, once such a matrix is prepared, the present methods of calculation of actual hierarchical strength is applicable for all animal species. It may yield reliable comparisons across species as well as within a species in different habitats. Since the hierarchical strength is also related to many other aspects of sociality, the  $h$  value may become one of the diagnostic keys to understand social organization in a species. The relationship of  $h$  may also be established for species

**Figure 1.** Rank of individuals on an interval scale.

in different phylogenetic groups, or for species and ecological variables such as uneven food supply, harsh environments, etc.

- Bernstein, I. S. and Gordon, T. P., *Anim. Behav.*, 1980, **28**, 1033–1039.
- Schjelderup-Ebbe, T., *Z. Psychol.*, 1922, **88**, 225–252.
- Bernstein, I. S., *Primate Behavior: Development in Field and Laboratory Research* (ed. Rosenblum, L. A.), Academic Press, New York, 1970, pp. 71–109.
- Bernstein, I. S., *Behav. Brain Sci.*, 1981, **4**, 419–457.
- de Waal, F., *Q. Rev. Biol.*, 1986, **61**, 459–470.
- Preuschoft, S. and van Schaik, C. P., *Natural Conflict Resolution* (eds Aureli, F. and de Wall, F.), University of California Press, Berkeley, 2000, pp. 77–103.
- Murchison, C., *J. Gen. Psychol.*, 1935, **12**, 14–15.
- Collias, N. E., *Am. Nat.*, 1943, **77**, 519–538.
- Landau, H. G., *Bull. Math. Biophys.*, 1951, **13**, 245–262.
- Appleby, M. C., *Anim. Behav.*, 1983, **31**, 600–608.
- Kendall, M. G., *Rank Correlation Methods*, Charles Griffin, London, 1962.
- Zumpe, D. and Michael, R. P., *Am. J. Primatol.*, 1986, **10**, 291–300.
- Singh, M., D'Souza, L. and Singh, M., *J. Biosci.*, 1992, **17**, 15–27.

ACKNOWLEDGEMENTS. We are grateful to the Department of Science and Technology, Government of India for research grants to Mewa Singh and Mridula Singh. Mewa Singh also acknowledges the help from Douglas Candland and Peter Judge during data collection on Japanese macaques at Bucknell University, Pennsylvania.

Received 23 July 2002; revised accepted 10 December 2002

## Corrigendum

### Mapping of *Hippophae rhamnoides* Linn. in the adjoining areas of Kaza in Lahul and Spiti using remote sensing and GIS

P. S. Roy, M. C. Porwal and Lalit Sharma  
[*Curr. Sci.*, 2001, **80**, 1107–1111]

While preparing the paper we have used certain material to describe the terrain and characteristics of the study area from the paper 'Mapping of ophiolites: A study in the Indus Suture Zone of North-Western Himalaya, using IRS-1C/1D data' (Philip, G., Ravindran, K. V. and Thakur, V. C., *Current Science*, 2000, **78**, 1014–1019). Inadvertently the paper by Philip *et al.* has not been referenced. We regret this omission.

P. S. Roy  
M. C. Porwal  
Lalit Sharma