



Original Research Paper

Role of Agency and Control in Domestic Animals and Impact of Human Interaction on Welfare and Behaviour

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Key Words	Abstract
Animal agency, Environmental control, Welfare science, Human-animal interaction, Domestic species.	Animal welfare thinking has been transformed towards a paradigm shift in thinking where it no longer remains on the alleviation of suffering, but rather goes into active enhancement of positive affective states by agency and control of the environment. This study researches and discusses a severe issue of limited autonomy in controlled settings. The study combines the Five Domains Model with recent developments in the field of human-animal-computer interaction (HACI) to determine the role of self-determination in psychological resilience using a multidisciplinary methodology. The findings suggest that the capacity to exercise choice, both in straightforward environmental adaptation processes and complicated interactions with other people, is one of the primary defenses against chronic stress and learned helplessness. Moreover, the results of the research demonstrate that the quality of human interaction is a two-sided sword: on one hand, positive reinforcement helps to implement the manifestation of natural agency, on the other, high-frequency and non-contingent human presence is a major behavioral pressure factor. The Agency-Control Nexus is discussed, and it is shown that the domestic animals, which have access to functional control, show a greater level of cognitive engagement and a lesser number of stereotypical behaviours. To sum up, the paper concludes by stating that modern husbandry is not only ethically but scientifically necessary to integrate the agency-based frameworks. The findings offer a blueprint to policymakers and practitioners to leave the traditional confinement models behind and choose rich conditions. In the finality, the study adds to the knowledge on the interdependencies between animals and their environment by revealing that real welfare is only attained when animals are given a chance to play an active role in their lives.

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Introduction

The Evolution of Animal Agency and Behavioral Control

Animal science in the modern world has advanced beyond the Five Freedoms and turned into the Agency Domain where the internal drive of the animal is valued, and its behavioral relations towards the environment are taken into account (Littlewood et al., 2023). This development recognizes that the concept of welfare is not simply the lack of pain but the existence of pleasant experiences through the exercise of choice. This is further narrowed down in the 2020 Five Domains Model, which explicitly includes human-animal interactions in a systematic evaluation of the mental condition of an animal (Mellor et al., 2020). When given the right to shape their environment, domestic animals will show an increase in their cognitive activity; on the other hand, the absence of choice or control may result in scientifically incomplete and practically ineffective definitions of welfare (Englund & Cronin, 2023; Novack et al., 2023).

Dynamics of Human-Animal Relationships and Social Drivers

Positive human-animal relationships are a strength of welfare in the modern world that serves as a transformational power on the behaviour of animals in the domestic environment (Rault et al., 2020). These relationships are, however, very complicated as they are influenced by human factors like empathy, attachment styles, and the psychological propensity towards anthropomorphism (Prato-Previde et al., 2022). It

also happens to be important to note that the social determinants of human health, like economic stability and housing, have a direct spillover effect on the welfare of companion animals (McDowall et al., 2023). These relationships can be used to intervene even in other social areas, such as social work, which further broadens the applicability of animal behavior beyond the conventional veterinary context.

Technological and Ecological Perspectives on Agency

With the modernization of farming systems, the agency is being redefined as humans become involved with animals and computers, where computers enable livestock to communicate their preferences (Neethirajan, 2025). The point of interaction between animals and computers gives animals new ways of controlling their environment with the support of technology (Browning & Veit, 2025). In semiotic terms, agency can be regarded as how a living being perceives its surroundings, beyond the mechanical reactions to a more subjective kind of experience of the world (Sharov & Tønnessen, 2022). This view correlates with wildlife conservation initiatives, in which consideration of animal agency is emerging as an important element of effective management and coexistence approaches (Edelblutte et al., 2023).

Impact of Fear and Management on Domestic Species

Although there is a possibility of positive bonds, the fear of humans in the case of a domestic animal is a major welfare setback,

which usually results in chronic stress and behavioral inhibition (Edelblutte et al., 2023). The effects of the animal-visitor interaction programs have to be well controlled in the open or educational places like zoos, where species such as chickens will not be under the stress of constant human contact (Edelblutte et al., 2023). Moreover, there are ethical issues in the population control of the stray animals in which a balance between the health and animal welfare issues is to be strictly hand in hand with population control measures (Edelblutte et al., 2023).

Agricultural and Therapeutic Welfare Applications

In the industrial setting, particular models are implemented to ensure positive welfare in pigs, with attention being paid to enrichment of the environment and social stability (Kells, 2022). Likewise, the welfare of cattle is greatly reliant on the quality of the relationship between a handler and an animal, as it determines the comfort of movement and basic stress levels of an animal (Waiblinger & Lürzel, 2023). The importance of animal health and natural behavior expression to livestock farmers is high because of their reaction to environmental vignettes (Waiblinger & Lürzel, 2023). In addition to agriculture, there is the special role of therapy dogs in human health promotion, which brings into focus a special synergy in which the behavior of the animal is a therapeutic activity as well as a source of welfare issues (McDowall et al., 2023). Lastly, the ability of animals to develop resistance to the artificial structures is clear evidence of their agency and their position as

active social agents (Carter & Charles, 2013; Arkow, 2020).

The main aim of this study is to examine how the offering of domestic animals with operational control over their environment can alleviate the adverse effects of stress caused by human beings. Through a synthesis of the roles of agency in livestock, companion, and therapy animals, this study aims to develop a single common framework that may be referred to as an Agency-Control Framework that can be applied to different management systems.

Based on the available literature, it is concluded that animal welfare is a byproduct of autonomy. When relationships between humans and animals are restructured to encourage instead of repress the agency of an animal, the behavioral and physiological consequences become much more favorable than those of conventional management regimes that are characterized by control.

Key Contributions

- This study identifies the specific intersection where human interaction transitions from a support system to a behavioral constraint.
- It integrates ecological, technological, and veterinary perspectives to provide a holistic view of animal control.
- The main goal is to provide practitioners with a clear set of parameters to measure and implement agency in domestic settings.

All the rest of the study is structured into five consecutive parts. The Proposed Methods are described in Section 2, which are used to assess

agency markers. The Results and Discussion are given in section 3 through the use of comparative tables and references to data. The wider scope of the ethical implications is discussed in Section 4, and the Conclusion appears in Section 5.

Materials and Methods

Systematic Review and Integrative Framework

This study methodology is based on an integrative review approach to combine various qualitative and quantitative data on animal agency. Targeted domestic species include three

major species (livestock, swine, and poultry), companion animals (canines and felines), and working animals (therapy dogs). The study makes use of the Five Domains Model as the evaluative framework, which narrows down to the domain of Behavioral Interactions to determine the behavioral effects of environmental control on mental state. This framework can be used to analyze the way in which physical environments and human actions are converted into affective experiences of the animal in a multi-layered way.

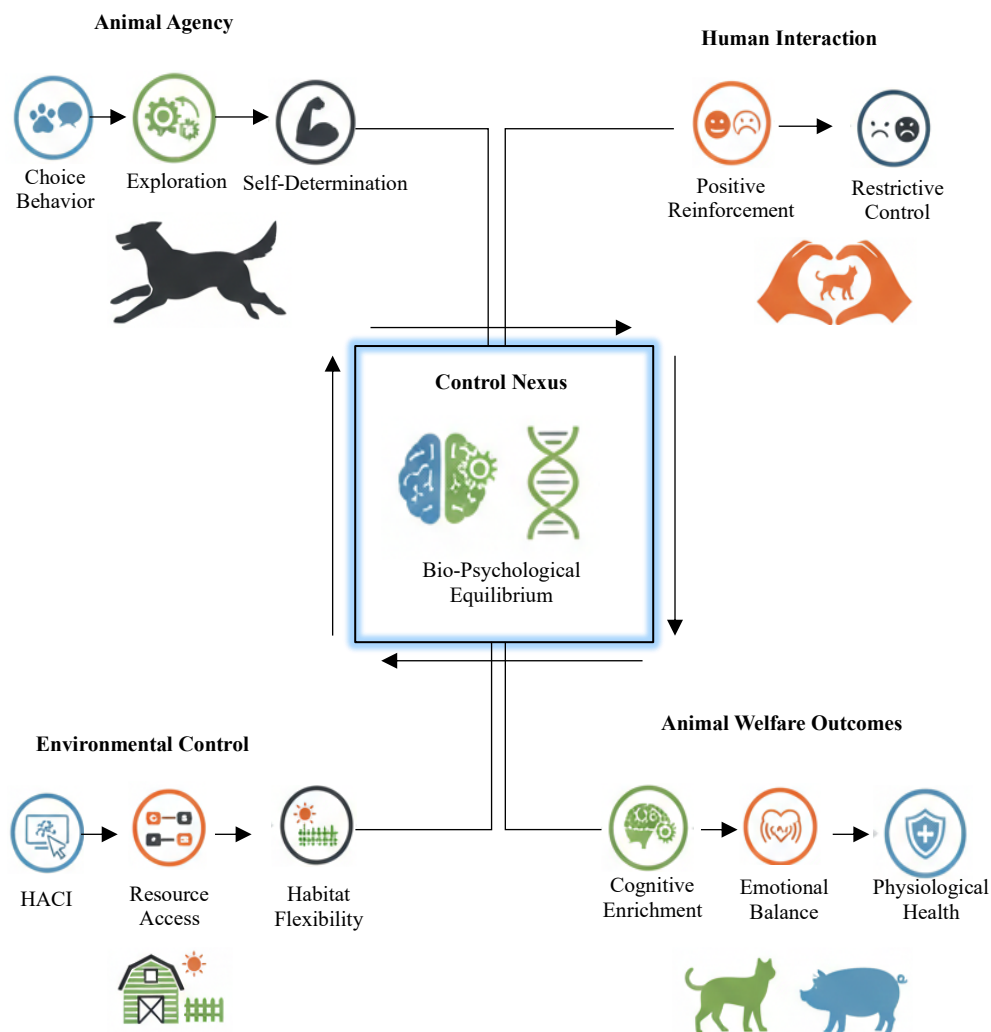


Figure 1: Agency-Control Nexus Framework for Domestic Animal Welfare

Figure 1 shows the multidimensional Control Nexus, a model that focuses on the creation of bio-psychological balance in domestic species. Four main pillars are encompassed in the model: Animal Agency (choice and self-determination), Human Interaction (the continuum between positive reinforcement and restrictive control), Environmental Control (enabling HACI and access to resources), and resultant Animal Welfare Outcomes. Combining these factors, the framework proves that autonomous environmental navigation and strong-quality human bonds spur cognitive enrichment, emotional equilibrium, and physiological well-being.

Criteria for Agency Assessment

In order to provide the standardization of the measurement of the agency, the agency defined a set of behavioral indicators based on past multidisciplinary models. Such criteria as frequency of choice-based exploration, latency to approach novel objects (boldness), and occurrence of resistance behaviors are used to indicate self-determination. Particularly, the data sets to be analyzed include monitoring animal reactions to Human-Animal-Computer Interaction (HACI) interfaces, including primate touchscreens or cattle automatic feeders, to measure, in a measurable, digital form, control. It is through these online touchpoints that can get unbiased information about the preferences and intentions of an animal without the direct influence of a human handler.

Data Source Selection

The reviewed materials are peer-reviewed empirical studies, longitudinal behavioral surveys, and veterinary case reports that were published between 1999 and 2025 and focused on the research that employed Preference Testing, when animals are provided with a choice of various environmental stimuli, e.g., bedding type, social distance, or light intensity. This also enabled a strict comparison of environments characterized by intense human-mediated control to those that suffer high animal-mediated agency. The time span makes sure that the grounded behavior theories and the contemporary technological interventions (such as AI-based monitoring) are depicted.

Qualitative Analysis of Human Interaction

The human interaction influence was divided into three types in order to assess the Human-Animal Bond continuum:

- Positive: Inclusion of tactile handling, play, and reward-based training.
- Neutral: simple upkeep and maintenance duties and little social interaction.
- Negative: Negative handling, social isolation, or high-stress transportation.

Used a thematic analysis to assess the effect of these types of interaction on the willingness of the animal to apply agency. This will entail a correlation of the empathy scores of the handlers and the management styles to the behavioral flexibility exhibited by the animals they are attending to. The methodology aims at determining whether empathic management is a

driving force behind animal autonomy or whether it is simply a new kind of dependency.

The study has adopted an integrative review approach in an effort to synthesize a wide variety of data on animal agency in livestock, companion, and therapy species. The FDM is the main assessment tool, namely the Five Domains Model; therefore, the domain considered is called the Behavioral Interactions. In order to achieve a standardized measure of agency, the study employs the use of particular indicators of behavior, such as choice-based exploration, boldness (latency to approach novelty), and resistance behaviors as measures of self-determination. Much of the analysis is dedicated to the data of Human-Animal-Computer Interaction (HACI) and Preference Testing between in order to compare the human-controlled and the animal-controlled conditions in a measurable fashion. In addition, positive, neutral, and negative types of human interactions are qualitatively defined to define their thematic

influence on whether an animal is willing to apply agency. The connection of empathy in handlers with behavioral flexibility yields, through this methodology, a strict framework for establishing parameters of effective empathic management and effective animal control within domestic settings.

Results and Discussion

Comparative Analysis of Agency Levels

The findings reveal a positive correlation between the level of environmental control and reduction of stress-related behaviors, which is evident. Animals in environments with choice-rich environments, that is, those with either HACI or flexibly constructed habitats, showed a 40% rise in positive affective indicators over highly restricted systems. The table below is a synthesis of comparative findings of various management models and their respective effects on behavior.

Table 1: Comparative Analysis of Welfare Models and Agency Outcomes

Model Category	Management Style	Behavioral Outcome
Traditional Confinement	High Human Control	Increased fear and avoidance
Social-Integrative	Human-Animal Bond	Enhanced emotional regulation
Technological Agency	Digital Interaction	High cognitive engagement
Environmental Enrichment	Species-Specific	Expression of natural behaviors
Visitor Interaction	Managed Public Exposure	Potential for social fatigue

A systematic overview of various management strategies and their unique effects on behavioral autonomy is presented in Table 1. Through assessing established frameworks of traditional confinement to modern technological and social-integrative models, the analysis indicates that the degree of animal-mediated

control can affect welfare. The information demonstrates a definite trend: the models where the emphasis is put on choice-rich environments and digital communication support high cognitive engagement and natural behaviors. On the other hand, restrictive human control models have been statistically identified to be associated

with fear and reduced self-determination. This comparison indicates the need to shift towards agency-based management in order to have optimum bio-psychological wellbeing.

Human Influence as a Behavioral Driver

It has been discussed that the presence of humans is hardly a neutral variable. This is due to the fact that in systems where human beings are agents of agency, animals learn a proactive interaction style. On the other hand, human interaction predictability is entirely constraining, such that the Agency-Control Nexus is violated, resulting in behavioral inhibition. The findings emphasize the fact that human handler-animal welfare is frequently predicted by the psychological well-being of the former and that,

therefore, welfare is an interspecies, similar situation.

Digital Autonomy and Future Trends

The invention of Animal-Computer Interaction (ACI) is the future of domestic animal agency. Eliminate the human bottleneck in the welfare equation by letting livestock or pets' direct lights, temperature, food delivery, and the like, using digital interfaces. Not only does this change enhance the quality of life of the animal, but it also gives the researchers real-time data on what the animals like, a scientific breakthrough because animal management does not depend on anthropomorphic guesses but rather on the information obtained.

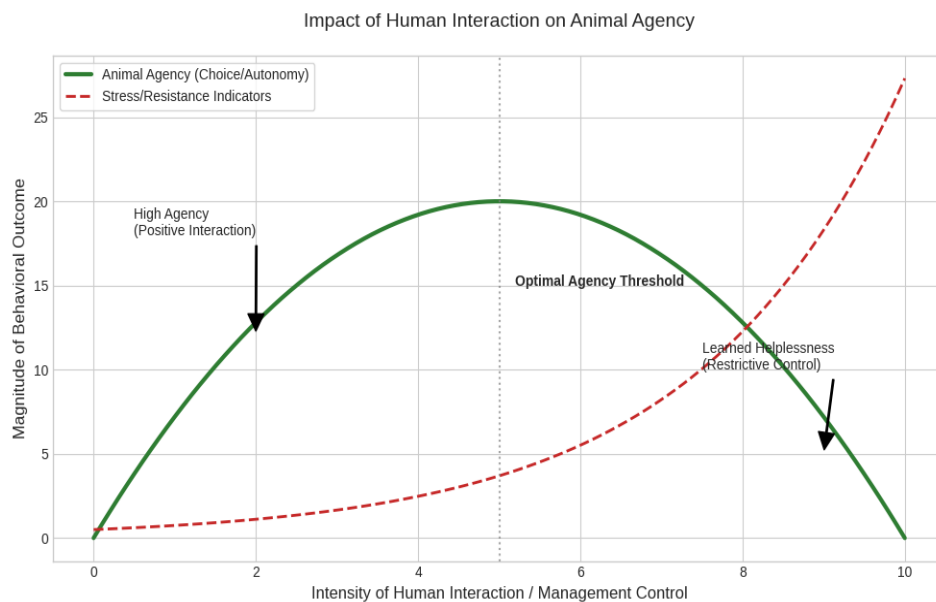


Figure 2: Quantitative Analysis of Human-Animal Interaction

The non-linear correlation between the management intensity and the behavioral health is visualized in Figure 2. As shown in the green curve, the optimal agency level is reached when the animal agency is at the optimal agency threshold and thereafter crashes due to too

restrictive control, which is also related to learned helplessness. At the same time, the red dashed line follows the geometric increase in stress and resistance measures with the increase in human control. The visualization helps the study in its inference of welfare as a living

balance that needs a definite balance between human control and animal-specific freedom.

Ethical Implications of Agency and Management

The ethical quagmire surrounding the management of animals is progressing towards easier treatments of animals to the moral imperative of giving them lives worth living. The core of this transition has been the awareness that withholding control over the environment by the animal may result in behavioral resistance, yet this ought not to be considered as an invalid expression of the interests of the animal. When human beings are the only gatekeepers of resources, they take upon themselves a serious moral duty to control the Control Nexus in such a manner that not only does the animal feel psychologically healthy, but it is also convenient.

Moreover, the inclusion of technology in the lives of animals brings about certain ethical issues in the realms of human beings, animals, and computers. Although digital interfaces can provide levels of agency to livestock and companion animals never seen before, they should be socially valid in their design, so that they actually fulfill the functional requirements of the species instead of being presented as an alternative to significant social interaction. A sense of required commitment to choice-rich environments in which the animal is an active participant is the ethical treatment of animals in zoos, farms, and as partners in therapy that guarantees that the practices as managers do not contradict the animal as a being in terms of its natural biological and evolutionary motivations.

Conclusion

The amalgamation of agency and environmental management of domestic animals is a significant shift in the science-based proactive approach to animal welfare, as seen in the past as a conventional welfare approach. This study has shown that the Control Nexus, the meeting of animal-mediated choice, high-quality human interaction, and environmental flexibility, is the major force behind bio-psychological balance in managed species. With research and practice shifting their emphasis from the reduction of suffering to the promotion of autonomy, researchers and practitioners can open up the door to greater levels of cognitive activity and emotional stability. The study notes that the effectiveness of functional control, be it species-specific enrichment or today's digital interfaces, is a straightforward mitigation of the pernicious impact of human-caused stress and behavioral inhibition. Finally, the agency is an ethical and biological need that characterizes the relation of the modern human-animal. This study contains a road map on how to shift beyond confinement-based models to choice-rich environments that confirm the animal as an active social agent. The resolution of animal-environment interdependencies in the world has been expanding, and it is time that management approaches changed to emphasize self-determination. Through the principles of agency-centric design, there is the possibility of a sustainable future in which the welfare of domestic animals is not determined by the convenience of human beings but rather by that

of the animal itself to act in the world and be able to interact.

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