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Positive Welfare in Science and Society: Differences, Similarities and Synergies

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Societal and scientific perspectives of animal welfare have an interconnected history. However, they have also, somewhat, evolved separately with scientific perspectives often focusing on specific aspects or indicators of animal welfare and societal perspectives typically taking a broader and more ethically oriented view of welfare. In this conceptual paper, we examine the similarities and differences between scientific and societal perspectives of *positive welfare* and examine what they may mean for future discussions of animal welfare considered as a whole. Reviewing published studies in the field we find that (UK and Republic of Ireland) farmers and (UK) members of the public (i.e., society) typically consider both negatives (i.e., minimising harms) and positives (i.e., promoting positive experiences) within the envelope of positive welfare and prioritise welfare needs according to the specific context or situation an animal is in. However, little consideration of a whole life perspective (e.g., the balance of positive and negative experiences across an animal's lifetime) is evident in these societal perspectives. We highlight how addressing these disparities, by simultaneously considering scientific and societal perspectives of positive welfare, provides an opportunity to more fully incorporate positive welfare within a comprehensive understanding of animal welfare. We suggest that a consideration of both scientific and societal perspectives points to an approach to welfare which accounts for both positive and negative experiences, prioritises them (e.g., by seeing positive experiences as dependent on basic animal needs being fulfilled), and considers the balance of positives and negatives over the lifetime of the animals. We expand on this view and conclude with its potential implications for future development of how to understand and assess animal welfare.

Keywords: animal welfare, quality of life, farmer attitudes and perceptions, public attitudes and perceptions, happiness

INTRODUCTION

Societal concern for farm animal welfare and animal welfare science have a shared and interconnected history, with societal concern often described as a catalyst for the establishment and development of welfare science (Fraser, 2008; Lawrence and Vigors, 2020). However, societal and scientific perspectives of welfare have also evolved separately, influenced by different factors, within their own domains. The science of animal welfare was, in its early phases, driven by a concern

for biological functioning (coping) (Broom, 1988), animals' feelings (Duncan, 1993; Fraser and Duncan, 1998), and a desire to find solutions to welfare issues (Lawrence, 2008). Recently there have been dissenting voices arguing for a richer notion of animal welfare with a focus on natural adaptations (Bracke and Hopster, 2006; Fraser, 2008). The latter view has by some (Weary and Robbins, 2019) been motivated by an effort to bring animal welfare science in line with popular views. Within society, animal welfare is subject to a plethora of different ethical, economic, and political viewpoints, which have mostly been studied in the global north (Lund et al., 2006; Ohl and van der Staay, 2012; Miele and Lever, 2013; Kupsala et al., 2015). These points of view—played out by the attitudes, beliefs, behaviours, actions, values, and policies of a variety of societal stakeholders—influence how animal welfare is perceived and valued. Consequently, although societal concern has inspired the development of welfare science, the different assumptions, values, and beliefs in which they are rooted contribute to differences between how animal welfare is understood within science and among stakeholders of the wider society. Thus, animal welfare “can mean different things to different people” (Hewson, 2003; p. 1).

The science of animal welfare has largely been underpinned by an effort to understand an animal's experience through objective, observable and quantifiable means (Fraser, 2009). This was particularly notable in the development of animal welfare science where there was, on the one hand, a need for the pioneering scientists to gain scientific credibility and, on the other hand, a need from governments and other stakeholders to use scientists as neutral arbiters in controversies concerning animal welfare (Sandøe et al., 2006). Although welfare science has since developed to assess animals' subjective experiences (Wemelsfelder, 1985; Lawrence, 2008), societal actors can have a more subjective perspective of animal welfare (i.e., driven by multi-faceted factors such as personal experiences, ethical views, knowledge, and attitudes to animals) (Clark et al., 2016). This has implications for how welfare is viewed and perceived between and within science and society and, consequently, what welfare scientists and societal actors may value and how they may act to improve different aspects of welfare.

The interconnectedness between science and society has also been a key aspect of the development of the idea of *positive animal welfare*. Here, societal perspectives have been cited as one of the underlying drivers of positive animal welfare within science (Lawrence et al., 2019; Rault et al., 2020). Positive welfare has been justified on the basis that it is more in line with public expectations for welfare, which often focus on animals having positive experiences or positive emotions (Miele et al., 2011; Rault et al., 2020). However, beyond societal perspectives contributing to an initial sparking of scientific interest in positive animal welfare, as a concept, it has since evolved separately and been developed further within welfare science. Similar to animal welfare more generally, this has implications for how positive welfare is viewed between science and society, with likely divergences between how positive welfare has evolved and been constructed within welfare science and how society may view positive welfare. Explaining the nature of these differences may prove important for the effectiveness of future positive

welfare (and welfare more generally) related exchanges between science and stakeholders from wider society (e.g., farmers and consumers) and vice versa. As Van Poucke et al. (2006, p. 556) advises, considering perspectives of societal actors within animal welfare science helps make animal welfare a “a more workable concept in politics and society.” A conception of welfare which considers the views of societal actors may be workable in the sense that it can enhance acceptance and uptake amongst farmers (Rousing et al., 2001; Vaarst, 2003; Kirchner et al., 2014) and ensure that welfare policy addresses public views and concerns (Lundmark et al., 2018; Alonso et al., 2020). When taken together, such factors may indirectly (via public influence) and directly (via farmer uptake) improve the welfare of farmed animals.

In light of this line of thinking, the present paper seeks to examine potential overlaps and differences between science and society on positive welfare and explore what this may mean for our understanding of both positive animal welfare and animal welfare in general. First, we briefly ‘take stock’ of the current characterisation of positive welfare within science, based on the recent reviews of Lawrence et al. (2019) and Rault et al. (2020). Second, we share key insights gained from recent social science research which directly examined how members of the public (MOP) (in UK) and livestock farmers (in UK and Republic of Ireland) construct positive animal welfare (as opposed to ‘animal welfare’ more generally). In doing so, we uncover societal (i.e., livestock farmers and MOP) constructs of welfare not currently captured by the welfare science focussed on positive welfare, and aspects of positive welfare science not considered by society (i.e., farmers and MOP), indicating some disparities between the insights that may be gained from how both groups view welfare.

The aim of this paper is thus to explore and set out how consolidating both societal and scientific perspectives of positive welfare presents opportunities to more fully incorporate and integrate positive welfare within a general concept of animal welfare. Notably, a consideration of societal perspectives points towards the need to marry and better integrate positive welfare with more traditional welfare perspectives which emphasise the importance of minimising negatives, whilst also considering how this can contribute to and be situated within a ‘whole life’ perspective. We propose three elements which would support this, including (i) an integration of ‘negative’ and ‘positive’ aspects of welfare; (ii) a ‘prioritisation’ approach; and (iii) a whole life perspective. The purpose of this paper is not to provide a full theory or framework of animal welfare but rather take inspiration from both science and society to suggest how positive welfare and animal welfare more generally can, via future work in the field, be more wholly integrated than they currently are.

POSITIVE ANIMAL WELFARE

Positive animal welfare is an increasingly used term within welfare literature, often taken to denote an approach to welfare which goes beyond minimising negative aspects of welfare and encourages the promotion of positive aspects (Yeates and Main, 2008; Turner, 2020). In this section, we briefly review current characterisations of positive welfare within the animal welfare

science literature, before presenting some key findings from social science studies (conducted in the UK and Republic of Ireland) exploring how farmers and MOP view positive welfare.

Scientific Perspective

The science of positive animal welfare could be described as a sub-interest within animal welfare science which seeks to investigate and promote the importance of providing animals with positive experiences. The common narrative is that it developed as a response to the over-focus on the minimisation of negatives within welfare science (Yeates and Main, 2008; Lawrence et al., 2018, 2019). However, it is also evident that positive welfare emerged from a growing interest in positive aspects of welfare (e.g., positive emotions) within animal welfare science (Lawrence et al., 2019) and has evolved into a separate area of scientific study. As such, it is both an individual area of specific scientific interest but is also connected to the wider field of animal welfare science. As Rault et al. (2020, p. 2) describes, it is a “concept that fits under animal welfare and that focuses on a specific and overlooked part of it.”

Given the emergent and gradual evolution of positive welfare, there are, unsurprisingly, multifaceted viewpoints on and characterisations of positive welfare within the literature. Lawrence et al. (2019) reviewed the core positive welfare literature (constituting, at the time, 10 key papers) and described it as having four defining features or characteristics—positive emotions, positive affective engagement, quality of life and happiness—which could also be linked to the wider welfare literature. The ‘positive emotions’ [where emotions were defined as “an overarching term to cover subjective experiences in animals” (Lawrence et al., 2019, p. 4)] characteristic denoted the emphasis placed on the capacity for animals to experience positive emotions (by the core positive welfare literature) and the increasing use of terms such as pleasure, fun and enjoyment in relation to animals’ experiences (Lawrence et al., 2019). A further feature of this literature was an interest in the function of positive emotions (i.e., how they emerge and their influence on animal behaviour) (Lawrence et al., 2019). This largely derives from Mellor’s (2012, 2015a) work on ‘positive affective engagement,’ which can be described as the positive emotions animals experience when they engage in rewarding goal-directed behaviours. Lawrence’s (2019) review further highlighted ‘Quality of Life’ (QoL) and ‘Happiness’ as key but less well-developed features of the positive welfare literature. Both are aspects of welfare which encourage a broader approach to viewing and assessing welfare. Namely, QoL can be understood as a continuum from negative to positive, where a good QoL entails positive experiences outweighing negatives overall (Yeates and Main, 2008; FAWC, 2009), while ‘Happiness’ takes a whole-life perspective and has been described as a relatively stable trait based on an animal feeling positive ‘most of the time’ (Webb et al., 2018). As such, Lawrence et al. (2019) review reveals a relatively small literature on positive welfare, primarily focused on animals experiencing positive emotions or engaging in behaviours associated with positive emotions, and with a lesser focus on wider perspectives where welfare is conceptualised as a balance between good and bad or is viewed over time.

More recently, Rault et al. (2020) also reviewed the positive welfare literature [including papers not reviewed in Lawrence et al. (2019)], with a particular focus on the multiple uses of the term, to clarify and provide guidelines on its use. As with the Lawrence et al. (2019) review, it highlighted the existence of multifaceted conceptions of positive welfare within the literature, but also noted some similarities. Specifically, Rault et al. (2020) describe how the various conceptions could be grouped as either ‘hedonic positive welfare’ or ‘positive welfare balance’ (Rault et al., 2020). The former refers to positive welfare “arising from likes and wants and their positive outcomes on welfare” and the latter as “an overall positive welfare state based on the effects of positive experiences outweighing the effects of negative experiences” (Rault et al., 2020, p. 2). Although both characterisations emphasise the importance of positive affective states, they differ in the object of focus; the ‘hedonic’ literature is focused only on positive experiences while the ‘positive welfare balance’ literature claims that positives should be balanced against, and can, outweigh negatives (Rault et al., 2020). Importantly, Rault et al. (2020) describe how, when defined in terms of ‘hedonic positive welfare,’ positive welfare could be conceived as a stand-alone construct. However, they further highlight that when characterised as ‘positive welfare balance,’ its definition overlaps with concepts such as QoL and happiness, and is thus less clear (Rault et al., 2020).

Overall, it is evident that the concept of positive welfare is not separate from the wider welfare literature. Rather, as described in Lawrence et al. (2019), its key characteristics can be linked with prior and simultaneous developments within wider welfare science. However, beyond this, a critical point evident in both reviews (Lawrence et al., 2019; Rault et al., 2020) is a potential divergence in the interests of the positive welfare literature; it either focuses on singular events in an animal’s life (i.e., opportunities to engage in positive experiences) or on the accumulation of such events across an animal’s life (i.e., a balance of positive experiences outweighing negative or a general positive balance throughout life or large stretches of it). As will be made clear in the following sections, this distinction is relevant to understanding where and how societal perspectives of positive welfare link to scientific perspectives and underlie the need to more fully integrate positive welfare and perspectives which focus on minimising negative aspects of welfare.

Societal Perspective

There have been numerous studies examining societal perceptions of animal welfare (e.g., Lassen et al., 2006; Clark et al., 2016; Cornish et al., 2016) with a particular focus on the views of consumers or citizens (e.g., Spooner et al., 2014; Thorslund et al., 2016; Buddle et al., 2018) and livestock farmers (e.g., Spooner et al., 2012; Balzani and Hanlon, 2020). For the most part, this research demonstrates that multiple views of animal welfare exist (Fraser, 2008; Cornish et al., 2016; Weary and Robbins, 2019). That is to say, animal welfare means different things to different people, and understanding societal perspectives of animal welfare often requires acknowledgement of these multiple subjective perspectives (Given, 2008).

Few studies have explicitly examined societal perspectives of *positive animal welfare*, and those that do have only studied the perspectives of livestock farmers and MOP in the UK (Vigors, 2019; Vigors and Lawrence, 2019). As such, our reference to societal perspectives of positive welfare refers to these specific societal actors (i.e., farmers and MOP) and this context. Regardless of this, what is notable in the findings of this research are the multiple views of positive welfare demonstrated by these societal actors (see Vigors, 2019; Vigors and Lawrence, 2019).

A qualitative interview study, with a sample of UK MOP, revealed they interpreted and perceived positive animal welfare to mean that farm animals are either 'free from negative experiences' or that they are having 'positive experiences' (Vigors, 2019). Thus, positive welfare meant qualitatively different things to different MOP participants. Underlying these different interpretations was a comparison between the words 'positive' and 'negative.' To make sense of a term, previously unknown to them, participants relied heavily on comparing perceived 'positive' aspects of welfare (e.g., natural behaviours) to perceived 'negative' aspects of welfare (e.g., physical harm) (see Vigors, 2019 for further explanation). In other words, MOP participants made sense of positive welfare by expressing what it was not (e.g., 'negative aspects' of welfare). This resulted in some individuals interpreting it to mean simply an absence of any negatives (e.g., not 'negative' welfare), and others perceiving it to be more than being 'free from negatives' but to also include the provision of 'positive experiences' to animals (Vigors, 2019). Thus, MOP who framed positive welfare as being 'free from negatives' considered that ensuring no harm, eliminating negative affect, and preventing health issues would provide positive welfare (Vigors, 2019). Conversely, MOP who held the 'positive experiences' frame believed that animals require opportunities for positive experiences by provision of a natural-outdoor environment, autonomy and positive human-animal relationships (Vigors, 2019).

The mentioned qualitative interview research also revealed multiple conceptions of positive welfare amongst livestock farmers in the UK (see Vigors, 2019; Vigors and Lawrence, 2019). It was evident that participating farmers, potentially due to their first-hand experiences, drew on pre-existing views and personal experiences relating to animal welfare to make sense of 'positive animal welfare.' As with MOP, there were differences between individual farmers, with the majority of participants framing positive welfare as 'good husbandry,' while others framed it as either 'proactive welfare improvement' or the 'animal's point of view' (see Vigors, 2019 for full details of each). Again, exploring and accounting for these multiple views and conceptions of welfare is important as they help understand how farmers may respond to the increasing interest in positive welfare and why there may be differences in response between individuals (Given, 2008). For example, those who framed positive welfare as 'good husbandry' considered it to be similar to their current welfare practises (e.g., supporting health, reducing stress, ensuring resource needs are met) (Vigors, 2019). Conversely, those who possessed the 'proactive welfare improvement' frame conceived that positive welfare would require doing more or going beyond standard levels of welfare, while those who constructed it as the 'animal's point of view' believed that positive welfare

required a consideration of the animal's perspective when making management decisions (Vigors, 2019).

Further analysis highlighted several key areas where farmers' current practises and attitudes were somewhat reflective of aspects of positive welfare as presented in the literature (see Vigors and Lawrence, 2019). This included animal autonomy, play, positive affect, social interaction and developing positive human-animal interactions. Importantly, however, this research also investigated how farmers saw their role in the provision of such factors; most farmers felt that minimising stress and health issues should be their priority as animals would then be free to engage in positive experiences with their physical needs being met (*ibid.*). In other words, a general view for farmers was that animals could engage in positive aspects of welfare (e.g., play, social interactions) of their own accord provided they were free from negatives (e.g., stress, pain), hence the farmers' emphasis on the importance of minimising the latter. In that way, farmers seem to highlight the welfare relevance of animal autonomy, pointing to the benefits that may arise if we give animals the opportunity to pursue their own motivations of what is good for them (Palmer and Sandøe, 2018).

Findings from further social science research also revealed quantitative differences between societal actors in their judgements of and attitudes towards two key factors of welfare, which arguably reflect polar elements of welfare and positive welfare; minimising health issues and promoting natural behaviours (see Vigors et al., 2021a,b). In a factorial survey using vignettes, MOP in the UK and farmers in the UK and Republic of Ireland were asked to judge the well-being of farm animals under varying conditions of health and natural behaviours, where animals were described as having either; (i) health issues minimised and natural behaviours not promoted; (ii) health issues minimised and natural behaviours promoted; (iii) health issues not minimised and natural behaviours not promoted, or; (iv) health issues not minimised and natural behaviours promoted. Interestingly, whether health issues were minimised or not had the greatest impact on how both MOP and farmers judged animal well-being (Vigors et al., 2021a,b). Moreover, situations where health issues were not being minimised, but natural behaviours were being promoted were judged to be more negative for animal welfare by both MOP and farmers than situations where health issues were minimised but natural behaviours were not promoted. Such findings potentially indicate that MOP and farmers construct welfare within a prioritisation approach, where potential harms and suffering (i.e., health issues) must first be dealt with, or are seen as a baseline requirement, before any benefits from promoting natural behaviours can be gained (Vigors et al., 2021a,b). The similarity between MOP and farmers found here is of note, however, although the findings from the MOP study are generalisable to the UK population those of the livestock farmers are not.

When taken together, these findings reveal some important insights into how MOP and farmers in the countries studied frame and construct positive welfare and the way in which they appraise factors relevant to the positive welfare debate (i.e., minimising health issues and promoting natural behaviours). It is notable that 'minimising harms' was an important aspect

of both MOP and farmers' constructions of what positive welfare meant to them. Furthermore, when positive aspects of welfare were freely elicited by interview participants, these tended to focus on specific positive experiences for animals such as engaging in play, or the potential positive experiences that may arise from animals being able to exert some degree of autonomy. However, there was limited indication of either MOP or farmers conceiving of positive welfare within a whole life perspective (i.e., the balance of positives and negatives over an animal's lifetime). In addition, when asked to judge the well-being of animals under varying health and natural behaviour conditions, the health of the animals appeared to take precedence. As will be set out in the following section, such societal (i.e., farmer and MOP) perspectives point to the potential need to more fully integrate positive welfare with more traditional perspectives on animal welfare, where approaching welfare from a 'prioritisation' perspective may be a useful way to construct welfare in a manner which supports animal welfare and addresses societal expectations.

Similarities and Differences Between Science and Societal Perspectives

Scientific and societal perspectives, as previously mentioned, are both interconnected but separate, each influencing the other but also each developing in their own way in response to differing factors of influence which, in many instances, leads to conflicting views (Lassen et al., 2006; Weary and Robbins, 2019). As such, in the current context of positive animal welfare, it is arguably beneficial to more directly compare and contrast the scientific (i.e., animal welfare research and literature) and societal (i.e., farmer and public) perspectives of positive welfare presented in the prior sections.

A key similarity between science and societal perspectives of positive welfare is a focus on the specific kinds of activities and feelings relevant to positive welfare. The positive welfare literature highlights play (Ahloy-Dallaire et al., 2018), positive social interactions (Mellor, 2015b), positive affective engagement (Mellor, 2015a), and positive emotions (Boissy et al., 2007) as factors which could support positive welfare. These factors were also mentioned and emphasised by farmers and MOP in their sense-making of positive welfare (see Vigors, 2019; Vigors and Lawrence, 2019). However, there are also some key differences between the positive welfare literature and societal perspectives. Firstly, the societal perspectives of positive welfare do not fully extend to that of the broader perspectives captured in the science literature by concepts such as QoL, Happiness or 'Positive Welfare Balance.' Secondly, the literature focused on positive welfare states (as outlined previously in section Scientific Perspective) does not extend to that of the societal consideration of the 'minimisation of harms' or 'eliminating negative affect' as an integral aspect of positive welfare. Of course, this is an aspect of welfare extensively dealt with by welfare science more generally. However, it is important to note that MOP and farmers viewed avoidance or reduction of negatives as positive in and of

itself, and therefore framed it as an element of positive welfare (Vigors, 2019).

We are thus presented with a situation where the positive welfare literature, alone, does not fully account for the minimisation of harms seen as important to societal actors (where these harms include both physical and mental aspects) and equally, societal perspectives of positive welfare do not consider some of the perspectives found in the science literature (i.e., the balance of positive and negatives and a whole life perspective). As such, there is arguably room for improvement, both in terms of more fully consolidating positive welfare with perspectives of welfare which emphasise the minimisation of harms and, by encouraging greater consideration of broader perspectives (e.g., QoL or happiness) within societal perspectives of welfare. As will be set out in the next section, one way to do this may be to extend efforts to integrate positive welfare into a broader animal welfare envelope and here consider the 'prioritisation perspective' evident in societal perspectives. This would support a more balanced approach to welfare, where both 'the minimisation of harms' and the 'promotion of positives' are considered and prioritised according to the situation an animal is in, and embedded within a 'whole life' perspective.

COMBINING SCIENTIFIC AND SOCIETAL PERSPECTIVES: OPPORTUNITIES FOR A MORE BALANCED CONCEPTUALISATION OF WELFARE

As revealed in the previous sections, there are some disparities between societal and scientific perspectives of positive animal welfare which, if addressed, provide opportunities for the development of a more balanced conceptualisation of welfare. Based on the overlaps and differences we identified between science and society, we suggest the consideration of three elements in future developments of welfare; (i) an integration of 'negative' and 'positive' aspects of welfare; (ii) a 'prioritisation' approach; and (iii) a whole life perspective. For brevity, we refer to perspectives in the welfare literature which emphasises the minimisation of harm as 'negative welfare' and the literature focusing on the promotion of positives as 'positive welfare.' In other words, negative welfare can be taken to denote the approaches to welfare which have traditionally dominated welfare science and positive welfare denoting the more recent movement towards enhancing positives in animals' lives. As previously mentioned, our aim with this section is not to create a theory of welfare but rather to highlight areas for consideration within welfare science, particularly relating to more wholly integrating positive welfare into welfare generally and developing welfare in a manner which considers societal views. Moreover, it is important to note that the perspectives put forth in this section are ideas (developed from our review of scientific and societal perspectives) to support the integration of positive welfare into wider perspectives of welfare. We recognise there are numerous other factors to be considered here that are beyond the scope of this paper (e.g., aggregation of welfare indicators, impact on human actors, effective routes to implementation).

‘Healthy and Happy’: Integrating Negative and Positive Aspects of Welfare

There is a general agreement, particularly within the positive welfare literature, that welfare is concerned with not only the minimisation of negative factors but also the promotion of positive experiences (e.g., Yeates and Main, 2008; Mellor, 2012; Mattiello et al., 2019). This suggests a need for an animal’s welfare to be assessed through an integrated approach i.e., one which looks for both the absence or reduction of negatives and the presence or promotion of positives. However, similar to positive human psychology (e.g., Myers and Diener, 1995), the positive welfare literature has largely justified the need for positive welfare by problematising ‘negative’ approaches to welfare. Indeed, it is somewhat the norm, in positive welfare papers, to first set the scene by pointing out that welfare science has been too focused on negative aspects of welfare (e.g., Mattiello et al., 2019; Rault, 2019; Spiesberger et al., 2019; Gladden et al., 2020; Miller et al., 2020).

Consequently, there seems to have been a growing separation between research focused on positive indicators of welfare (e.g., Mattiello et al., 2019; Ocepek et al., 2020) and those examining negative indicators (e.g., Bravo et al., 2019; Reiche et al., 2020). To support animal welfare more effectively, there is arguably a need for these perspectives to be integrated for the evaluation of animal welfare (Stokes et al., 2020). As Hemsworth (2021) hints, just focusing on promoting positives is not enough, just as focusing only on minimising negatives is not enough. Critically, given the wider societal context within which welfare science must operate (Ohl and van der Staay, 2012), more fully considering both negative and positive aspects of welfare would be more in line with how societal actors conceptualise and interpret positive welfare (as set out in the prior sections).

A consideration of indicators of both positive (e.g., promoting positive experiences) and negative welfare (e.g., welfare harms) is evident in some recent studies (e.g., Baciadonna et al., 2020; Dūpjan, 2020). However, this is often in the narrow context of a specific welfare indicator. For example, numerous studies on animal emotion consider both positive and negative affective states (e.g., Lambert and Carder, 2019; Baciadonna et al., 2020; Laurijs et al., 2021). Similarly, research into human–animal interactions also tend to consider both negative (e.g., fear, stress) and positive (e.g., pleasure) indicators (e.g., Rault, 2016; Destrez et al., 2018; Mota-Rojas et al., 2020). However, the simultaneous consideration of both negatives and positives here is arguably an outcome of the centrality of emotional valence (i.e., a range from unpleasant to pleasant) in the study of affective states and human–animal interactions, as opposed to a perceived need to integrate negative and positive aspects of welfare.

However, perhaps in response to the mentioned division, we have recently seen indications of a recognised need to assess welfare from a perspective which covers both negative and positive welfare aspects. For instance, Laurijs et al. (2021) stress the need for valid indicators of positive emotions to be developed to support their effective integration

into welfare assessment protocols, currently dominated by negative assessment indicators. Tallentire et al. (2019), when developing a social sustainability methodology to include animal welfare, demonstrated awareness that both negative and positive welfare indicators will be needed when they highlighted that their “methodology could easily accommodate additional negative indicators and even positive welfare indicators as advancements are made in the understanding of animal welfare” (p. 1093).

Importantly, there have been efforts to integrate positive indicators of welfare into existing assessment frameworks or develop new frameworks with this in mind. For example, the Five Domains framework was updated to include a consideration of welfare enhancement (e.g., positive affective engagement) in addition to welfare compromises (Mellor and Beausoleil, 2015) and was more recently updated to include the negative and positive impacts of human–animal interactions (Mellor et al., 2020). In response to the good life opportunities set out by the Farm Animal Welfare Council (FAWC, 2009), research has also been dedicated to the development of a resource-tier approach to the assessment of welfare (in laying-hens) (Edgar et al., 2013; Stokes et al., 2020). Although the resource-tier framework was predominantly designed to assess positive welfare (according to the ‘good life opportunities’ of comfort, pleasure, confidence, interest, healthy life), it also considers outcomes of negative welfare. Thus, although there is an increasing interest in integrating negative and positive approaches to assessing welfare, this is often done from the perspective of either a pre-existing interest in positive welfare or by including narrow positive indicators (e.g., positive affective states) into existing frameworks.

A further thorny problem which will have to be addressed in future attempts to integrate positive welfare into a full account of how to understand and assess animal welfare concerns aggregation (Sandøe et al., 2019). When several indicators are added up, numerous ethically tainted methodological issues arise. Famously, an ambition of the Welfare Quality® system has been to prevent severe welfare problems which could be hidden by allowing for compensation by less important welfare benefits (Veissier et al., 2011). However, as documented by Sandøe et al. (2017) this ambition has not been fulfilled.

However, we think there is value in developing ways to assess the overall welfare state of an animal where the interaction between positive and negative aspects of welfare is central (i.e., an integration approach). For example, positive experiences may not be enjoyed or availed of in the presence of severe negatives (e.g., strong pain and discomfort) and, arguably, a lack of positive welfare opportunities (e.g., through enrichment) may not only mean limited positive welfare but could induce a negative state e.g., apathy (Meagher et al., 2018) and fear (Zebunke et al., 2013). Whereas, a complete avoidance of pain, fear, discomfort, and other aspects of negative welfare will not be practically or biologically feasible it is important that positive welfare outweighs the negative. We elaborate further on this idea in the following section, drawing on the societal (i.e., farmers and MOP) perspective of taking a ‘prioritisation’ approach to welfare.

'It Depends on the Context': A Prioritisation Approach

Farm animals are raised in a multitude of heterogeneous environments and production systems, both within and between species, contributing to the complexity of assessing welfare (Temple and Manteca, 2020; Hemsworth, 2021). Yet, as presented in prior sections, stakeholders from wider society appear to address this complexity by taking a 'prioritisation' approach. That is to say, when presented with multiple, and sometimes conflicting, aspects of welfare, they prioritise some factors over others according to the situation an animal is in (e.g., outdoor-access vs. heat stress, protection against health issues vs. freedom to engage in natural behaviours) (Cardoso et al., 2018; Vigors et al., 2021a,b) and the particular aspects of welfare in question (e.g., physical vs. mental health) (Vigors et al., 2021a,b). As such, a 'prioritisation' approach could be described as one that views welfare as context-dependent, assessing the particular situation an animal is in and determining what aspects of welfare should take precedence before benefits from subsequent welfare inputs can be gained.

Within the existing animal welfare literature, a prioritisation approach is somewhat implicit in studies which highlight the context-dependent nature of welfare assessment. For example, Hemsworth (2021) argues that the priority for laying-hen welfare depends on the system; health and hygiene is a welfare priority for non-caged systems, while positive aspects of welfare, such as being able to express natural behaviours takes precedence in caged systems. Similarly, Mee and Boyle (2020) argue that when assessing pasture-based and confinement-based dairy systems, welfare depends on animals being appropriately managed and welfare needs prioritised according to the context they are in (e.g., natural behaviours may need to take precedence in a confinement system). Smid et al. (2020) further highlight how taking actions which directly support spontaneous behaviours in dairy cattle, such as lying, standing, and walking, is of greater priority for those managed in confinement, rather than pasture-based, systems. Within the positive welfare literature, Rault et al. (2020) distinguish between 'hedonic positive welfare' and 'positive welfare balance,' the latter meaning an approach to welfare which considers the balance between positive and negatives. Although not expanded upon by Rault et al. (2020) achieving this would require some 'prioritisation' of welfare to create a balance. In a somewhat similar vein Webb et al. (2018) define human and animal happiness as how 'an individual feels generally' but also do not develop how their approach might influence decisions over how to manage animals in practise. We take inspiration from the societal 'prioritisation approach' to develop this point further.

A key benefit of taking a prioritisation approach is drawing attention to the mutually dependent nature of negative and positive aspects of welfare (e.g., the absence of positive welfare can indicate the need to address negative aspects). For instance, research by Rayner et al. (2020) found that when environmental conditions were supportive of play, fast-growing broilers were less likely to express play behaviours than slow-growing broilers. A key interpretation of such a finding is that animals may

be unable to engage in or enjoy positive experiences (e.g., play) unless they are physically and mentally healthy. In other words, when an animal is not making use of positive welfare opportunities (e.g., play) this could indicate the presence of negative welfare concerns (e.g., health issues) (Lawrence, 1987; Ahloy-Dallaire et al., 2018), just as engaging in play can indicate positive emotions (Boissy et al., 2007; Held and Špinka, 2011). Considering the potential mutually dependent nature of positive and negative welfare is novel; it raises the question "if an animal is not engaging in a 'positive welfare' opportunity, what does that say about their 'negative welfare'?" Concomitantly, it also highlights that only addressing physical health may not be enough to support overall welfare if positive welfare is not also facilitated. In light of this, there is room for disagreement about strategy. One strategy could be to try to get the best out of a non-ideal production system, the other would be to say that for a production system to be acceptable it must be possible to make up for the negative aspects of welfare so that positive welfare prevails. For example, considering the latter approach it may be argued that to achieve acceptable welfare, broiler production systems with fast growing broilers should be replaced with systems using slower growing birds. Notably, this is already happening on a large scale in some countries (Saatkamp et al., 2019).

Within the positive welfare literature, emphasis is often placed on the welfare gains and benefits from providing animals with greater opportunities to have positive experiences (e.g., Fernandes et al., 2021). This is an important and critical point, and one which has helped to advance and develop welfare science in recent years. However, the prioritisation approach evident in societal assessments of welfare (as presented in section Societal Perspective) would encourage the application of a range of welfare indicators (e.g., from those that serve to minimise negatives to those that promote positives) whilst emphasising that, in response to the specifics of the situation, particular welfare attributes may need to take priority or be actioned first before subsequent benefits can be gained from another. For example, hill sheep, who lead a relatively autonomous life with opportunities for positive experiences (e.g., play, social interaction, foraging), may not be able to fully 'enjoy' those positive opportunities if the minimisation of negative factors (e.g., lameness, parasitic diseases) are not prioritised. In other words, the emphasis on and prioritisation of negative or positive approaches to welfare is arguably context-dependent, whereby the gains from one may depend on another aspect of welfare first being dealt with. The critical issue is, as already suggested, to ensure that positive aspects of welfare outweigh negative. This should, ideally speaking, be the case for each and every animal. In real life this ideal assumption may not hold true and there will be some animals that do less well. This will give rise to intricate problems about aggregation at farm or group level, which are beyond the scope of this paper [see Sandøe et al. (2019) for an in-depth discussion].

Nevertheless, as will be expanded further in the following section, developing a balance between positive and negative experiences is central to a whole life perspective to welfare; the decisions taken under a prioritisation approach could

cumulatively support this over an animal's lifetime, as we will now go on to discuss.

'Balancing the Positives and Negatives': A Perspective Over Time

A 'whole life' perspective is one that looks not at singular incidents but considers the cumulative quality of welfare across longer stretches of an animal's life or over its full lifetime (i.e., net welfare). Such a view is evident in the positive welfare literature in concepts such as QoL (McMillan, 2000; Yeates and Main, 2008; FAWC, 2009) and 'Happiness' (Webb et al., 2018) [see Lawrence et al. (2019) for review]. Perhaps as an outcome of its roots in human QoL, where it is considered a subjective concept based on the individual's perception of their life, a 'whole life' view in animal welfare has largely focused on emotion. For instance, animal QoL is conceptualised as arising from positive emotions outweighing negative across an animal's lifetime, experienced on a continuum from negative to positive affective states (e.g., pains to pleasure) (McMillan, 2000). Moreover, in the context of positive welfare, Laurijs et al. (2021, p. 1) recently defined animal welfare as "the balance of positive and negative emotions, where positive emotions are key to a good animal life." However, assessing welfare across an animal's life according to an adding up of negative and positive feelings (e.g., negative vs. positive affective state) may be overly reductive. The key factor is whether the positives prevail; and this cannot be adequately determined by a simple multiplying exercise (Sandøe et al., 2019). Moreover, focusing only on affect-based indicators precludes the inclusion of biological factors and health which are also relevant as they also arguably impact welfare even if they cause no suffering (Broom, 1991).

Within the broader welfare literature, the importance of a multifactorial approach to assessing welfare has contributed to the development of frameworks such as the Five Domains model (Mellor and Reid, 1994; Mellor, 2017; Mellor et al., 2020), whose welfare compromise and welfare enhancement grading scales may provide a starting point for assessing the negative–positive welfare balance inherent to QoL (Mellor and Beausoleil, 2015). Nonetheless, this negative–positive balance is limited in that it is focused only on 'affect-based grades' (Mellor and Beausoleil, 2015, p. 250) and does not incorporate how other factors contribute to a balance of positives and negatives beyond affect. Turner (2020, p. 2) points to the need to take a broader view when she argues "*we can infer that positive affective state is critically important but not sufficient for positive welfare of humans or animals. Therefore, if we are to take a holistic view of animal well-being, then positive animal welfare incorporates more than the net valence between positive or negative affective states; it should also include a state of good physical health and ensuring that many if not all needs of the animal are being met in terms of natural drives.*"

It is therefore arguably of benefit to take a broader conceptualisation of the whole life view, one which considers the cumulative benefit of multi-factorial, welfare-enhancing incidents across an animal's lifetime, where the aim is to have favourable conditions and experiences outshining the negative

ones. Achieving this requires both the minimisation of negatives (e.g., by intervening on health issues) and the support and promotion of positives (e.g., opportunities for play behaviours, positive social interactions). In line with the prioritisation approach, depending on the particular situation, minimising negatives may contribute just as much to a favourable 'whole life' balance as promoting positives; the right decisions need to be made at the right time. However, as Green and Mellor (2011) highlight, there are considerable difficulties associated with extending the assessment of animal welfare from singular incidents to a time period of the 'whole life,' as the various contributing factors may interact in complicated ways that are difficult to untangle.

Nevertheless, embedding welfare within a perspective that considers longer stretches or the whole life of the animal is arguably relevant for achieving a good QoL in farm animals; one where positive experiences prevail over negative. Achieving this requires, and arguably relies on, a fuller integration of positive and negative aspects of welfare, and recognising the reciprocal interaction between positive and negative welfare indicators. Critically, without minimising negatives animals may not have the opportunity to engage in positives, and without being cognisant of a lack of engagement in positives, negatives may go unresolved. Likewise, without considering how such decisions may impact welfare across an animal's lifetime — a whole life perspective— positive experiences prevailing over negative may not be realised.

IMPLICATIONS

There is a recognised need to address and conceptualise animal welfare in a manner which reflects both societal and scientific perspectives (see Lund et al., 2006; Ohl and van der Staay, 2012). It has been argued that 'progress can be made' when lay-person perspectives are considered by and integrated into scientific perspectives of welfare (Weary and Robbins, 2019). As we demonstrate and discuss in this paper, considering both scientific and societal perspectives of positive welfare enables synergies and opportunities for the further development of not only positive welfare, but animal welfare as a whole. An integration of the negative and positive aspects of welfare, the application of a prioritisation approach and the embedding of this within a whole life perspective has implications for farm animal welfare, particularly with regards to how best to approach enhancing farm animal welfare and in assessing the impact different factors (e.g., breeding decisions) have on welfare.

One of the key differences identified between science and society, was the lack of a 'whole life' perspective within societal constructions of positive welfare (and welfare more generally), with farmers and members of the public tending to focus their assessments and perceptions of welfare on specific events and situations. For animals to have a better quality of life there is arguably a need for societal actors to take actions which result in positive experiences exceeding negative across an animal's lifetime. However, as Webster (2016, p. 1) argues, "the animal welfare scientist has a responsibility to... communicate

new knowledge and understanding in a manner that is most appropriate to the full spectrum of individuals in society.” As such, if societal attention is largely focused on specific ‘moments in time’ and the welfare conditions within them, then it is arguably of greater benefit for a ‘whole life’ perspective to keep the attention on a ‘prioritisation’ approach.

For example, if farmers’ attention is primarily focused on day-to-day management decisions, they should be supported (e.g., as in Sumner et al., 2018; Fernandes et al., 2021) to prioritise what is needed to enhance the welfare of their animals under those particular conditions at that particular point in time (i.e., a prioritisation approach). By doing so, they do not necessarily need to develop a ‘whole life’ view of welfare, rather, correct prioritisation of welfare needs would support a balance of favourable conditions and experiences over negative across the animal’s lifetime. Although this does not solve the intractable problem, within welfare science, of untangling how various welfare-related decisions across a whole life contribute to an animal’s quality of life, it does support practical steps to achieving an overall better quality of life. Furthermore, it would also be important to consider the human context within this and how such approaches to welfare may impact (e.g., in terms of costs and benefits) key human actors involved (Fernandes et al., 2021).

The three key elements set out in this paper also have implications for how particular welfare issues may be viewed and assessed. For example, the negative impact of some breeding and genetic selection decisions on welfare is well-documented (Rauw et al., 1998; Rauw, 2016) and is of particular concern to animal welfare experts (Rioja-Lang et al., 2020). However, the welfare emphasis here is often on the impact of genetic selection (e.g., selecting on productivity traits) to cause harm or suffering (FAWC, 2012), rather than effects on an animal’s ability to engage in positive experiences. An ‘integrated’ and ‘prioritisation’ approach (as outlined in this paper) enables the uncovering of welfare and ethical concerns that may not be revealed when examined through a singular, separate ‘negative’ or ‘positive’ view of welfare. For example, breeding and selecting for docility in animals, when viewed through a ‘negative’ lens, has favourable outcomes as it can result in calmer, less aggressive, less fearful and therefore less stressed animals (Rodenburg et al., 2010; Haskell et al., 2014). Indeed, selecting for calmness and for traits which suit the specifics of the farm system is considered an important aspect of welfare by farmers (Vigors and Lawrence, 2019). However, selecting for one trait (e.g., calmness) can modify other characteristics (Boissy and Erhard, 2014) and there is limited consideration of how selecting for traits which minimise negatives may impact an animal’s ability to engage in positives (e.g., by creating stoic, unreactive ‘zombie’ animals) (D’Eath et al., 2010). An ‘integrated’ approach, which considers the interaction between negatives and positives, provides a more sensitive lens through which this can be explored. For example, what appears to be calmness and contentedness could be signs of boredom and apathy (Wemelsfelder, 2007) and genetic factors may underlie an animal’s inability or lack of desire to avail of positive welfare opportunities (as is suggested with fast-growing broilers, see Rayner et al., 2020).

Genetic selection often raises the ethical question of whether welfare should be improved by changing the animal to suit the environment or changing the environment to suit the animal (Boissy and Erhard, 2014). Undoubtedly, both play an important role in improving animal welfare. However, the conceptualisation of welfare set out in this paper provides greater opportunity to address such issues. Arguably, there is little benefit in altering the environment and providing animals with opportunities for positive experiences (e.g., through enrichment) if, due to reasons of genetic selection (or indeed, other welfare concerns such as health issues), they are unable to avail of them. Here, the need for an ‘integrated’ lens to assess welfare and a ‘prioritisation’ approach to address context-dependent welfare needs is evident if a positive ‘whole life’ experience is to be achieved. This presents an interesting opportunity from which the mutual dependence between positive and negative aspects of welfare can be further explored; not only could we be attuned to negative or positive outcomes but also to how a lack of engagement in a positive behaviour could be indicative of a negative welfare issue (Lawrence, 1987). For instance, when providing enrichment, studies could examine not only engagement in enrichment but also reasons for variation in the use of that enrichment (e.g., lameness or social competition).

More broadly, such an approach and conceptualisation of welfare has implications for welfare assessment. As discussed in previous sections, although there are increasing attempts to include both negative and positive indicators of welfare in assessment frameworks (e.g., Mellor et al., 2020; Stokes et al., 2020), this is often done by either including positive indicators into an existing framework or by developing a framework from a positive welfare perspective. There is arguably limited consideration within such assessment frameworks of a potential mutual dependence between positive and negative aspects of welfare (i.e., an absence of one indicates the need for the other, as described in the section ‘It Depends on the Context’: A Prioritisation Approach). Critically, however, achieving this requires assessment measures or indicators which are sensitive enough to distinguish e.g., a positive welfare state from a state where there is merely an absence of negatives (Mattiello et al., 2019). For instance, play is commonly considered an indicator of positive welfare but, as Ahloy-Dallaire et al. (2018) argue, it is difficult to distinguish whether play is indicative of optimal welfare or a neutral welfare state. Developing assessment protocols which can account for the potential reciprocity between positive and negative aspects of welfare is not without its challenges. Arguably, an important starting point would be for studies of animal welfare, in a variety of contexts, to include both positive and negative indicators of animal welfare in their experimental or research design, with the explicit aim of studying the interaction between negative and positive factors. For example, the recent work of Rayner et al. (2020) on broiler chickens included clear measures for both negative welfare (e.g., mortality, gait score) and positive welfare outcomes (e.g., interaction with enrichment (bale) object). Indeed, when it is increasingly recognised that “an absence of negative affective states cannot be used as a surrogate marker for positive animal welfare” (Turner, 2020, p. 3) there is a timely need for studies of

welfare to more fully assess negative and positive factors to truly capture an animal's experience of their environment.

As set out in this paper, moving towards an 'integrated' and 'prioritisation' approach to welfare, embedded within a 'whole life' perspective has some key benefits. Not least that it more appropriately reflects both scientific and societal perspectives of welfare but also that it enables a consolidation of approaches to positive and more general welfare. However, achieving this will not be possible without further research which will both involve theoretical and practical developments to enable integration of positive and negative aspects of welfare and the application of a prioritisation perspective. In addition, it is important to note that the social science research on positive welfare this paper drew from, was conducted in a specific geographical context (UK and Republic of Ireland), and is thus limited in its transferability to other contexts. Furthermore, this research was specifically focused on positive animal welfare (particularly the interview studies) which may have influenced participants to focus on specific factors of welfare rather than viewing welfare from a broader whole life perspective. However, the interviews were conducted using a narrative research approach which provides breadth to participants to discuss factors of importance to them and specifies that what naturally arises in participants' recounted stories are those which they give greatest meaning to Squire (2008). It is thus notable that a whole life perspective was absent within this. Additional research on societal perspectives of positive welfare in other cultural and geographical contexts and from additional methodological viewpoints would be beneficial for the further development of these perspectives.

CONCLUSION

In line with the interconnected history between societal and scientific perspectives of farm animal welfare, we examined

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the similarities and differences between science and society on positive welfare. Considering both perspectives revealed a need to more wholly integrate positive welfare with animal welfare more generally and embed this within a 'whole life' perspective, whilst being cognisant of the benefits a 'prioritisation' approach may provide to address context-dependent welfare needs. As farm animal welfare is largely effected and determined by the actions and decisions of societal actors, it is arguably essential that welfare is developed and conceptualised in a manner which reflects societal realities and constructions of welfare. Importantly, as revealed in this paper, doing so can have a synergistic effect whereby both scientific and societal perspectives support, build on and enhance the other, furthering the development of animal welfare.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Scotland's Rural College Social Science Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

BV, PS, and AL contributed to conception and design of this paper. BV wrote first draft of this manuscript. PS and AL wrote sections of this manuscript and contributed to its further editing. All authors contributed to manuscript revision and read.

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