Applying welfare science to bottlenose dolphins (Tursiops truncatus)

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Abstract

Animal welfare science is a burgeoning field, but research on cetaceans (whales, dolphins and porpoises) is lacking. Bottlenose dolphins (Tursiops truncatus) are the most well-known and studied cetaceans, particularly in captivity, and thus are used in this review as a model for other cetacean species. Despite the public interest and need for such research, studies specifically investigating dolphin welfare are lacking. This review uses the three broad categories of behaviour, health, and cognition, to discuss how dolphin welfare has been assessed thus far, and could be assessed in future. We present welfare indicators validated in other species that could be applied to dolphins, including innovative measures, such as cognitive appraisal of emotions. We provide a summary of practical recommendations for validating the indicators of bottlenose dolphin welfare. This paper aims to stimulate further research into dolphin welfare which could improve the lives of the animals themselves and ultimately support regulatory decisions. We recommend unifying expertise in cetology and welfare science in order to develop a holistic approach to dolphin welfare assessment.

Keywords: affective states, animal-based measures, animal welfare, bottlenose dolphins, cetaceans, welfare assessment

Introduction

Research into welfare assessments for zoo and aquarium (hereafter referred to as ‘zoo’) animals is increasing as farm animal welfare assessment is proven to be feasible and valid (Barber 2009; Whitham & Wielebnowski 2013). There is much support for the adaptation of farm animal measures to zoo animals (Swaisgood 2007; Hill & Broom 2009; Mason & Veasey 2010), and zoological institutions are well set-up for conducting measures due to the individualised care and multiple daily interactions (Barber 2009).

In this review, we conceptualise welfare using Spruijt et al’s (2001) description of a “...balance between positive (reward, satisfaction) and negative (stress) experiences or affective states. The balance may range from positive (good welfare) to negative (poor welfare)”. This ‘feelings-based’ definition aligns with positions taken recently by many others (eg Yeates & Main 2008; Mason & Veasey 2010; Watters 2014; Dawkins 2015), and specifies measurement of both positive and negative welfare. Our review also prioritises animal-based over resource-based measures, since they are more likely to accurately reflect welfare (Webster 2005; Roe et al 2011; Whitham & Wielebnowski 2013). We also give equal consideration to indicators of positive and negative welfare (Désiré et al 2002; Paul et al 2005; Boissy et al 2007; Yeates & Main 2008).

There is very little existing research on the welfare of cetaceans (Ugaz et al 2013; Clegg et al 2015), in captivity or the wild. Given that public interest often stimulates research in the associated areas (eg with farm animal welfare; Rushen et al 2011), cetacean welfare studies are likely to increase markedly in the near future since the public’s interest is at a high level and intensity (Grimm 2011; Ventre & Jett 2015). Although many questions posed are, in fact, ethical dilemmas (eg ‘Should we keep dolphins in captivity?’), objective data on the animals’ welfare state would aid in these personal decisions (Jiang et al 2007; Clegg et al 2015). Published farm welfare assessments have shown how this type of data can be gathered, for instance the Welfare Quality® project for farm animals (2009a,b,c) and its subsequent cross-species adaptations (eg Mononen et al 2012; Clegg et al 2015; Barnard et al 2016).

While cetology, the study of cetaceans, has burgeoned (Hill & Lackups 2010), there are very few studies on cetacean welfare and methods of assessment (Galhardo et al 1996; Clark 2013; Ugaz et al 2013; Clegg et al 2015). Bottlenose dolphins (Tursiops truncatus) are the most studied cetacean species (Hill & Lackups 2010), and the most common in captivity (Pryor & Norris 1998; Wells & Scott 1999), thus we choose them as the focus species for this review of how welfare science could be applied to cetaceans. We arrange the relevant cetology knowledge...