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SHORT NOTE

An observation of a gentoo penguin *Pygoscelis papua* feeding an Adélie penguin *P. adeliae* chick

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Abstract
Interspecific feeding refers to behavior where an adult of one species feeds the young of another species, with the exclusion of brood parasitism. In birds, most of observed cases concern passerines and this behavior has so far never been described among seabirds. We report on interspecific feeding provided by an adult gentoo penguin *Pygoscelis papua* to an Adélie penguin *P. adeliae* chick on the Antarctic Peninsula.

Keywords Interspecific feeding · Penguin · Antarctic

Introduction

The ecology and evolution of helping behavior in birds continues to engender considerable interest among behavioral ecologists (Skutch 1961; Koenig and Dickinson 2004), including interspecific feeding, or the feeding of non-brood parasitic offspring of another species. The behavior is generally rare and has been of theoretical interest since it appears to provide little evolutionary benefit to the feeding bird (Shy 1982). Such incidents have therefore usually been attributed to reproductive errors in species with analogous ecology (habitat, behavior and diet), where individuals fail to correctly identify offspring (Plissner and Gowaty 1988). In fact, it is likely to represent rare, maladaptive 'mistakes', but could also contribute to the acquisition of parenting skills (Dawkins 1976). Shy (1982) reviewed 140 cases of such interspecific feeding, identifying feeding by 65 species, none of them being a seabird. Here, we report on misdirected parental care by a gentoo penguin (*Pygoscelis papua*) in the form of feeding an Adélie penguin chick (*P. adeliae*).

Methods

During the Antarctic summer 2019–2020, one of us (FG) visited Petermann Island (65° 10′ S–064° 10′ W), a popular tourist destination, situated off the northwest coast of Kiev Peninsula in Graham Land, Antarctic Peninsula. Petermann Island is located in Penola Strait, in the Wilhelm archipelago, a short distance south of Booth Island and the Lemaire Channel. It is 1.8 km long and 1.2 km across. It is one of the few localities were gentoo and Adélie penguins breed in sympatry on the Antarctic Peninsula. 3516 nests of gentoo and 238 nests of Adélie penguins were reported on this island by the Antarctic Site Inventory in January 2018 (Harris et al. 2015; Humphries et al. 2017). Although both species have a distinct distribution on the island, breeding birds of both species coexist in a few places, at the edge of their respective colonies.

Results and discussion

On 12 February 2020, between 14h25 and 14h30, an adult gentoo penguin of unknown sex was observed feeding an Adélie penguin chick by passengers of the vessel *M/V Ocean Diamond*. The observation occurred on the East coast of the island in a place frequently visited by tourists due to its easy access. In this section of the colony, gentoo, Adélie penguins and Antarctic shags (*Leucocarbo bransfieldensis*) are breeding side-by-side on granite outcrops, with nests being often less than a meter away. A video was recorded (Online

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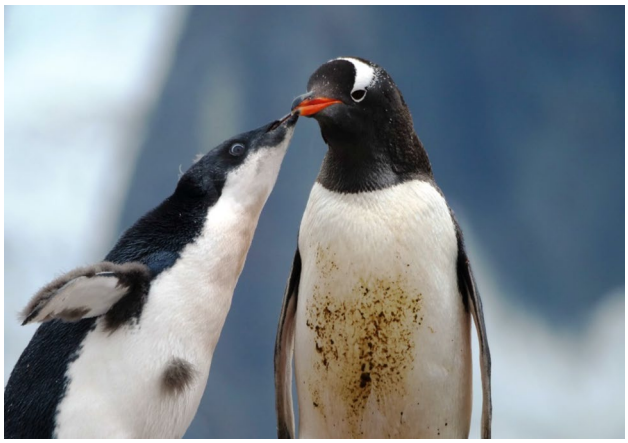

Fig. 1 The Adélie penguin *Pygoscelis adeliae* chick tries to initiate feeding by begging from a passive adult gentoo penguin *P. papua*. (Photo: Noam Sgan-Cohen)

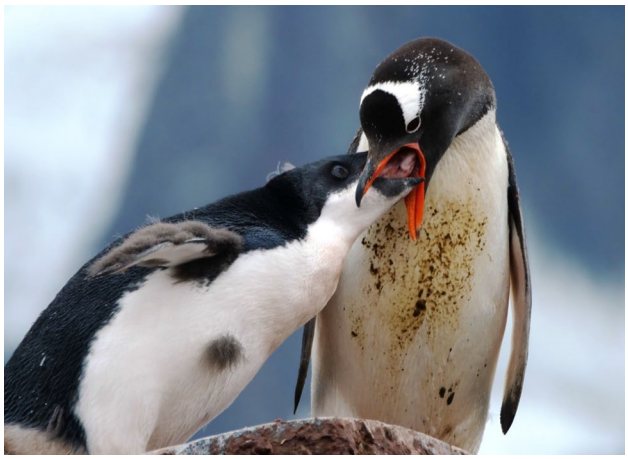

Fig. 2 Subsequent begging by the chick then stimulates the adult gentoo penguin *P. papua* to regurgitate food into the chick now open bill. (Photo: Noam Sgan-Cohen)

Resource 1) and photographs were taken during the event (Fig. 1). The Adélie penguin chick was approximately two months old and had already completed its molt, with only a few patches of down remaining on the back of its flippers and on the top of its head (Fig. 1). The feeding event lasted for approx. 5 min, with 18 distinct feeding bouts apparently mostly made of krill (*Euphausia* spp.) balls (Fig. 2). However, the interspecific feeding session probably lasted a longer period of time, as the gentoo penguin was already feeding the chick when this unusual behavior was noted. For that reason, we do not know if the gentoo penguin gave a series of display calls when coming back to the colony. At the end of the last feeding bout, the Adélie penguin chick initiated a feeding chase, a classical behavior in Pygoscelid penguins (Boersma and Davis 1997) but the run didn't last for more than a few seconds. Soon after leaving the chick, the gentoo penguin gathered some stones, the chick standing only a few meters away.

To the best of our knowledge, the only record of interspecific parental care in penguins concerns a king penguin (*Aptenodytes patagonicus*) brooding and defending a sub-Antarctic skua (*Catharacta lonnbergi*) chick on the sub-Antarctic Marion Island (Oosthuizen and de Bruyn 2009). However, interspecific feeding has never been recorded in penguins. Intraspecific alloparental care is more common than interspecific feeding but its frequency is highly variable depending on the species. For example, allofeeding (feeding of offspring by adults other than their own parents) is rare in Adélie penguin (Beaulieu et al. 2009) but common in king penguins where up to 25% of adults in one study allofed chicks (Lecomte et al. 2006) and in emperor penguins (*A. forsteri*) after adoption by a foster parent (Jouventin et al. 1995). Close proximity of nests is one of the main factors associated with interspecific feeding events in birds. It was the most common of the seven probable proximate causes of interspecific feeding identified by Shy (1982), implicated in 23.8% of the reviewed cases. Our observation of interspecific feeding probably falls into this category and is a rare and maladaptive event, with the stimulus–response mechanism that normally initiate the feeding of the young by their own parents results in misdirected feeding of chick of a different species nesting in close proximity (Jamieson 1987; Ligon and Burt 2004). Vocal cues allow offspring-parent recognition in penguins (Jouventin 1982) and although chicks may beg for food from adults other than their parents, they are usually aggressively repelled in Pygoscelid penguins (Bustamante et al. 1992; Boersma and Davis 1997). Therefore, it is highly improbable that the adult gentoo penguin was lured by the begging fledgling, especially in an interspecific context, although other factors could be considered as potential drivers of such behavior.

In some penguin species, like the emperor and the king penguins, 'parenting hormone' prolactin may be endogenously controlled to maintain parental care during extended absences from the breeding site while foraging at sea (Jouventin and Mauget 1996; Lormée et al. 1999). High levels of prolactin have been linked to high intraspecific adoption rates in emperor penguins and could also explain why king penguins involved in allofeeding are mostly failed breeders desperate to take care of a chick (Angelier et al. 2006; Lecomte et al. 2006). In the present case, it is possible that the gentoo penguin might have suffered recent nest failure, another contributing factor facilitating interspecific feeding identified by Shy (1982). This assumption remains speculative as we do not know the breeding status of the adult gentoo penguin and no hormonal levels were measured. We also do not know if this feeding event happened more than once, but we assume that the association was short-termed,

as the adult probably gained no benefit from this behavior. However, this unusual behavior can also be the result of interspecific egg dumping and the possibility that the adult had adopted the chick at a younger age and has continued to feed it on a regular basis cannot be discounted.

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Author contributions F.G. made the observations in the field, F.G. and C.B. wrote the manuscript.

Compliance with ethical standards

Conflict of interest The authors declare no conflict of interest.

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