

Behavioural expression of positive anticipation for food or opportunity to play in lambs

Claes Anderson^{a,*}, Jenny Yngvesson^a, Alain Boissy^b, Kerstin Uvnäs-Moberg^a, Lena Lidfors^a

^a Department of Animal Environment and Health, Swedish University of Agricultural Sciences, Sweden

^b INRA UMR 1213 Herbivores, Research Centre of Clermont–Theix–Lyon, France

ARTICLE INFO

Article history:

Received 8 October 2014

Received in revised form 3 February 2015

Accepted 4 February 2015

Available online 7 February 2015

Keywords:

Anticipatory behaviour

Play behaviour

Food reward

Emotions

Lambs

ABSTRACT

Anticipatory behaviours may serve a useful tool in studying positive emotional states in animals. This study aimed to investigate if lambs express anticipatory behaviours for opportunities to play or a food reward and if these behaviours would differ depending on the anticipated event. Forty-two male lambs were allocated into three treatment groups (control, play, food). Play and food lambs were conditioned to anticipate play or food in a holding pen for three minutes prior to accessing a reward arena containing toy objects or concentrate, respectively. Control lambs returned to their home pen following three minutes in the holding pen. Compared to the control lambs, both play and food lambs differed in several behaviours frequencies and durations, e.g. by an increased frequency of behavioural transitions and duration of walking. Following these observations, food lambs received the toy objects when entering the reward arena. The subsequent session in the holding pen resulted in a decrease in number of behavioural transitions, time spent walking and an increase in time standing still. In conclusion, anticipating a positive event resulted in differences in behaviour compared to a control group, and these behaviours are affected when the anticipated event does not fit with the lambs' expectations.

© 2015 Published by Elsevier B.V.

1. Introduction

It is suggested that anticipatory behaviours can give information about the emotional state of an animal (e.g. [Spruijt et al., 2001](#); [Boissy et al., 2007](#)). Emotions are defined as mental states elicited by rewards and punishers, a reward is defined as something for which an animal will work ([Rolls, 2005](#)). Anticipation is a motivational state that can be studied in animals in e.g. the period between a signal indicating the arrival of a positive event and the actual arrival of the positive event called reward ([van den Bos et al., 2003](#); [Boissy et al., 2007](#)) and require the ability to make the contingent association that one event precedes another event ([Ursin and Eriksen, 2004](#); [Greiveldinger et al., 2011](#)). Experiencing this event as rewarding will reinforce the appetitive motivation ([Spruijt et al., 2001](#); [Balcombe, 2009](#)), thus positive anticipation requires an understanding that the anticipated event will be experienced as positive (see [Rolls, 2005](#); [Baumeister et al.,](#)

[2007](#)). Emotions and anticipated emotions are believed to affect behavioural responses (e.g. [Cabanac, 1971](#); [Frijda, 1988](#); [Fraser and Duncan, 1998](#); [Baumeister et al., 2007](#); [Mendl et al., 2010](#)) thus studying anticipatory behaviours prior to the arrival of something rewarding may give indirect measures of the appetitive phase of positive emotions. Different methods of stimulating anticipation may be e.g. classical conditioning, operant conditioning (see [Spruijt et al., 2001](#)) or conditioned place preference (e.g. [Haghpour et al., 2013](#); [Domínguez-Salazar et al., 2014](#)).

Anticipatory behaviours in relation to a positive event have previously been shown to be expressed by e.g. increased activity ([van den Berg et al., 1999](#); [van der Harst et al., 2003](#); [Hansen and Jeppesen, 2006](#); [Imfeld-Mueller and Hillman, 2012](#); [Peters et al., 2012](#)), proximity to where the reward is presented ([Vinke et al., 2004, 2006](#); [Wichman et al., 2012](#)) and an increased frequency of shifts between behaviours, known as behavioural transitions ([van den Bos et al., 2003](#); [Vinke et al., 2004](#); [Peters et al., 2012](#)). It has also been suggested that a cue of a reward after conditioning will act as a substitute for the reward and therefore elicit the same response. To our knowledge it has not been studied empirically in farm animals, that anticipation will be expressed by goal directed behaviours, also called consummatory conditioned responses ([Panksepp, 2005](#); [Dickinson and Balleine, 1994](#); [Pearce, 2008](#)) that has been observed

* Corresponding author at: Department of Animal Environment and Health, Swedish University of Agricultural Sciences, P.O. Box 7068, SE-750 07 Uppsala, Sweden. Tel.: +46 18672136.

E-mail address: claes.anderson@slu.se (C. Anderson).

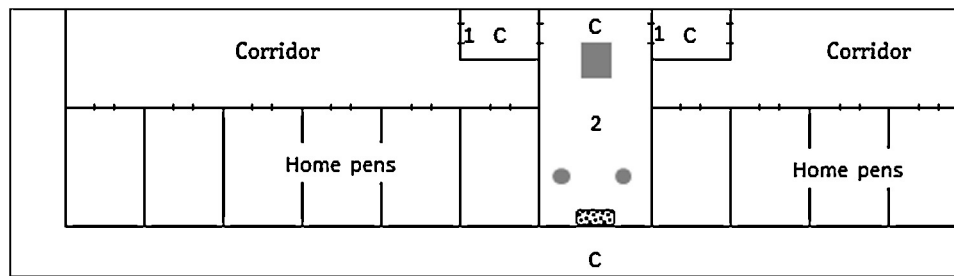


Fig. 1. Overview of half of the barn with ten home pens housing treatment pairs. 1 represents the holding pens and 2 represent the reward arena. Grey shapes represent position of platform and volleyballs (for PL), dots represent position of the food trough (for FL). C represents camera positions.

in pigeons (Brown and Jenkins, 1968) and dogs (Pavlov, 1927). There are however exceptions to these anticipatory behaviour indicators (e.g. van den Bos et al., 2003; Reimert et al., 2013) and there may be variation between species (see van den Bos et al., 2003) and within a species (Zimmerman et al., 2011; Wichman et al., 2012). One limitation with previous studies is that the majority have used food or something with a palatable taste as the reinforcer that stimulates anticipatory behaviour. These studies have thus used an extrinsic reinforcer, thus an external consequence to the behaviour will increase the likelihood that the behaviour will be performed again (Tarou and Bashaw, 2007). Contrary to an extrinsic reinforcer, intrinsic reinforcement means that by simply performing a behaviour the probability increases of the behaviour occurring again (Tarou and Bashaw, 2007) and one behavioural pattern that is believed to be experienced as positive only via its performance is play behaviours (e.g. Špinka et al., 2001; Burghardt, 2005).

The ultimate explanation (Tinbergen, 1963) why play is expressed and the potential benefits from play is outside the scope of this paper, but as Balcombe (2009) states regarding play behaviour; “pleasure acts as the proximate mechanism that causes animals (including humans) to behave adaptively”. Several recent reviews on emotions in animals have also suggested play behaviours to coincide with a positive emotional state (e.g. Burgdorf and Panksepp, 2006; Boissy et al., 2007; Yeates and Main, 2008; Balcombe, 2009; Held and Špinka, 2011; Špinka, 2012). It has also been suggested that regular displays of behaviours with no apparent immediate fitness benefits, and which are performed when the cost is low are believed to be motivated by their rewarding properties, coinciding with positive emotional states (Fraser and Duncan, 1998; Spruijt et al., 2001; Boissy et al., 2007), and research have shown support for an association between play behaviour and positive emotional states (e.g. Vanderschuren et al., 1996; Knutson et al., 1998; Trezza et al., 2010). If play elicits a positive emotional state, one may therefore expect that an animal will positively anticipate opportunities to play. This has been suggested (Fraser and Duncan, 1998), but to our knowledge not tested empirically other than in rats conditioned to anticipate social play (van den Berg et al., 1999) and in pigs conditioned to anticipate access to an enriched compartment (Reimert et al., 2013). For young farm animals, empirical studies on anticipatory behaviours for play are thus scarce.

Lambs may serve as a good model species when investigating anticipatory behaviours for play. In a previous study, it was found that lambs expressed play behaviours when being moved from their pens to a larger arena containing enrichment objects (Chapagain et al., 2014). Male lambs engage more in social play compared to females (Sasch and Harris, 1978; Dwyer, 2009), and a previous study has shown that female lambs have the ability to form anticipation for forthcoming rewards (Greiveldinger et al., 2011).

The aim of this study was to investigate if lambs would express behaviours indicative of anticipation for two different kinds of reward (food vs. opportunity to play), and if so, would these behaviours appear similar or reward specific. We were also interested in studying behavioural expression of a discrepancy from the anticipated reward and how this would affect anticipation behaviours on the subsequent repetition. We predicted that anticipation would be expressed by an increase in locomotor (walking) and explorative activity as well as in number of behavioural transitions and that anticipating food would elicit more profound effects on their behaviours compared to anticipating opportunity to play. We predicted, however, that anticipation for opportunity to play would result in more play behaviour. Following a discrepancy from the anticipated reward (food), we predicted a decrease in walking and number of behavioural transitions in the subsequent session.

2. Materials and methods

This study was reviewed and approved by the regional (Gothenburg) Ethical Committees on Animal Experiments (ref: 163-2012). Following the completion of this study, lambs remained in the barn for approximately two months until they had reached desired slaughter weight and were transported to a local abattoir.

2.1. Animals, treatment groups and housing

A total of 42 male lambs (various crosses of Dorset, Swedish Fine wool, Texel and Native Gotland sheep), were obtained from a local farmer at 75–98 days of age, one day after weaning. On arrival to the barn, they were housed in groups (10–16 lambs) for one day before being housed in pairs that remained throughout the study. Pairs were randomly allocated into three treatment groups (thus seven pairs per treatment). The lambs were of various crosses, but since 40 of 42 lambs were a minimum of 50% Dorset, treatment groups were not balanced for breed, but stratified for age. Twin lambs were separated and we confirmed that there was no significant weight difference between the treatments. One lamb in each pair was randomly selected as focal animal for observations and the other lamb was considered as a companion animal. The focal lambs were marked using a colour spray. Treatments were control lambs (CL), play lambs (PL) and food lambs (FL), and pairs were housed in a systematic order (Fig. 1). Each pair was housed in a home pen (5.8 m²) with straw bedding, ad libitum access to water, minerals and silage. Fresh silage and 1.5 kg of concentrate was added to the feed trough each morning. On observation days, concentrate was offered at the end of the day (see Section 2.3). The barn consisted of 21 home pens, two ‘reward arenas’ measuring 19.5 m² each (Fig. 1) and on each side of the reward arenas were located two smaller ‘holding pens’ (2.7 m²). Each holding pen had one gate to the corridor accessing the home pens, and one gate into the reward arena. The walls of the holding pens and reward arenas were solid up to 1.2 m, apart from one side of the arena that was fenced.

Download English Version:

<https://daneshyari.com/en/article/8497166>

Download Persian Version:

<https://daneshyari.com/article/8497166>

[Daneshyari.com](https://daneshyari.com)