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INDIVIDUAL VARIABILITY IN FORAGING BEHAVIOR AND SUCCESS OF FREE-RANGING WEDDELL SEALS

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Foraging behaviors are known to vary among individuals within a population or species. Such variation in behavior may affect ecological performance. The objectives of this study were to determine whether foraging behavior and foraging success (number of prey encountered during a dive) of Weddell seals vary among individuals and to determine whether such variation in behavior affects success. From October to November of 2002, seven adult seals were equipped with an animal-borne video camera, data logger, and GPS unit, and were allowed to dive freely in McMurdo Sound. Eighteen behavioral descriptors were developed to characterize 117 foraging dives on the basis of time, depth, speed, stroking, gliding, and energetic cost. Foraging success for each dive was based on prey observed in the video record. To reduce the influence of variations in prey availability on seal behavior and success, analyses were restricted to five seals that made foraging dives (N = 54) along the coast of Tent Island. Seals differed significantly in both success (ANOSIM, P = 0.015) and behavior (discriminant analysis, Wilks' Lambda = 0.004). Discriminant analysis revealed that the most important behavioral differences between seals were: d*ive duration, mean stroking rate, time below 155 m, total number of strokes, total distance*, and p*ercentage of time below 155 m*. The most successful seal (seal 27) and the least successful seal (seal 26) displayed the most distinct behavior. Principal components analysis (PCA) and analysis of covariance were used to determine how behavior and individual differences affected foraging success. The second principal component (PC2) was significantly related to foraging success and there were also significant differences between seals. PC2 characterized dives in terms of: t*otal number of strokes, total energy expended, total distance*, and d*ive duration*. Three variables (d*ive duration, total distance,* and *total number of strokes*) with high loadings on PC2 were also important in the discriminant analysis for distinguishing individual seals. Thus, some seals appeared to dive longer, farther, and stroke more than other seals and this coincides with greater foraging success.