Animal Personality

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1. Introduction

The increase in the number of animals threatened by extinction is leading researchers worldwide to increase their efforts to conserve animal species [1]. Among the conservation initiatives, habitat protection and captive breeding for animal translocation/reintroduction are the most applicable since they have direct implications for the survival of the species in a specific location [2][3][4][5]. Animal introduction (i.e., the intentional movement and release of an organism outside its indigenous range), reintroduction (i.e., the intentional movement and release of an organism inside its indigenous range from which it has disappeared), and reinforcement (i.e., the intentional movement and release of an organism into an existing population of conspecifics) are types of animal translocation (all definitions taken from [6]).

The success of animal translocations can be low [7][8][9] and biologists are studying methods to decrease failures in animal translocation programs [10][11][12]. One of the actions is to consider how aspects of the animals' behavior affects conservation success [13][14][15]. Conservation biologists have been working separated from behavioral biologists for a long time and the recent union of both scientific areas has proved to be important for the increase in the success rates of translocation programs [16][17][18]. A translocation is considered a success if the released animals maintain a viable population in the release area [6].

Animal personality can be defined as behavioral and physiological differences between individuals of the same species that are stable in time and across different contexts [19][20][21]. Animal temperament, coping styles, behavioral syndromes, and behavioral predisposition are synonyms of animal personality found in the scientific literature [19][20][21]. Every person who has two or more vertebrate pets can easily distinguish differences in their personalities, and these differences are beginning to be observed and studied for wild animals, both in nature and in captivity [21]. Personality is a construct, identified and classified for animals as including: neuroticism, agreeableness, extraversion, openness, conscientiousness, dominance, boldness, sociability, activity, exploration, aggressiveness, and activity, with some overlaps [19][22][23]. Although linking animal personality and conservation is relatively new for science [21], it has proven to be promising.

2. How to Evaluate Personality before Release

Since personality is so important for various biological processes, it is important to know the best methods to collect personality data: questionnaires (rating) and behavioral data (coding) [24][25].

The rating method is a qualitative way to consider animal personality [26]. It involves people familiar with the individuals answering questionnaires [27]. In the questionnaires different aspects of animal personality are addressed (boldness, sociability, activity, exploration, aggressiveness), and the respondents score these aspects by marking on scales that normally range from 1 to 10, where 1 means that the aspect is not or hardly observed in the evaluated individual and 10 means that the aspect is always observed in the individual [27][28]. Ratings need to be statistically validated, which is a complicated process [27], because they need to measure animal personality accurately [26]. The rating method is one of the most used in animal personality studies [28]. A recently developed similar approach, which can provide insights into an animal's personality, is Qualitative Behavioral Assessment [29][30].

The coding method is based on recording the behavior expressed by the individuals during behavioral tests (e.g., open-field, novel object, etc.) or during normal activities, in captivity or in the wild [28]. Behavioral tests are considered better for the animals to display their personality than observing general behavior [24]. Then, the frequencies of behavioral expressions are computed and used in personality determination [25].

Both methods are efficient in personality investigation, and the best method should be chosen based on the study goals and on the environment where the study is being conducted (the rating method is easier for captive environments and the coding method is better for natural environments [24]). The rating method has the advantage of gathering data faster than the coding method, but also has the disadvantage of being based on the judgements of the raters (if more than one rater is rating the animals, their ratings need to present high levels of agreement to be validated; this normally occurs when very experienced raters are rating the animals) [24]. The coding method has the advantage of being based on the behavior exhibited by the animals, which are recorded without the idea of personality classification, but has the disadvantage of being more time-consuming to gather data [24]. Some authors compared the two methods and found contradictory results, with studies showing that both methods generated similar results [31][32][33], and different results [24][34]. Some authors argued that personality researchers should apply both methods because they are complementary and generate important information about the personality dimensions of the animals [35]. It is important to validate behavioral rating and coding because behavioral recordings always involve subjective judgements. Before validity, we need to test the consistency of data, i.e., how reliable is the collected data. Intra-observer, inter-observer and inter-test's reliability needs to be evaluated by statistical tests, such as correlation statistics, and if the result of the correlation coefficient is 0.7 or more, then we can assume that the data is reliable [36]. Suggestions for data reliability and validation can be found in the scientific literature [26][37].

A practical and quick idea/suggestion for conservationists is to calculate boldness scores for the animals intended to be reintroduced. Boldness score is calculated based on the number of bold and shy behaviors exhibited during novel object trials [38][39]. To do this, researchers need to classify the species' behaviors into four categories: overly bold, bold, shy, and overly shy. Overly bold behaviors will be summed and multiplied by 3, bold behaviors will be summed and multiplied by 2, shy behaviors will be summed and multiplied by 1 and overly shy behaviors will be summed and multiplied by -1 [39]. The scores for each bold/shy category are summed, and the highest values represent the bolder individuals while the lowest values represent the shyer individuals. This method developed for the swift fox proved to be easy to apply and should be considered in conservation programs (this is only a suggestion; other practices can be found in the scientific literature [40][41]). Obviously, it would be useful to have population data because of the possibility of having only one personality type in your sample.

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