Social Repercussion of Translocating a Jaguar in Brazil

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The translocation of "problem-animals" is a common non-lethal strategy to deal with human-wildlife conflict. While processes of wildlife translocation have been widely documented, little is known about the social repercussions that take place once the capture and the return of a problem-animal to its natural habitat fail and it has to be permanently placed in captivity. We investigated how the public, an important stakeholder in wildlife conservation, perceived the translocation of a female jaguar to a wildlife captivity center. The objectives were to (1) assess the public's perceptions (e.g., attitudes, emotions, awareness) toward the jaguar and its translocation process, and (2) how these psychological constructs are related. We used the social media profiles of the three institutions involved in the process (one responsible for the jaguar rescues, one that supported its recovery, and the one responsible for the jaguar's final destination) and analyzed the comments left by their followers on posts related to the jaguar and the translocation itself during 25 days. A total of 287 comments were analyzed through coding, a categorizing strategy of qualitative analysis; 33 codes were identified. Results showed high admiration for the work done, positive attitudes and emotions, and concern toward the animal. Lack of awareness about the translocation process was high, with comments of curiosity toward the situation being one of the most commonly found. To a lesser extent, people felt sad for the jaguar not being able to return to the wild and criticized the need for translocation. Admiration for the work had a strong relation with gratitude and broader positive perceptions toward the jaguar's story. Criticism related to concern, which was also related to a need for more information and curiosity. Our findings suggest that the public who engaged with those institutions through their Instagram accounts were grateful for seeing the jaguar safe, but were not aware of the complexity of the operation nor about the nature of the conflict with farmers. The public can either reinforce a particular action or jeopardize an entire operation, depending on their perceptions of the matter. In the case of this jaguar, the public held a positive view; however, we acknowledge the limitations of our sample and recommend further analyses

of social repercussions among people who are not followers of these organizations. Furthermore, we recommend engaging other stakeholders to fully understand the human dimensions of translocating this jaguar. Finally, for social acceptance, we highlight the importance of transparency and reliability of the organizations operating the translocation.

INTRODUCTION

Human-wildlife conflict (HWC) is a growing worldwide issue, receiving great attention not only by conservationists and researchers, but by society in general (Frank et al., 2019). The proximity between people and wildlife and the challenges that it imposes on both parts has reached such extended levels that it is impossible to promote conservation without taking the social aspects into account (Manfredo, 2008). A growing human population, coupled with agricultural and urban expansion, has contributed to human-wildlife encounters that oftentimes leads to conflicts. These conflicts may take the form of direct interaction with humans, which can result in injuries or fatality to either the animal or the human, or more indirectly, when crops are damaged or livestock are injured or killed by the predator. In both cases, when the animal escapes and continues causing problems, retaliation is often the strategy adopted to deal with the situation. Lethal control of "problem-animals," however, is polemic, often illegal (when done in the form of poaching), and contributes to the decline of the species population in the wild, exacerbating the problem (Bergstrom, 2017).

A common non-lethal strategy to deal with human-wildlife conflict is the translocation of problem-animals (Weise et al., 2014; Nyhus, 2016; Berger-Tal et al., 2020). Translocation refers to the process of capturing, moving and releasing an animal from an area to another for the purpose of conservation (Linnell et al., 1997; Craven et al., 1998; Berger-Tal et al., 2020). Intended to reduce conflicts, this non-lethal strategy is typically well-accepted among the public (Linnell et al., 1997). The problem, however, arises when the animal keeps returning to the conflict area. In sound situations, wild animals can sometimes be relocated to wildlife sanctuaries and kept in captivity for the remaining of their lives.

In the Caatinga domain, a Seasonally Dry Tropical Forest located in Northeast Brazil, conflicts between humans and carnivores are marked by a strong and historical secular tradition of free-grazing livestock, and are mostly related to the depredation of domestic animals, generally resulting in the persecution and slaughter of jaguars (*Panthera onca*) and pumas (*Puma concolor*) (da Silva et al., 2017). A recurrent event of depredation within the Environmental Protected Area of "Boqueirão da Onça," located in the north of the state of Bahia, resulted in two apprehensions and rescues of a 12-years old female jaguar (later named *Luísa*). Different people and institutions were mobilized for the translocation of this animal, but the return of the jaguar to the wild was not successful; mainly due to the advanced age of the jaguar and its repeated behavior of predating domestic animals. According to local authorities involved in this endeavor, after careful analysis of the situation

it was decided to translocate the jaguar to a legal wildlife captivity center. Based on the definition of translocation, we consider "a translocation effort" every time that the jaguar was captured and moved to another area, different from the location where it was captured.

While the success, or failure, of translocating an animal has been widely documented (e.g., Weise et al., 2014; Berger-Tal et al., 2020; Hoogesteijn et al., 2020), little is known about the social repercussions of removing (i.e., translocating) a problem-animal from the wild and placing it in captivity to avoid further conflict with humans and potentially a premature death; particularly among those who financially support the organizations involved in the process. Wildlife conservation is intimately related to interpersonal relationships (Manfredo, 2008). Thus, identifying, describing, and understanding the human dimensions of wildlife translocation is paramount to an appropriate, ethical and conciliatory management.

The objectives of this paper were to assess the public's perceptions (e.g., attitudes, emotions, awareness) toward the jaguar and its translocation process, and how these psychological constructs are related. The public in this case refer to those people who do not necessarily live in the community or region where the conflict happened (as locals were already involved in the process since the beginning; details in the Case Study description), but people who support the organizations involved. With the growing popularity of the internet and the potential impact of media on public perceptions and awareness of wildlife (Wu et al., 2018), social media has become a useful source to examine public views on wildlife issues (Fidino et al., 2018). We used comments left on Instagram posts published by the three organizations involved in the translocation of the jaguar (one responsible for the jaguar rescues and decision-making of every taken step of translocation, one that supported its recovery, and the one that became the jaguar's final destination) to analyze the social repercussions of this translocation case. This is the first time that certain aspects of translocating this jaguar have been analyzed through a human dimensions' lens.

Case Study—A Jaguar in the Brazilian Caatinga

The Caatinga, a highly diverse Brazilian semi-arid region, is home to the largest feline in the Americas, the jaguar, whose population is fragmented and declining, mainly due to habitat loss and hunting in retaliation for depredation on goats and sheep (de Paula et al., 2012). The environmental conditions in the Caatinga, such as high air and soil temperatures, irregular rainfall, thorny and deciduous plants, and water scarcity result in adapted and resilient fauna, flora and local people (known as *sertanejo* in

Portuguese). This scenario, intensified by economic, educational, and health challenges along with lack of governmental assistance (Martins et al., 2021), perpetuated a rural economic base sustained by extensive goat and sheep farming and small-scale agriculture. This was inherited from the colonial system with the sugar mills (large slave-owning properties with sugar cane plantations for processing and producing sugar and *aguardente*) in the coastal cities. The *sertões* served as the yard for the livestock of these sugar mills' owners in the dry season, when the *vaqueiros* (cowboys) commitment was to drive livestock into hinterland and its highlands, where it would stay for grazing in the wild for 5 or 6 months. When the sugar engines lost their economic prominence, the *vaqueiros* lost their role, left embedded in something like a nomadic state-of-mind and able to replicate the model of free-ranging for the rough cattle he could afford: goats and sheep (Andrade, 1963). Jaguars and *sertanejos* have learned to live in the Caatinga, taking advantage of its resources and sharing the territory. Despite sharing the same environment, their relationship, however, is not of harmonious coexistence, and the imbalance of this relationship is the great generator of HWC.

The Northeast region of Brazil is the one that historically and culturally presents the greatest hunting pressure (Bragagnolo et al., 2019). It is also one of the inland regions with the greatest potential for renewable energy as wind and solar plants (Neri et al., 2019). The increasing development of these renewable energy projects modifies the habitat and behavior of these cats, by clearing vegetation, opening roads, excessive artificial light, intense circulation of people and vehicles and noise from turbines (Helldin et al., 2012). These factors combined with a decline of the jaguar's natural prey and the presence of free-ranging herds, contributes to an increase in livestock depredation events and consequently retaliation. Thus, programs and projects to reduce livestock depredation by large felines and the consequent retaliatory killing are crucial to short and long-term mitigation actions.

The female jaguar was rescued twice from caves (dolines), after being cornered and trapped by local residents for preying on sheep. The team from the *Programa Amigos da Onça* (PAO), a regional program of a Brazilian NGO and *one* of the institutions analyzed in this study, was contacted to help in the situation. Due to the complexity of the mission, the team mobilized in the first rescue (in two attempts) involved 12 professionals from different areas and it took 22 days to capture the jaguar. Very weakened by being held for a long time without food and water, the jaguar was immediately taken to an enclosure in the nearest wild animal rehabilitation center (Cemafauna/UNIVASF-Caatinga), where its sex, age, and physical condition were assessed. Community engagement began at this stage, which proved to be of paramount importance for the jaguar's post-devolution survival in the wild. On the occasion, the residents were gathered several times to be informed about the situation and oriented by one team member of PAO about the importance of adopting actions that would allow the coexistence with jaguars and pumas in the region. After 2 months of rehabilitation, it was decided to return the jaguar to the wild, fitted with a GPS-satellite collar for remote monitoring. The release of the jaguar was carried out about 18 km from the point of its rescue, in an area of caatinga vegetation.

After 4 months of telemetry monitoring, the jaguar movements were again close to the areas where the domestic herds grazed in the native vegetation. Some frightening devices were undertaken at the location, making use of primary repellents as alternative measures in preventing depredation and damage to livestock (Shivik et al., 2003; Gese, 2006). In addition, a farmer close to the area where the jaguar was passing by was instructed by the personnel responsible for monitoring it to confine his sheep for a month. Despite the extreme investment effort due to the unbearable cost of feed for the locals, the farmer complied with the suggestion. These combined actions were aimed at keeping the jaguar away and avoiding retaliation in case of further attacks. The preventive actions, however, were not effective to deter the jaguar from preying on the local herds and the PAO team was contacted again by locals to rescue the jaguar from another nearby cave. A team of eight professionals was mobilized for a second rescue and the weakened jaguar was captured after 15 days of imprisonment. After a new evaluation, a generalized oral infection was identified in the jaguar and two specialists from *AMPARA Silvestre* were sent to perform the treatment. It was necessary to decide its destination after the recovery. Considering its physical conditions, its age, the specific environmental characteristics of the Caatinga and the persisting conflict with livestock farmers, the team involved with the case decided to keep the jaguar in captivity. As final destination, the jaguar was sent to *NEX Institute*, a wildlife captivity center, with the authorization of the Chico Mendes Institute for Biodiversity Conservation (ICMBio), a national agency linked to the Ministry of Environment and responsible for wildlife management and protected areas. Therefore, Luísa became the only jaguar of Caatinga kept in captivity, making it a valuable resource for science as a reservoir of a genetic heritage of a poorly known population.

This jaguar represents many other jaguars (and pumas) in the Caatinga, sharing territory with the local communities of *sertanejos*, and bringing challenges to *in situ* conservation efforts for the species. The conflicts with big cats are not easy to solve and involve ethical issues with different scenarios, social groups and institutions. Although the jaguar has not been able to return to the wild, the success in this particular case lies primarily in its survival and also in the engagement between the PAO team and the community over the years, showing mutual trust and cooperative work.

METHODS

Data Collection

The social media repercussions of a jaguar translocation was analyzed from three different Instagram profiles: (1) *Programa Amigos da Onça: grandes predadores e sociobiodiversidade na Caatinga* (PAO), of the Institute for the Conservation of Neotropical Carnivores, which works with the conservation of big cats in Caatinga biome and was responsible for organizing the jaguar rescues in partnership with other environmental institutions, companies, fire brigade and army, as well as its

health care and final translocation; (2) *AMPARA Silvestre*, a Civil Society Organization of Public Interest (acronym OSCIP in Portuguese) responsible for the jaguar's specific health treatment and translocation for the permanent captivity; and (3) *Instituto NEX—No Extinction*, a NGO that maintains specimens of native wildlife in captivity for carrying out and subsidizing conservation programs, and that received the legal guard of the jaguar in permanent captivity in the Midwest Brazil.

All three profiles created social media content (*posts*) on Instagram in February of 2021, when the jaguar was translocated from Northeast to Midwest Brazil. NEX and AMPARA did the first post on February 6th, when the jaguar started its journey to the center, while PAO did the first publication about the jaguar on February 14th, 1 week later. The publications created by PAO were made in a series of four posts, one per day, reporting the whole detailed story about the jaguar, including the two different rescues, the treatments that it received, the difficulties of capturing it, the jaguar releasing attempt, the communities involved with the jaguar and its final destination to permanent captivity at NEX. The post also mentioned the reasons for not returning the jaguar to the wild. AMPARA created only one post on February 6th telling a short story about the jaguar's trajectory, translocation, and final destination to captivity at NEX. This institution (NEX) created several posts about the jaguar, most of them focused on leveraging money for its new inhabitant. The first post, on February 6th, was about the jaguar traveling and anticipated arrival to its new home. Due to the large number of posts created by NEX related to the jaguar case, we selected the first five made during a 7-day interval (from February 06th to February 12th).

The subject of this study was the general public represented by the followers of the Instagram profiles of the three institutions considered in the translocation of the jaguar. No connection was established between individuals' Instagram profiles and reactive comments to the institution's posts. Moreover, to keep the subjects anonymous and follow the ethics requirements, no data from the Instagram profiles was collected, we have only assessed the origin of the commenters (national or international). For the purpose of this analysis, we only considered comments left until March 02nd, 2021—about 15 days after the last post made by PAO—accounting for 25 days in total. Hence, we analyzed comments from a total of 281 different profiles, 279 national and written in Portuguese and two internationals written in Spanish. From this total, 22 profiles commented on PAO, 86 on AMPARA, and 173 on NEX posts. Two profiles commented both on PAO and AMPARA posts, while 12 profiles commented both on AMPARA and NEX posts, and three commented both on PAO and NEX posts. The comments and replies made by the original Instagram profiles (PAO, AMPARA, and NEX) were not analyzed, nor were the comments containing just "emojis" (varied small images, symbols or icons used for electronic communication to express the emotional attitude of the writer, without the need to use words). Thus, we analyzed a total of 287 comments (23 from PAO, 58 from AMPARA, and 206 from NEX).

Social Repercussion Analysis

We analyzed the comments following a categorization strategy of qualitative analysis, called coding, in the software Atlas.ti 9.0 (Scientific Software Development GmbH). This method organizes data based on similarities and differences in relation to the subjects of interest, being useful to organize and compare the data and to know which topics appear in a speech (Maxwell and Miller, 2008; Maxwell, 2012). Firstly, we transcribed faithfully all comments (except the ones with only emojis) in three Word documents, each document according to each institution. Then these documents were imported by the software Atlas.ti and we began the process of coding. Initially, we created citations for each written comment and then we attributed one or more codes for each citation. Codes are substantive categories that describe concepts and beliefs of the subjects of the study. These substantive categories are topics closed to data that help to understand ideas of the participants and the researchers. The codes were then grouped into organizational categories that represent broader subjects of research interest (Maxwell and Miller, 2008; Maxwell, 2012). For instance, "financial support" was a substantive category created inside the organizational category called "engagement." There were no predetermined codes before the analysis began, so we decided to create both codes and groups of codes during the analysis according to the characteristics of the comments and the subjects that appeared. For instance, the sentence "Thanks for the attention, this episode is very sad, congratulations to all those who were involved" received the codes "gratitude," "sadness," and "admiration for work." Thus, we didn't prioritize any sentence or concept. All the sentences were analyzed and received at least one code. This process of coding was done by three authors simultaneously, so we could discuss the concepts according to the sentences in order to avoid misunderstandings. We read the sentences together and then each one spoke which code should be used, or if a new code appeared and should be created. We then discussed until we reached an agreement and codified the citation. This process was also important to avoid the subjectivity of only one researcher. We then evaluated the social repercussions of the translocation by analyzing the frequency of each code (the number of citations codified with it) and the content of them.

In order to assess how participants' reactions and beliefs interact and the relationship among the topics of social repercussion, we performed an analysis of co-occurrence of codes. This is a function of analysis in Atlas.ti that shows which codes appear simultaneously in the same citation/sentence, as well as the frequencies of these co-occurrences. It is possible to select one or more specific codes to check its co-occurrence with other codes, or select all codes. In this case, we chose to verify the co-occurrence among all the codes, because we didn't have a specific interest in a particular code. The software enables us to create a co-occurrence table (**Supplementary Table S1**), in which we can visualize the frequencies of co-occurrence among the codes, and also a Sankey diagram to graphically represent these relationships. We present here the Sankey diagram, which makes it easy to visualize the associations among the codes. Once the table is created, the cell representing the co-occurrence of codes

is filled with the number of times the codes occurred together. In the Sankey Diagram, this co-occurrence will be represented by an edge, and the codes will be represented by nodes. The width of the edge is proportional to the quantity of frequencies of co-occurrence.

RESULTS

It is important to note that our results strictly represent the comments that were made about the specific posts of each institution, in the time period cited in the methodology. We categorized 33 codes, which were distributed in eight organizational categories (group of codes): admiration, attitude, characteristics of the jaguar, emotions and feelings, engagement, perception, criticism, and information (**Table 1**).

The frequency of all codes is listed in **Figure 1**. Admiration toward the institutions' work was, by far, the code with the highest number of citations (104 times). Comments like "congratulations" and "wonderful work" were the most cited in this category, which related to the other five codes that had the most significant presence: "hope" (46 citations), "curiosity" (45 citations), "positive perception" (38 citations), and "gratitude" (32 citations). "Hope" was related to the expectations about the future of the jaguar. For instance, comments like "good luck" and "a long and happy life for her" [referring to the jaguar] were frequent in this category. In the category "curiosity," all the questions about the jaguar's situation, its story and possible ways to help were coded.

A frequent question was if the jaguar would return to the wild and why it was unable to feed by itself, and what had happened to its teeth. "Positive perception" was related to the reactions toward the jaguar's story, which was described in the posts. In this category there were comments like "fantastic story" and "amazing." There were no negative perceptions about the jaguar's story, but we computed nine comments that were coded as "negative perception," all of them related to humankind, like "planet Earth would be thankful if that kind of people was completely extinct" [referring to those who pursue and poach jaguars]. The fifth most frequent code, "gratitude," was related to people who were thanking the institutions: "Thank you for your dedication and love to these beautiful animals."

"Welcoming" (25 citations) and "nominations" (23 citations) also had an expressive frequency. "Nominations" was a code included in the category called "characteristics of the jaguar," that was related to all the words used in reference to the jaguar Luísa, like warrior, darling, beloved, brave, precious and poor thing. We found that within this variety of adjectives used by people to describe the jaguar, "warrior" was the most cited.
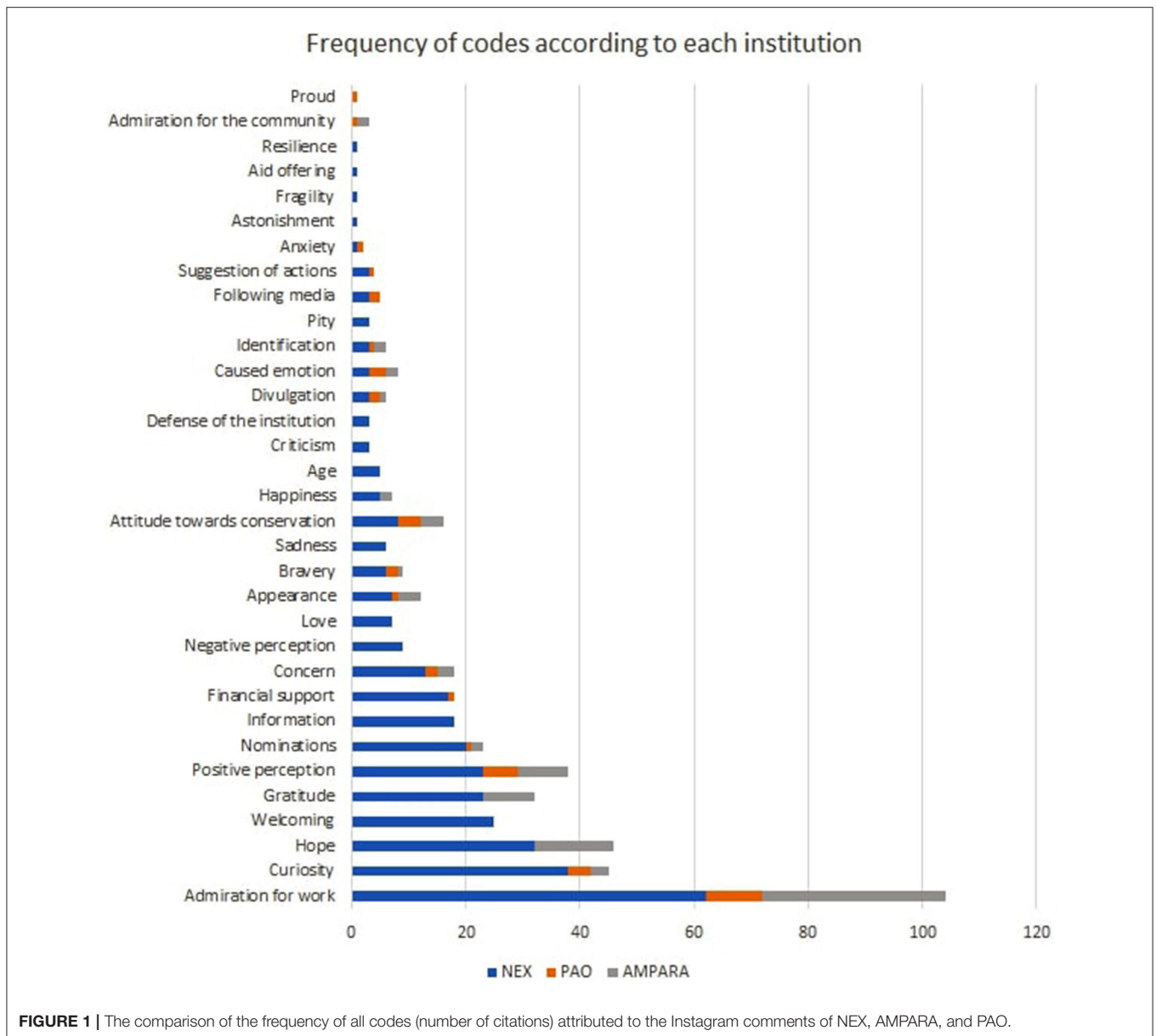
The codes "concern," "information," and "financial support" came eighth in the general frequency of codes (18 citations each). The code "information" was related to all kinds of informative contents posted by people, like details about the institutions, the jaguar's story, the species, the Caatinga biome, etc. It occurred only in posts posted by NEX. In general, we found that these comments were a way to interact with the institution and with other followers, as sometimes comments were responses to the

TABLE 1 | A list of all the items that were coded in the posts of NEX, AMPARA e PAO.

Group of codes	Codes	Examples
Admiration	Admiration for the community	*God bless the woman who called the person who could save Luísa*
	Admiration for work	*What a wonderful work!*
Attitude	Attitude toward conservation	*Loving is protecting!*
Jaguar's characteristics	Appearance	*She looks healthy!*
	Bravery	*She is a warrior! A survival!*
	Fragility	*So fragile!*
	Age	*She is an old lady!*
	Nominations	*Princess!*
	Resilience	*Such a unique resilience!*
Emotions / feelings	Love	*We love you!*
	Anxiety	*I hope you arrive soon, Luísa!*
	Happiness	*I am glad to know that she is fine!*
	Caused emotion	*Luísa's story is very touching!*
	Gratitude	*Thanks to NEX for receiving her!*
	Proud	*Such an honor filming her when she was released.*
	Pity	*Poor thing, she must be very scared.*
	Concern	*Won't she come back to nature?*
	Sadness	*All this is so sad!*
	Curiosity	*How did Luísa get there?*
	Astonishment	*Such a horror!*
	Identification	*My compatriot!*
	Hoping	*Luísa, I hope you will be very happy in your new home.*
	Welcoming	*Welcome to Nex, Luísa.*
Engagement	Financial support	*I made a donation today!*
	Divulgation	*I will share it on my Facebook.*
	Aid offering	*Count on me!*
	Following media	*I am following the story and waiting for the next chapters!*
	Suggestion of actions	*We need to make a national campaign of consciousness.*
	Defense of the institution	*Take a look in the previous posts to understand NEX's work, instead of comparing it with another one.*
Perception	Negative perception	*Unfortunately, she is one more victim of men's destructive actions.*
	Positive perception	*What a wonderful story!*
Criticism	Criticism	*It makes no sense keeping her in captivity.*
Information	Information	*The jaguars of caatinga are the smallest of the species.*

questions of others. The third emotion most codified in the category "emotions and feelings" was "concern." After "hope" and "gratitude," people expressed in various comments their concern about the jaguar's health and safety. Some comments involving concern also were related to the species in general.

The comments related to donations were codified as "financial support." They were related especially to NEX, which announced its bank account in one post, and launched a campaign to build an appropriate place for its newly arrived jaguar. "Financial support" also occurred in one comment of PAO. There were also people who offered other kinds of help, like sharing the post

FIGURE 1 | The comparison of the frequency of all codes (number of citations) attributed to the Instagram comments of NEX, AMPARA, and PAO.

to spread the jaguar's story ("Divulgation"—six citations) and making themselves available for anything ("aid offering"—one citation in NEX). The engagement of people was noticed also by their interest in following the institutions, to keep informed about the jaguar's situation ("following media"—five citations) and by their answers to other followers' critics, defending especially the NEX institution ("defense of the institution"—three citations). This theme did not occur in the other two institutions.

Comparing the frequency of the codes between the three institutions (**Figure 1**), we found that "admiration for work" was the most frequent in all of them. NEX received this code 62 times, AMPARA 32 times and PAO, 10 times. "Curiosity" was the second most frequent code in NEX (38 citations). Considering PAO, the second most frequent code in this institution was "positive perception" (six citations). This code had a large

frequency also in NEX (23 citations) and AMPARA (nine citations). Regarding AMPARA, "hope" was its second most frequent code (14 citations). This code did not appear in PAO whereas was the third most frequent in NEX.

In PAO we noticed two codes that received the same frequency in the third position: "curiosity" and "attitude toward conservation" had four citations. In AMPARA, there were also two codes that came third: "gratitude" and "positive perception." The code "gratitude" also had an expressive frequency in NEX (23 citations, the fifth most frequent), and did not appear in PAO. "Welcoming," the fourth most frequent code in NEX, was not mentioned neither in PAO nor in AMPARA. We noticed that all the comments that were coded as "attitude toward conservation" were related to a positive attitude, like people saying that nature is perfect, that all animals deserve love and respect and that it is

necessary to protect them. This code also occurred five times in AMPARA and seven times in NEX.

The relationships between all topics that appeared in public comments are shown in the Sankey diagram (**Figure 2**), a graphic representation of the co-occurrence of all codes. It shows how the most frequent coded item, "admiration for work," is related to various other topics, especially "nominations," positive perception," "appearance," "hope," "gratitude," "financial support," "attitude toward conservation," "concern," and "defense of the institution." That means that there were two or more codes occurring in the same sentence, as seen in: "Her story is so sad, but I'm glad she will be well-cared for! Congratulations for your work and thanks for your existence!"

The code "concern," with a high frequency, co-occurred with "curiosity," "happiness," and "information," e.g., some comments indicated that people were concerned about the jaguar's safety, and at the same time curious, asking for more information about its story and happy that it was safe. There were also some people who criticized the institution because they disagreed with the idea of captivity, or because they thought a human name for the jaguar could stimulate wildlife domestication, showing concern about the individual and the species.

The item "nominations" also co-occurred with many other topics, like "gratitude," "hope," "love," "attitude toward conservation," "pity," and "curiosity." We found that it was usually the comments in which people were thanking the institution, showing admiration for the work, expressing some feeling for the jaguar and using adjectives or substantives to refer to her, for instance. "Welcome Luísa! You will soon understand that people from NEX are just trying to help! Be very happy, big cat!" is an example.

"Attitude toward conservation" co-occurred with two codes related to engagement: "suggestion of actions" and "divulgation." We noticed that some people who had a positive attitude toward topics related to conservation and nature, revealed a willingness to do something, like sharing the posts in social media, or

talking to authorities to protect the animals. This topic also co-occurred with "positive perception," "resilience," "identification," and "happiness." Here we noticed that people appreciated the jaguar's story, associating it with a resilient animal, because of its suffering and persistence, and expressed happiness because it was alive, despite all the challenges it had to face. In addition, some comments indicated that the jaguar Luísa changed into a symbol, representing the struggle of all jaguars from Caatinga.

DISCUSSION

In this study, we investigated how followers and supporters of three organizations that were responsible for solving a case of human-jaguar conflict perceived the translocation process of the so-called problem-animal and its removal from the wild. We used social media as a first approach to analyse a sensitive subject (i.e., human-jaguar conflict in the Brazilian Caatinga) that is still little known by the general public. This translocation is unique, considering circumstances such as the double rescue of the same individual, captured, and trapped in a cave twice for the same farmer, who in turn, warned a representative of the regional program of jaguar and puma conservation twice; thus, indicating willingness to solve the problem without eliminating the animal. Aware of the commotion surrounding the story of this female jaguar, this article is pioneering the investigation of stakeholder's perceptions toward the jaguar's translocation. More specifically, we assessed the perceptions of a stakeholder that was not directly involved with the conflict nor the translocations, but that have the power to influence conservation efforts by either voicing their views and concerns on social media (Greenspan et al., 2021), or donating money to the organizations involved.

While translocating wildlife from a conflict zone back to the wild tends to be socially acceptable (Linnell et al., 1997), results have shown that removing the jaguar from its natural habitat and placing it in captivity for the rest of its life caused
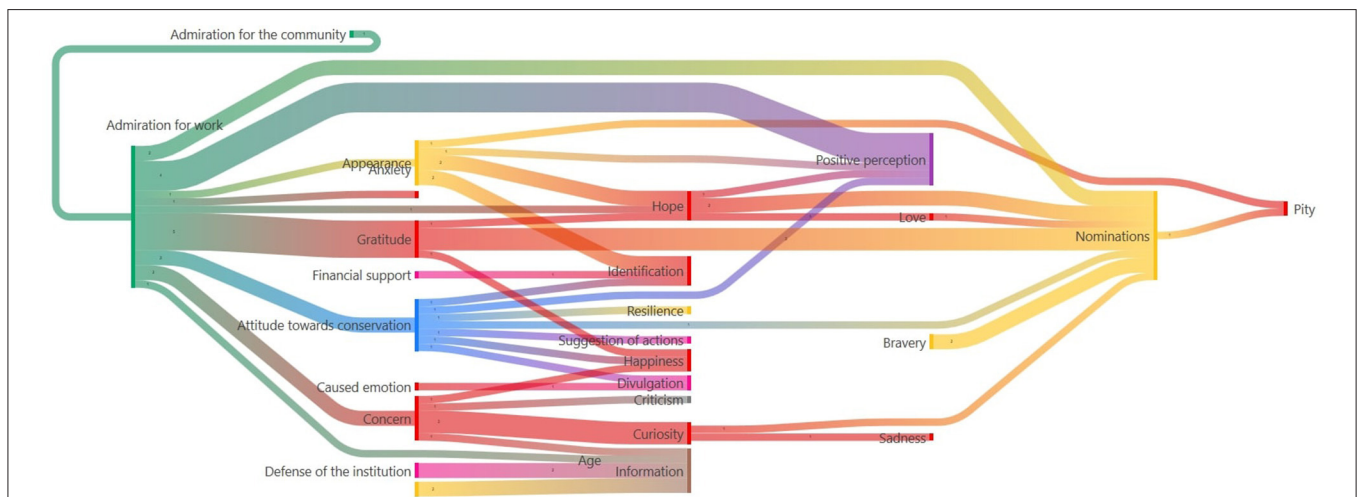

FIGURE 2 | The Sankey diagram shows the co-occurrence of all citations that were coded in the posts of NEX, AMPARA, and PAO.

discomfort among people. Oftentimes people are not fully aware of the role of *true* wildlife sanctuaries in caring for wild animals that cannot remain free in their natural habitat (Doyle, 2017). This lack of understanding and differentiation between ethical or unethical sanctuaries and other wildlife enclosures that use animals to attract people, may be causing people to feel uncomfortable (Doyle, 2017). Our findings indicate that this feeling of discomfort relates to a negative perception toward humankind, more specifically, toward people who kill jaguars as retaliation for livestock depredation. Furthermore, a positive attitude toward conservation seems to indicate a relation between concern toward the jaguar and concern with both the individual and the species. The opposite attitude and the discomfort with keeping the jaguar in captivity may also be linked with a lack of knowledge about the role of translocation and the removal of an animal from the wild as a means to solve a conflict situation with humans. It may even be related to a lack of knowledge about HWC itself as pity and compassion were turned to the predator and rage and intolerance were turned to humans. The code related to the institutions showed that admiration prevailed among other variables assessed. Although PAO is the institution closest to the jaguar and most familiar with the local context, with representatives leading every step of the operational interventions, it received less recognition than the other two other institutions. This may have happened due to the different strategies used by the institutions. For instance, while PAO uses its Instagram profile to disseminate information and knowledge about conservation more broadly (not specific to a single individual), AMPARA and NEX use their profiles more with an emotional appeal to leverage funds for their organizations and raise awareness (typically focusing on single individuals).

Cemafauna, the rescue center closer to where the conflict took place and the organization that performed a key role in the rescue and recovery of the jaguar, was not acknowledged in any reactive comments, despite being mentioned by PAO posts as a partner in the operation. Our data and analyses do not allow for an in-depth examination of the reasons for this disparity of reactions, but we wonder if it was a matter of AMPARA and NEX having more followers and supporters, or because AMPARA and NEX were simply more aware than PAO on how to engage the public on social media. Inevitably two questions arise, (1) what is the relation between trust and credibility of institutions in general, their mediatic prominence and their ecological relevance in the conservation of wildlife, and (2) institutional reputation turned the spotlight to jaguar (individual and species) conservation, or the uniqueness of this jaguar's story added credibility and trust to the institutions?

Our findings showed a high number of messages coded as "welcoming" (25 citations) and as "nominations" (23 citations). Both were addressed to the jaguar, as if it could read the comments in its own Instagram profile. Several "nominations" given to the jaguar correspond to human attributes and some "welcoming" citations cut the link to the jaguar's natural habitat. The borderline between caring for an individual unable to remain in the wild, and the distorted or exacerbated feelings that may pave the way for attempts (or willingness) of domestication (or undue proximity to humans), is too tenuous and may

be counterproductive in terms of wildlife conservation. Some comments shared this concern when people criticized the choice of a human name for the jaguar and the option for its captivity.

Using social media to analyze people's perceptions toward wildlife has limitations like any other analytical tool. However, given the rise of these platforms, like Instagram, it has become an advantageous means of investigating discussions on wildlife (Wu et al., 2018), shedding light on some important remarks. Although we were unable to assess perceptions toward the translocation from the public at-large or from those directly impacted by the human-jaguar conflict, our investigation allowed us to obtain enough data to have a sense of how the target public (i.e., social media followers) perceived the translocation of a charismatic and endangered species. People far from HWC zones are important for wildlife conservation and a key stakeholder. Those Instagram followers tend to cooperate with conservation efforts by donating money used for infrastructure needed for the animals, food, and by disseminating information related to HWC. Thus, institutions already reliable for their values, norms and operational efforts, must take into account that any communication has to be accurate and transparent. Knowledge is one of the first human dimensions assessed in HWC. Although institutions like AMPARA, NEX, or PAO are not educational institutions, their visibility and wide range along with the relevance of their role as maintainers of wild species, mostly charismatic species (AMPARA, NEX) and as conservationists (researchers and practitioners) (PAO), increase their commitment in providing precise biological and ecological information accessible to specialists and the public in general. As pointed out by Wu et al. (2018), social media can be a powerful tool to strengthen public awareness of wildlife conservation.

Many comments started by responding to the content of the post and then changed its focus to more general and complex discussions about human-nature relations. This change in the discourse suggests that the case of the jaguar acted as a catalyst of broader reflections of wildlife management and conservation, thus showing the power social media has on generating debate among the public. What human dimensions of HWC and wildlife management would arise with the repetition of the analysis? Our results indicate that the studied public is likely to embrace Luísa as an ambassador for jaguar (and maybe even puma) conservation in the Caatinga. Therefore, the case of Luísa may become a showcase for strengths and weaknesses of conflict mitigation measures in order to help management agencies, and a symbol of what are the final outcomes if governance of natural resources is weak or absent, for both men and beast. Once people learn better with storytelling (Bogner, 1999), the potential of fostering knowledge and enhancing pro-conservation behaviors increases with an individual that stimulates the human dimensions beyond cognitive aspects. Therefore, this individual would have fulfilled a purpose to science as valuable as the genetic pool within it.

We acknowledge that there are other stakeholders involved in the translocation event described here (e.g., conservationists, governmental authorities, the local community). Therefore, future research should investigate the views, concerns and attitudes of all stakeholders who were involved in the

translocation so as to have a better picture of the implications of this effort for the conservation of jaguars in the Brazilian Caatinga and beyond. Furthermore, it would be beneficial to encourage the organizations AMPARA, NEX, and PAO to bring the subject (translocation and the jaguar) back to their social media accounts in a coordinated and cooperatively way, to repeat the methodology of this study and investigate other dimensions like engagement, leveling of concepts and transparency, for example. Based on our findings, we recommend that wildlife management agencies and institutions that keep captive animals align their posture and speech to establish a good foundation for continuous and savvy public engagement with *in situ* conservation.

CONCLUSION

The success of the translocation started where the conflict arose: the farmer that was affected by the jaguar's depredation trapped the animal in the cave and contacted the regional representative for jaguar and puma conservation program (PAO). The animal was old and unable to feed on natural prey and the farmer was exposed to the conflict with a predator. Several institutions collaborated and the translocation to the captivity at NEX was done successfully, being reported on social media, engaging an external public.

Our results showed that people cared, were concerned and engaged with interventions involving charismatic species. This finding is of particular importance for wildlife conservation as it motivates people to financially support projects and institutions committed to *ex situ* conservation. Furthermore, it provides a window of opportunity for education for conservation and behavior change programs, either for those impacted by the HWC or for those who watch from afar. People looked after the welfare of a single animal and gave their help and support. But people also cared for the species and the wildlife in general. That awareness must encourage institutions and wildlife management agencies to improve their communication objectives, content and skills, to go beyond the survival and welfare of an individual that will be kept in captivity to the end of its life and effectively promote coexistence, through conservation *in situ* of endangered species and their habitats and improvement of quality of human life within its traditional livelihoods.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcosc.2021.788641/full#supplementary-material

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