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ARTICLE

Pathos as a persuasive resource for online research funding: exploring emotion-based rhetorical strategies in science crowdfunding videos

Ana Cristina Vivas-Peraza

Abstract

This paper uses the Aristotelian concept of *pathos* to investigate how scientists can persuade their audiences through emotional appeals in science crowdfunding videos (SCVs). SCVs are short videos created to promote and fund a research project through online crowdfunding platforms, and represent an emerging genre of science communication that connects experts and audiences. By adopting a linguistic and semiotic approach, a sample of 50 SCVs was analysed with qualitative analysis software to identify linguistic and non-linguistic resources that could appeal to viewers' emotions. The findings show a strong emphasis on positive emotional appeals, particularly strategies that foster kindness and friendship between scientists and audiences. In contrast, appeals to fear and pity were minimal, suggesting that SCVs focus mostly on building trust and empowering potential donors rather than evoking urgency or guilt. These results shed light on the role of emotions in science communication, particularly in the context of research funding.

Keywords

Public engagement with science and technology; Visual communication; Digital science communication

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1 ▪ Introduction

Crowdfunding is a strategy increasingly used by scientists to finance their research through online public donations [Pérez-Llantada, 2021; Vachelard et al., 2016]. The process involves publishing a research proposal on a specialised web-based platform to engage internet audiences who may support the cause for various ideological and practical reasons [Mehlenbacher, 2019]. This proposal typically includes a written description of the project and an edited short video, or Science Crowdfunding Video (SCV) [Vivas-Peraza, 2022, 2025]. In SCVs, scientists have just a few minutes to make a compelling pitch that captures the viewer's attention and encourages participation in the scientific campaign in question.

Previous studies on crowdfunding have shown the persuasive potential of these short videos, since their audio-visual nature enhances communication and taps more directly into human emotions [Dey et al., 2017; Doyle et al., 2017]. Building on these findings, the present study investigates persuasion through emotions in SCVs by drawing on *pathos* as a rhetorical strategy, which refers to the persuasive means aimed at generating an emotional response in the audience [Kennedy, 2007]. For that, a sample of 50 SCVs were selected from the science crowdfunding platform *Experiment.com* promoting research projects on Biology, Ecology and Medicine to answer the following research questions:

- RQ1. What emotion-based rhetorical strategies are observable in SCVs?
- RQ2. How are these strategies materialised into linguistic and non-linguistic modes of communication?
- RQ3. Which strategies are more frequently used?

As Taddicken and Reif [2020] argue, emotions are essential in the process of communicating science at the levels of the communicators, the content to be disseminated, and the audience. By answering the abovementioned questions, this study will provide an insight into the emotional linguistic and non-linguistic strategies that can be used by scientists to engage people in science and prompt public participation in research funding through short-form videos such as the SCV. To date, no studies have specifically addressed how emotional appeals can be crafted in this relatively new digital genre. While the study focuses on a small sample of SCVs and while it relies on the analysis of emotional appeals that can be subjective in nature, the results reported in this paper will offer an initial contribution to an underexplored area in the current literature.

2 ▪ Literature Review

2.1 ▪ *Science crowdfunding and the persuasive potential of SCVs on Experiment*

Scientists have traditionally relied on institutional grants for research funding, but applying for these has become an increasingly tedious, competitive, and time-consuming procedure [Berry, 2010]. This may be due to, among other structural factors, the declining financial capacity of funding agencies, which are struggling to keep up with the growing demand for these grants [Mehlenbacher, 2019]. Additionally, the erosion of public trust in institutions and science policies has led to reduced political support for science funding, resulting in budget cuts and less favourable conditions for scientific projects [Intemann, 2023]. As a consequence of these challenges in the science funding system, some scientists are turning

to alternative fundraising sources, such as crowdfunding, to cover their project expenses [Mehlenbacher, 2019; Pérez-Llantada, 2021; Vachelard et al., 2016].

Crowdfunding campaigns are launched on specialised digital platforms that host several digital genres (i.e., distinct forms of online communication with unique structures, purposes, and audience expectations). The largest international science-focused crowdfunding platform is *Experiment.com* [Sauermann et al., 2019], where campaigns are presented in a pre-established web layout that includes two main genres: a textual description of the research proposal and a promotional short video (SCV). *Experiment* is a donation-based crowdfunding platform where backers receive no material rewards but the satisfaction of supporting scientific causes that can positively impact the ecosystem and human lives [Mehlenbacher, 2019]. Since donations are motivated by intrinsic factors, proposals must be persuasive enough to appeal to their desire to contribute to meaningful research. In this context, the SCV plays a crucial role since, as established by the *Experiment* platform's *Researcher Guide*, it can boost funding chances by 60% [Experiment, 2025a].

Placed in the page header and overlaying a visually appealing image with a "play" button on it (see Figure 1), the SCV is the most eye-catching genre of the project page, underscoring its relevance. Prior research on crowdfunding highlights the positive impact that videos can have on campaign success, thanks to their potential to persuade viewers through compelling storytelling [Dey et al., 2017], visuals [Sauermann et al., 2019], and background music [Doyle et al., 2017]. Most importantly, crowdfunding videos provide the (likely) only face-to-face interaction between project creators and viewers, fostering a deeper emotional connection that can increase viewers' motivation and willingness to participate [Sheldon, 2012]. This emotional impact may be further enhanced by the concise nature of SCVs, as brevity and immediacy are effective in capturing and retaining audience attention, aligning with the decreasing attention spans of Internet consumers and their growing preference for quick, engaging content [Babu et al., 2024]. Emotional appeals play a central role in persuading potential donors, making campaigns stand out, and ultimately driving the success of crowdfunding efforts. As Manic [2024] asserts, "the capacity to evoke feelings or reactions transforms passive viewers into active participants" willing to take action (p. 47), and in the case of SCVs, this action involves donating money and sharing the campaign on social media.

In sum, SCVs offer a high potential to persuade through emotions thanks to their brevity, audio-visual affordances, discursive elements, and immediacy. Because of that, this genre presents an excellent opportunity to study how scientists craft emotional appeals that may engage audiences through persuasive science communication.

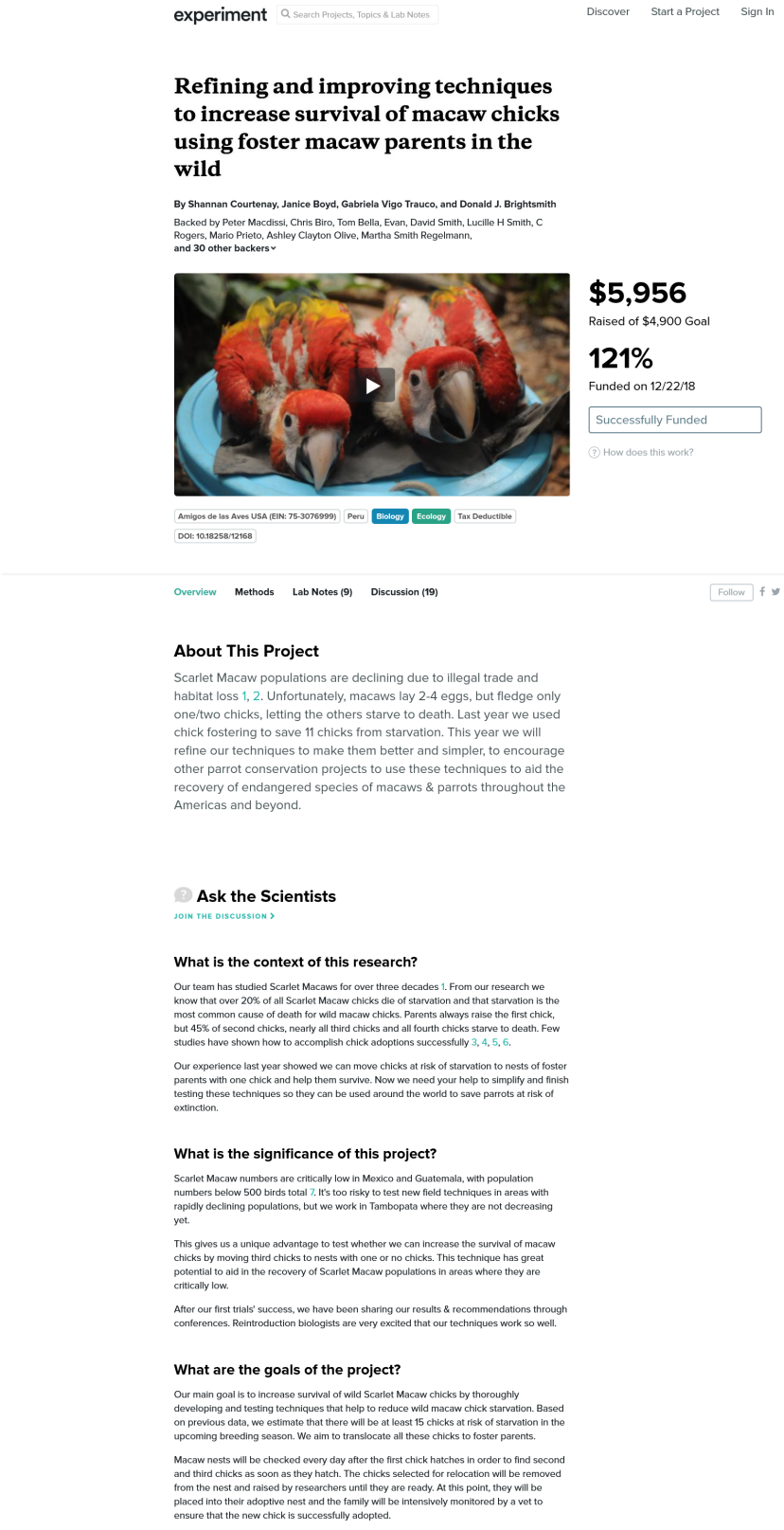

Figure 1. Example of a project page on *Experiment* (https://experiment.com/projects/refining-and-improving-techniques-to-increase-survival-of-macaw-chicks-using-foster-macaw-parents-in-the-wild).

2.2 ▪ *Emotions in science communication.* Pathos *as an analytical framework*

Persuasion is defined by Pullman [2013] as "any act that generates or modifies a belief" (p. xx). In the realm of rhetoric, all communication is, to some degree, persuasive. Whether it is intended to inform, entertain, or motivate action, all forms of communication seek to influence the audience's beliefs, attitudes, or behaviours [Foss, 2009]. This understanding of persuasion is particularly relevant in science communication where scientists are, in accordance with Open Science principles, required to engage people in science, shape their understanding, and encourage participation in scientific issues [Pérez-Llantada, 2021; Vicente-Saez & Martinez-Fuentes, 2018].

On his *On Rhetoric*, philosopher Aristotle distinguished among three main appeals or *artistic proofs* to persuade an audience: *ethos*, *logos*, and *pathos* [Kennedy, 2007]. Persuasion through *ethos* involves strategies to show the speaker's intelligence, competence, and good character to add credibility to their discourse. Persuasion is achieved through *logos* by means of logical arguments that show the truth or apparent truth. As for *pathos*, it refers to the speaker's ability to persuade by appealing to the emotions of the audience [Pullman, 2013]. Even if framed separately, these three appeals belong to an interdependent rhetorical triangle, resulting in frequent overlaps. As Pullman [2013] points out, an audience is unlikely to accept a logical argument (*logos*) without a credible speaker (*ethos*), and a valid argument may not motivate change without emotional appeal (*pathos*).

This study focuses on *pathos*, particularly how it materialises in SCVs. Aristotle categorised emotions based on their positive or negative effects on the individual's well-being and how they can be used for persuasion. Positive emotions such as calmness, friendship, confidence, and kindness can be used in rhetoric to encourage constructive actions and behaviours; while negative emotions like anger, fear, shame, and pity are often used to move an audience [Kennedy, 2007]. Although *pathos* has sometimes been associated with control and manipulation [Cockcroft et al., 2013], emotions are essential for persuasion, as they govern feelings necessary for understanding, thinking, and taking a stance on an issue [Pullman, 2013]. Therefore, effective communicators must appeal to emotions in a balanced and ethical manner to shape beliefs or prompt action.

Several studies have underscored the potential of applying Aristotle's concept to identify emotion-based rhetorical strategies in various forms of science communication. In their research on German scientific weblogs, Hanauska and Leßmöllmann [2021] noticed *pathos*-based resources used by experts and non-experts, such as the evocation of negative scenarios, to undermine the opponent's position in scientific debates. Similarly, Scotto di Carlo [2015] explored the *pathos* techniques used in an online TED talk for knowledge dissemination, finding a personal and emotive storytelling rich in metaphors, examples, humour, and visuals. Spoel et al. [2008] also showed how environmental narratives are infused with *pathos* in audio-visual materials, remarking that public engagement in this type of discourse involves an apocalyptic narrative warning of the catastrophic consequences of climate change. Conversely, Ting et al.'s study [2020] found a lack of emotional appeals in health risk messages in cancer pamphlets in Malaysia, and recommended incorporating *pathos* techniques to raise awareness of disease severity and enhance the pamphlets' persuasiveness.

In addition to research that applies *pathos* as an analytical framework, a considerable body of literature has examined emotions in science communication through other theoretical

lenses. Regarding climate change communication, O'Neill and Nicholson-Cole [2009] found that while fear-inducing representations of the environmental crisis can capture attention, non-threatening imagery linked to everyday concerns fosters greater public involvement. Additionally, Nabi et al. [2018] demonstrated that combining fear with hope in climate change persuasive messages strengthens advocacy behaviours, highlighting hope's key role in motivating pro-environmental actions. Other studies in healthcare communication echo these findings, suggesting that positive emotions like hope, empathy, and optimism often foster stronger, more sustained engagement than negative ones such as fear or guilt [Myrick, 2015; Heyn et al., 2023]

All these studies, whether or not using *pathos* as a framework, demonstrate that emotions are central to the persuasive strategies employed in science communication to engage audiences, shape perceptions, and motivate actions. Building on this, this paper expands the existing literature by examining how emotion-based rhetorical strategies can manifest through various linguistic and non-linguistic resources in the persuasive context of science crowdfunding videos, using *pathos* as an analytical lens.

3 ▪ Methodology

3.1 ▪ *Materials*

For this study, a convenience-based sample of 50 SCVs was collected from the science-specialised crowdfunding platform *Experiment* (see appendix A for further details). The compilation involved downloading the videos from their corresponding project pages and transcribing them with professional web-based software *Transcribe ByWreally* to obtain the spoken narration made by their author scientists.

The selected SCVs are all in English and promote scientific campaigns that were successfully funded between 2017 and 2021 in the fields of Biology, Ecology, and Medicine. The choice of these three fields and language was motivated by the fact that this study is part of a broader national research project focused on analysing digital genres for science communication in English, specifically related to health and the environment.[1] As for the choice of successful projects, it was based on two criteria. The first criterion was adopted as a practical solution. *Experiment* only displays ongoing and successfully funded campaigns. If an ongoing campaign fails, its project page is removed and no longer accessible, so only successful campaigns were selected to ensure continued access. The second criterion is grounded in a research hypothesis: since producing an effective SCV seems to be crucial for campaign success [Dey et al., 2017; Doyle et al., 2017; Experiment, 2025a; Sauermann et al., 2019], it was hypothesised that successful campaigns likely had persuasive SCVs worth analysing.

The selection process took place in 2021. Using the search function on the *Experiment.com* website, filters were applied to display successfully funded campaigns in the categories of Biology, Ecology, and Medicine. The first 50 SCVs retrieved by this filtered search were selected for analysis. These were chosen based on their order of appearance in the search results, which may have been influenced by relevance, popularity, or other algorithmic criteria set by the platform — though the exact ranking system is not publicly disclosed.

1. The study is derived from research carried out within the project "Digital Genres and Open Science: An Analysis of Processes of Generic Hybridity, Innovation, and Interdiscursivity" (*Genci 2.0* for short, reference code PID2019-105655RB-I00) granted by the Spanish Ministry of Economy and Competitiveness (MINECO).

While this approach ensured practical accessibility, it also introduces certain limitations. This convenience sample of only successful SCVs may bias the findings toward emotional strategies that are more effective or appealing. Unsuccessful campaigns could be associated with less persuasive or emotionally neutral SCVs that are not represented in this dataset. As a result, the frequency and variety of emotional appeals reported here may reflect a selection bias, and not the full range of emotional expression in the broader SCV genre.

3.2 ▪ *Analytical framework*

The primary objective of the study was to identify the different linguistic and non-linguistic resources used by scientists that can potentially appeal to the emotions of the audience (*pathos*). To achieve this, two main well-established analytical frameworks were drawn on to ensure a robust and systematic examination: Hyland's [2005] model of engagement for linguistic resources and Kress and van Leeuwen's [2006] semiotic approach for interpreting visual meaning.

3.2.1 ▪ *Linguistic expressions of* pathos*. The engagement model*

Cockcroft et al. [2013] use the term *engagement* to refer to the triangular nexus established between emotion, persuader, and audience in persuasive communication through *pathos*. For decades, the notion of engagement has been a subject of scholarly interest in the research of persuasive academic discourse. With regards to academic writing, Hyland [2005] has offered one of the most influential and widely cited linguistic frameworks for the analysis of engagement, which he defines as "an alignment dimension where writers acknowledge and connect to others, recognising the presence of their readers, pulling them along with their argument, focusing their attention, acknowledging their uncertainties, including them as discourse participants, and guiding them to interpretations" (p. 176). According to his model, engagement can be manifested in persuasive discourse through various linguistic resources, among which the following three were considered particularly relevant in this study for their potential contribution to the emotional appeal (*pathos*) in science crowdfunding videos:

- *Reader pronouns*: acknowledge the presence of readers (e.g., *you*, *your*) and/or build rapport and solidarity with them (e.g., inclusive *we*).
- *Directives*, or imperative sentences: prompt readers to perform an action.
- *(Rhetorical) Questions*: seek for dialogic involvement with the audience.

These resources aim to capture the reader's attention, arouse curiosity, and motivate them to feel, think, behave, or act in a certain way. They connect with the emotions of the audience, which play a central role in motivation, and thus, are inherently linked to *pathos* [Cockcroft et al., 2013; Pullman, 2013]. Hyland's framework has been widely applied in various academic writing contexts [e.g., Hyland, 2002, 2004; Hyland, 2005] and also in modern digital science communication, including science blogs [Zou & Hyland, 2020], online science videos [Luzón, 2019], and academic tweets [Villares, 2023]. Likewise, this model is used here to interpret linguistic expressions of *pathos* in SCVs.

3.2.2 ▪ *Non-linguistic expressions of* pathos*. Visual meanings*

As Díez-Prados [2024] points out, persuasion is inherently multimodal, meaning that persuasive communication can be expressed through a wide range of semiotic resources apart from verbal language, which in turn have the potential to persuade through *pathos*. For instance, images, drawings, music, gestures, and even camera effects in photographs and videos can be used to connect emotionally with the audience for persuasive purposes. In order to interpret these communicative modes, however, a semiotic approach needs to be adopted.

In their ground-breaking semiotic work *Reading Images*, Kress and van Leeuwen [2006] offer a manual for the interpretation of visual meanings where they, among other aspects, explore how to represent people in images in order to engage viewers and connect emotionally with them. In particular, they establish how the relationship of the participants involved (i.e., the individual being filmed and the viewer) is expressed through the choice of camera shot and angle and the gaze of the depicted character. According to Kress and van Leeuwen [2006], a direct gaze towards the camera establishes eye contact, creating an imaginary relationship with the viewer, and can be interpreted as the participant demanding something from the viewer. The choice of camera shot also plays a role in the participants' interaction: close-up and medium shots suggest closeness and intimate relationships, and long shots depict non-intimate public interactions. Camera angle further contributes to the power dynamic between the participants: low angles convey power over the viewer, high angles diminish the filmed participant's significance, and eye-level angles suggest an equal relationship.

Kress and van Leeuwen's work has been adopted for the analysis of visual communication in a variety of communicative contexts, including science communication contexts. Some examples are scientific conference presentations [Rowley-Jolivet, 2004], instructional images in academic contexts [Wilson & Landon-Hays, 2016], chemical images in school chemistry [Yu, 2024], and science communication websites [Zhang et al., 2016]. Similarly, this model was applied in this study to interpret visual resources that convey *pathos* in SCVs.

3.2.3 ▪ *Analytical procedure*

The videos were downloaded, transcribed, and watched multiple times to identify possible emotion-based linguistic and non-linguistic strategies used by scientists. For this, a combination of deductive and inductive approaches was employed. Strategies were both pre-determined based on Hyland's [2005] engagement model for linguistic resources and Kress and van Leeuwen's [2006] framework for visual meanings, and emergent from the data as new linguistic and visual strategies were observed. This approach allowed for a thorough analysis while remaining flexible to unexpected findings. Other resources such as music and paralinguistic features (e.g., intonation, pitch) were excluded, as they fall outside the study's theoretical scope [van Leeuwen, 1999]. As Paltridge [2012] points out, the abundance of semiotic resources in multimodal artefacts makes it impossible to cover all aspects in one study, and in this case, attention was directed towards verbal language and visual semiotics.

The analysis was primarily qualitative, focusing on identifying and interpreting potential emotional strategies in SCVs. However, to assess their prevalence, descriptive statistics in absolute numbers were used to examine strategy frequencies. To facilitate frequency counts, the qualitative analysis software *Atlas.ti* was employed, which allows fragmenting and coding

video data, providing insights into the frequency of codes used. *Atlas.ti* uses *quotations*, *codes*, and *code groups* for analysis. Quotations are fragments of video selected for analysis, while codes are labels assigned to those quotations to identify key themes or strategies. In turn, codes can be organised into code groups for further categorisation. In SCVs, each quotation was defined as a continuous fragment of visual material. Codes referred to the names of the linguistic and non-linguistic strategies found, and they were grouped into code groups according to the type of emotion they appealed to. Concretely, the strategies were classified based on the positive and negative emotions outlined by Aristotle [Kennedy, 2007].

Although emotions within classical rhetoric may not be strictly aligned with current psychological classifications, they are understood as discursive strategies aimed at persuasion, and so are considered in this study too. Consequently, categories such as friendship and calmness are included as rhetorical-emotional appeals, even if they may be conceptualised as relational contexts or moods in other contemporary theoretical traditions [e.g., Barrett, 2017; Russell, 2003]. This classical approach allows analysing how scientists rhetorically construct emotional resonance in SCVs, rather than to diagnose discrete affective states.

The process of fragmenting and coding the sample was thus the following: first, SCVs were fragmented into quotations based on changes in visual content. Since SCVs are edited sequences of different images and video footage that unfold over time, quotations could include an uninterrupted video shot (e.g., the scientist speaking to the camera without cuts), a sequence of video footage, or a static image displayed for a specific duration. Each of these quotations was treated as a distinct analytical unit. Then, strategies (codes) were assigned to these quotations accordingly. In the case of linguistic strategies, each strategy was coded only once per quotation, even if it appeared multiple times. For example, if an imperative sentence (i.e., a linguistic strategy, see section 4) was used several times within the same quotation, it was still counted as a single instance. This approach ensured consistency in the coding of visual strategies, which were coded according to their presence in a quotation rather than their duration in it. For instance, if a close camera shot (e.g., a visual strategy, see section 4) was used in a quotation, this strategy was coded once, regardless of whether its presence lasted five or fifty seconds. This approach allowed for a balanced analysis, accounting for differences in the way linguistic and visual strategies manifest over time in audio-visual material.

Once all the videos were fragmented and coded using the codes associated to the strategies found, *Atlas.ti* retrieved the frequency of each strategy and its corresponding group in absolute numbers. To enhance consistency, a reliability check was conducted six months later by re-coding the videos. While the analysis was performed by a single researcher, this step helped mitigate potential bias.

Regarding ethical considerations, this study complies with Experiment's terms and conditions [Experiment, 2025b] considering that the use of the data is strictly for non-commercial academic purposes. However, to further uphold ethical integrity, explicit consent was obtained from the scientists whose SCVs are used as illustrative examples in the following section. Still, the individuals depicted in SCV46 (Figure 4) were anonymised out of respect for their vulnerability.

4 ▪ Results

Table 1 presents the strategies identified in the sample, classified into four groups according to the emotion they appeal to (rows) and their linguistic or non-linguistic nature (columns). On the right of each strategy and group of strategies, their frequency of occurrence is indicated. Since *ethos*, *logos*, and *pathos* are inherently interconnected [Pullman, 2013], some of the *pathos* strategies discussed here may also invoke the other rhetorical appeals.

Table 1. Strategies appealing to *pathos* in SCVs of Biology, Ecology and Medicine.

Strategy group	Fr.[a]	Linguistic strategies	Fr.	Non-linguistic strategies	Fr.
1. Appealing to Kindness and Friendship	1227	Statements using viewer pronouns	122	Frontal camera angle of scientist	265
		Imperative sentences	69	Eye-level camera angle of scientist	190
		Rhetorical questions	29	Direct gaze	176
		Statements on the worth of any donation	9	Close-up camera shot of scientist	138
				Medium-close camera shot of scientist	128
				Researcher smiling	101
2. Appealing to Calmness and Confidence	154	Statements evaluating the project positively	134		
		Statements taking support for granted	20		
3. Appealing to Fear	41	Statements on the potential negative consequences	34	Images appealing to fear	4
				Video footage appealing to fear	3
4. Appealing to Pity	27			Images appealing to pity	20
				Video footage appealing to pity	7

a. While frequency indicates how often a strategy appears, it does not imply rhetorical weight or persuasive impact. For example, a single emotionally charged image may have greater influence on the viewer than multiple uses of a rhetorical question. The frequency data is thus intended to highlight patterns of usage across the sample, not to imply a direct correlation between occurrence and communicative effectiveness.

4.1 ▪ *Strategies for Appealing to Kindness and Friendship*

In the SCVs analysed, various strategies were found that evoke feelings of kindness and friendship, which are essential to foster a sense of connection between the scientist and potential donors. As Cockcroft et al. [2013] and Pullman [2013] note, this connection is crucial for the audience to feel comfortable and encouraged to act, as it cultivates a sense of mutual understanding and trust. This was the most frequently used group of strategies, with 1227 occurrences across linguistic and non-linguistic modes.

Linguistic strategies include second-person and inclusive pronouns, imperative sentences, and rhetorical questions. These techniques promote inclusivity, personal involvement, and a sense of shared purpose [Hyland, 2005]. The use of second-person pronouns (“you”, “your”) and inclusive pronouns (“we”, “us”, “our”) (122 occurrences) acknowledges the viewer and builds solidarity between speaker and audience. Imperative sentences (69 occurrences)

often invite action gently, as in “Join us” or “Help us fund this project,” which position the viewer as a valued participant. Rhetorical questions (29 occurrences) simulate dialogue and invite reflection, creating a more interactive and personal tone.

To illustrate these three possible linguistic manifestations, consider the following examples:

1. “Imagine this was all you ever saw of the world. But what if we could prevent this?” (SCV1)
2. “Now, like me, you’re wondering: is it safe to eat foods that were grown or produced in foggy areas?” (SCV42)

In both cases, second person and inclusive pronouns, imperatives, and rhetorical questions work together to create a sense of joint reflection and shared responsibility.

Additionally, some SCVs include explicit statements that emphasise the worth of any donation, reinforcing that all forms of contribution matter (9 occurrences). These appeal to kindness by validating the audience’s generosity, as in:

3. “Every bit counts and no donation is too small. If you don’t have the funds to help donate now, then you can help by sharing our campaign within your network.” (SCV8)
4. “If you’d like to help us reach our funding goal, please, donate a bit of money. Every donation is important regardless of how much.” (SCV41)

Non-linguistic strategies reinforce these emotional appeals through visual intimacy and affective cues. Camera techniques such as frontal angles (265 occurrences), eye-level framing (190), and direct gaze (176) foster a sense of equality and engagement between the speaker and the viewer [Kress & van Leeuwen, 2006]. Smiling (101 occurrences) adds warmth and signals approachability. Close-up (138) and medium-close (128) camera shots further contribute to emotional proximity by revealing facial expressions and body language in detail.

Figure 2 illustrates how these elements combine to construct a personal and friendly tone in SCV6, SCV39, and SCV46. Through these visual strategies, the scientist is not presented as a distant authority, but as a relatable and empathetic communicator seeking connection with the viewer.

Figure 2. Camera effects and facial expression in SCV6, SCV39, and SCV46.

4.2 ▪ *Strategies for Appealing to Calmness and Confidence*

Although less frequent than kindness-based strategies, some SCVs aim to reassure potential donors by appealing to calmness and confidence (154 occurrences). These appeals help present the project as credible, worthwhile, and impactful.

Two recurring linguistic strategies are statements evaluating the project positively (134 occurrences) and statements taking the audience support for granted (20 occurrences). The former highlight public health, ecological, or scientific benefits, creating a sense of optimism and forward-looking momentum. The latter project confidence in eventual success, subtly assuming the audience's participation.

Consider the following examples:

5. "This type of research has the potential to help patients with both autoimmunity and cancer and it will help us to better understand how the environment affects our health." (SCV5)
6. "With your help, this research may prove to have important public health impacts as we learn the tortoise's potential role in mitigation of tick-borne disease and the tick's role in the spread of the disease throughout the Mojave Desert." (SCV23)
7. "With your help, we will embark on the most comprehensive survey ever undertaken for this species." (SCV20)
8. "So, to wrap things up, I just want to say thank you so much for listening and thank you so much in advance for your donations to help amphibian conservation." (SCV25)

These utterances appeal to calmness and confidence by projecting success, expressing gratitude in advance, and framing the campaign as a safe, positive investment.

4.3 ▪ *Strategies for Appealing to Fear*

Fear-based appeals were comparatively rare in the dataset (41 occurrences), likely to avoid alienating viewers or triggering negative associations. Still, some SCVs do invoke fear to convey urgency or potential harm.

One way to appeal to the audience's fear is to announce the possible disadvantages or negative consequences of not carrying out the project (and therefore, of not donating money). These statements (34 occurrences) need to be close enough to the audience to make them react, so common ground is sought, as shown in the following examples:

9. "What we don't know is the potential of these ticks to transmit disease to tortoises, other desert wildlife that share habitat with tortoises, or people." (SCV23)
10. "So why do we care? Well, amphibians including salamanders are enormously important to the health and functionality of ecosystems on a global scale (…) So, if amphibians suffer, it's very likely that entire ecosystems and even human populations are going to suffer greatly as well." (SCV25)

In the two examples, the potential threats feel personal and widespread, leveraging fear to highlight the urgency and necessity of supporting the research project in question.

Images have a strong influence on human behaviour and state of mind as argued by Stöckl [2004], and some scientists also use them to evoke fear and prompt participation in the campaign (4 occurrences of static images and 3 of video footage). Visual appeals to fear were identified through specific semiotic markers, such as imagery suggesting danger, bodily harm, or negative consequences. For example, in SCV46 (Figure 3), a Thai scientist discusses efforts to develop a vaccine against the Zika virus, which is potentially spreading throughout Thailand. The use of deep red — a colour commonly associated with danger — signals urgency and impending threat. Large mosquitoes, the primary vectors for the Zika virus, are depicted to emphasise the potential health risk. The world map showing regions affected by the virus, along with warm colour gradients that increase the sense of immediacy, all serve to create a visual atmosphere of danger and alarm. These elements combine to portray Zika as a growing public health threat, appealing to the viewer's fear and urging them to take action to prevent its spread.

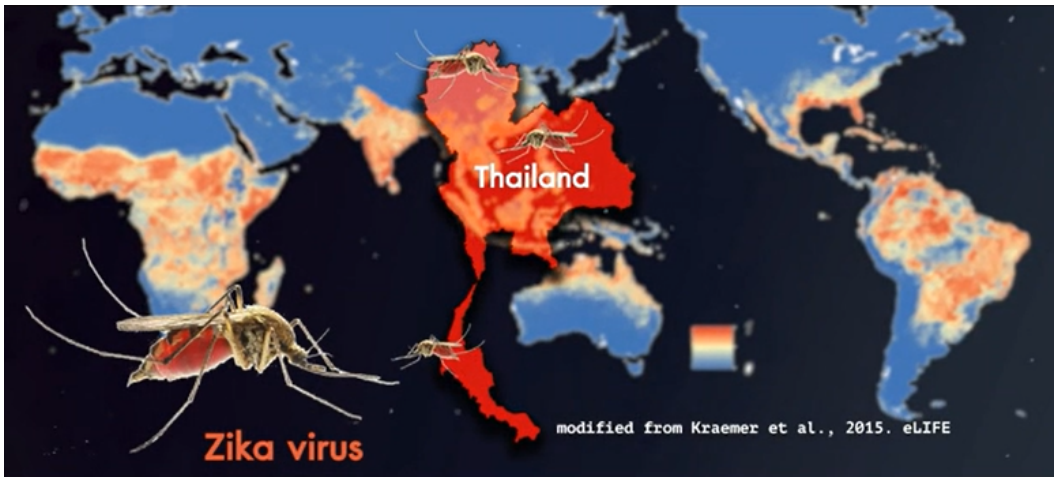

Figure 3. Image appealing to fear in SCV46.

4.4 ▪ *Strategies for Appealing to Pity*

Some other strategies are intended to appeal to pity to support the scientific cause. Pity appeals were the least frequent emotional strategy (27 occurrences), which suggests that SCVs avoid excessive reliance on hardship narratives.

Pity is evoked through images (20 occurrences) and video footage (7 occurrences). Visual appeals to pity were coded based on imagery designed to elicit empathy by showing the suffering, vulnerability, or needs of individuals or animals affected by the issue at hand. SCVs promoting the conservation of endangered species show injured animals looking directly at the camera to create a personal connection and evoke emotional responsibility. Similarly, SCVs on human diseases use images of suffering individuals to make the issue feel personal and urgent. This is the case in SCV46 (see Figure 4), which includes images of children, a particularly vulnerable group, affected by the Zika virus. Their visible cranial deformities, typical of the disease, appeal to pity by highlighting their innocence, vulnerability, and irreversible damage. These images can motivate viewers to take action, boosting donations for research and prevention on the disease.

Figure 4. Images appealing to pity in SCV46.

5 ▪ Discussion

The findings from the analysis of *pathos* strategies in SCVs provide relevant insights into how emotion-driven persuasion functions in the context of science crowdfunding. SCVs are not only intended to communicate scientific research but also to secure funding, which requires motivating viewers to engage and contribute. Since intrinsic motivation often stems from emotional appeals [Pullman, 2013], communication in SCVs should connect with the viewer on an emotional level. In this sense, the use of linguistic and non-linguistic strategies to appeal to emotions may become crucial in persuading potential donors through this digital genre.

Before delving any further into the discussion, it should be remembered that since the study only analysed SCVs from successfully funded campaigns on *Experiment.com*, the results may reflect a bias towards more persuasive or emotionally resonant content. SCVs that failed to attract funding may have less emotional engagement and are absent from the analysis, reducing the scope of interpretation. Therefore, the patterns observed here may not fully represent the diversity of emotional strategies employed across the spectrum of SCVs, including those that were less effective or unsuccessful.

That said, the frequency of strategies found in the sample suggests a clear preference for positive emotional appeals. The most prominent strategy group, *Appealing to Kindness and Friendship*, occurred 1227 times, indicating that SCVs aim to build mutual trust and inclusivity between scientists and audiences. Linguistic engagement devices (i.e., second-person pronouns, inclusive language, rhetorical questions, and imperative sentences) alongside statements valuing donations, help transform viewers from passive observers into active participants. These are supported by non-linguistic strategies like eye-level camera angles, close-up shots, and direct gazes, which foster an approachable and empathetic tone. Rather than adopting authoritative roles, scientists in SCVs present themselves as collaborators sharing a common goal with the audience. This approach aligns with co-creation, participatory models such as citizen science, which emphasise the value of public engagement in shaping scientific knowledge, in accordance with the Open Science principles of science democratisation [Vicente-Saez & Martinez-Fuentes, 2018].

On the other hand, the potential drawbacks of such positive emotional strategies need to be considered. Appeals to kindness and friendship, though often well-received, risk being

perceived as overly sentimental or even patronising — especially in the context of crowdfunding, where financial contributions are requested. Audiences may question the authenticity of these appeals, sensing that the tone is crafted more to elicit donations than to foster genuine emotional engagement. This tension between the desire for connection and the potential for manipulation highlights a key challenge for scientists and science communicators: how to maintain authenticity and avoid exploiting viewers' emotions. While fostering empathy and trust is vital, overreliance on emotional appeals to kindness may also prompt scepticism, particularly if audiences feel their generosity is being taken for granted.

Regarding positive emotional appeals to calmness and confidence (154 occurrences), though less frequent than kindness appeals, may also play a role in presenting the research project as credible and well-supported. By framing the research in terms of positive outcomes, such as public health impacts or ecological benefits, these strategies bolster the perceived legitimacy of the project and reassure potential donors about the value of their investment. This confidence in the project is reinforced by statements that take donor support for granted, which serve to subtly suggest that success is inevitable. These strategies also resonate with the idea of collaborative science, where public support is framed not as an optional gesture, but as a necessary component for advancing science. However, it is also important to note that framing donor involvement as inevitable can be seen as presumptive or even coercive, potentially leading to discomfort among those who may not yet feel fully invested in the cause.

In contrast to the frequent use of positive emotional appeals, fear-based strategies are relatively rare in SCVs, with only 41 occurrences of visual or verbal elements that highlight the negative consequences of failing to support the research. This limited use differs from other digital genres of science communication, such as online scientific debates [Hanauska & Leßmöllmann, 2021] and environmental documentaries [Spoel et al., 2008], where urgency and fear appeals are frequently used to motivate action. Instead, the relative absence of fear appeals in SCVs aligns more closely with studies on climate change narratives and representations [O'Neill & Nicholson-Cole, 2009; Nabi et al., 2018] and healthcare exchanges [Myrick, 2015; Heyn et al., 2023], which emphasise hope, optimism, and constructive engagement over fear-based tactics. Such alignment suggests that SCVs, like these other forms of science communication, seek to foster sustained involvement by building trust and empowerment rather than overwhelming potential donors with distress and urgency. Yet this preference could also reduce the perceived immediacy of certain issues, especially when swift action is essential to address pressing public health or environmental challenges.

Similarly, the minimal reliance on pity appeals (27 occurrences) further shows a cautious approach to negative emotional appeals that could be perceived as manipulative or counterproductive. Rather than framing research as a dire situation in need of urgent rescue, SCVs generally present it as a valuable and achievable endeavour in which audiences can actively participate. Perhaps an excessive reliance on pity or desperation could undermine the credibility of the campaign or create donor fatigue. By focusing on enthusiasm, shared purpose, and the transformative potential of scientific research, SCVs construct an emotional framework that invites participation without exploiting negative emotions. This approach may be particularly effective in fostering long-term commitment [Myrick, 2015], inspiring the public with optimism to support the cause without relying on feelings of fear or guilt.

As a genre, SCVs possess unique constraints and affordances that shape how *pathos* can be employed. Their short, self-produced, and goal-oriented nature, combined with public

visibility and direct appeals to individual viewers, allows for a highly personal, affect-driven form of persuasion not typically found in more formal formats such as institutional videos or TED talks. The homemade aesthetic, intimate tone, and grassroots *ethos* of SCVs afford a proximity between scientists and the public that encourages emotional resonance, but also places rhetorical responsibility more squarely on the individual researcher.

It is also important to acknowledge that the visual strategies analysed — such as direct gaze, eye-level camera angles, and smiling — reflect communication norms that may be culturally specific. While these cues are often interpreted in Western contexts as signs of friendliness, equality, and trustworthiness [Kress & van Leeuwen, 2006], they may not carry the same connotations in all cultural settings. In some contexts, direct eye contact may be considered confrontational or inappropriate, and smiling may not signal sincerity in the same way. This raises important questions about the cultural legibility of SCVs and the potential exclusion of audiences whose visual literacies or interpersonal norms differ from those implicitly embedded in the videos.

In addition to cultural considerations, the emotional appeal strategies found in SCVs raise critical ethical questions. While emotional communication can enhance engagement, it also carries the risk of manipulation. Where should science communicators draw the line between effective persuasion and emotional exploitation? Should scientists be trained to use emotional strategies deliberately? And if so, how should such training address ethical boundaries? The growing emphasis on engagement, visibility, and storytelling in science suggests a need to foreground ethical literacy alongside rhetorical skill.

These reflections also have implications for the broader field of science communication. SCVs exemplify a shift in how science is constructed for public consumption: less as a transmission of facts and more as a participatory, emotionally resonant exchange. This shift challenges traditional notions of science literacy as purely cognitive, suggesting instead that emotional resonance plays a role in shaping public interest, understanding, and support. As scientists take on more visible and emotionally expressive roles in public discourse, the line between expert and advocate blurs, inviting both new opportunities for connection and new responsibilities for ethical engagement.

6 ▪ Conclusions

This study has explored the emotional strategies employed in science crowdfunding videos (SCVs), shedding light on how scientists use emotion to engage potential donors and communicate the value of their work. The SCVs analysed in this sample appeared to favour positive emotional appeals (particularly those centred on kindness, trust, and confidence) over fear or pity. These choices seem to support a tone of collaboration and shared purpose, inviting the audience to participate in the scientific process not just as funders, but as engaged stakeholders. Such patterns resonate with broader discussions in science communication about public involvement, co-creation, and the democratisation of science.

However, these findings should be interpreted with caution. The descriptive nature of the analysis and the limited, convenience-based sample mean that generalisations beyond the sample are premature. While SCVs in this study leaned toward collaborative emotional strategies, further research is needed to determine whether this trend holds across different platforms, disciplines, and cultural contexts. Additionally, although positive emotional

appeals may encourage support, they also raise questions about authenticity and the potential for manipulation, particularly in a funding context.

Rather than offering definitive conclusions, this study should be seen as a point of departure: an initial effort to map how emotional persuasion operates within a relatively underexplored genre of digital science communication. Future research could expand this foundation by incorporating audience reception studies, more interviews with SCV producers, and comparative analyses across a broader range of scientific fields. Such work would contribute to a deeper understanding of how emotional strategies in science communication shape public engagement and support in a digital and increasingly participatory environment.

Ultimately, this study reveals that science communication is not only about transmitting knowledge but also about performing trust, empathy, and shared purpose — affective dimensions that increasingly define how science is made meaningful to the public.

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I am especially grateful to the three scientists who kindly consented to the use of images from their SCVs for illustrative purposes in this paper.

A ▪ Sample of SCVs

Table 2. List of the 50 SCVs used for analysis. * B: Biology EC: Ecology M: Medicine

SCVx	FUNDED ON	PROJECT TITLE	URL TO PROJECT PAGE	FIELD*
SCV1	12/11/17	How do cataracts form and how can they be prevented?	https://experiment.com/projects/how-do-cataracts-form	B + M
SCV2	14/12/17	Maceration of Skull Tissue by Mealworms	https://experiment.com/projects/maceration-of-skull-tissue-by-mealworms	B + EC
SCV3	31/01/18	How have warming waters influenced reef species around Poor Knights Islands, New Zealand?	https://experiment.com/projects/how-have-warming-waters-influenced-coral-species-around-poor-knights-islands-new-zealand	B + EC
SCV4	15/01/18	Why do wolverines need snow?	https://experiment.com/projects/why-do-wolverines-need-snow/discussion	B + EC

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SCVx	FUNDED ON	PROJECT TITLE	URL TO PROJECT PAGE	FIELD*
SCV5	17/03/18	How do chemical exposures trigger autoimmune diseases?	https://experiment.com/projects/how-do-chemical-exposures-trigger-autoimmune-diseases	B + M
SCV6	04/03/18	Squid in Space: Symbiosis and Innate Immunity	https://experiment.com/projects/squid-in-space-symbiosis-and-innate-immunity	B + EC
SCV7	03/03/18	How do Hovering Hummingbirds Survive Hot Days?	https://experiment.com/projects/how-do-hovering-hummingbirds-survive-hot-days/methods	B + EC
SCV8	17/04/18	How Will Global Climate Change Impact Tropical Communities?	https://experiment.com/projects/how-will-global-climate-change-impact-tropical-communities/labnotes	B + EC
SCV9	22/03/18	Genetic diversity across the Atlantic in a red seaweed	https://experiment.com/projects/genetic-diversity-across-the-atlantic-in-a-red-seaweed	B + EC
SCV10	19/05/18	What genes make domestic dogs friendlier than wolves?	https://experiment.com/projects/what-genes-make-domestic-dogs-friendlier-than-wolves	B
SCV11	16/04/18	MeadoWatch: When do Mt. Rainier Wildflowers Bloom?	https://experiment.com/projects/timing-is-everything-when-do-mt-rainier-wildflowers-flower	EC
SCV12	12/07/18	How do wildfires reshape plant-pollinator networks in oak woodlands?	https://experiment.com/projects/how-do-wildfires-reshape-plant-pollinator-networks-in-oak-woodlands/methods	B + EC
SCV13	02/05/18	Drought Adaptation in a Threatened White Pine	https://experiment.com/projects/drought-adaptation-in-a-threatened-white-pine	B + EC
SCV14	04/05/18	Bio-Fluorescence on Coral Reefs as a Measure of Reef Health	https://experiment.com/projects/bio-fluorescence-on-coral-reefs-as-a-measure-of-reef-health	B + EC
SCV15	16/06/18	Population Ecology of Risso's Dolphins in Monterey Bay, California	https://experiment.com/projects/population-ecology-of-risso-s-dolphins-in-monterey-bay-california	B + EC
SCV16	06/10/18	Exploring the Bioremediation and Environmental Impact of Halogenated Organic Compounds	https://experiment.com/projects/exploring-the-bioremediation-and-environmental-impact-of-halogenated-organic-compounds/labnotes	B
SCV17	21/07/18	How does sleep deprivation impact problematic eating?	https://experiment.com/projects/how-does-sleep-deprivation-impact-problematic-eating/methods	M
SCV18	20/10/18	Creating a refuge from amphibian chytrid fungus for the critically endangered mountain chicken	https://experiment.com/projects/creating-a-refuge-from-amphibian-chytrid-fungus-for-the-critically-endangered-mountain-chicken	B + EC

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SCVx	FUNDED ON	PROJECT TITLE	URL TO PROJECT PAGE	FIELD*
SCV19	04/08/18	The Potential of Compost and Compost Tea on Athletic Turfgrass	https://experiment.com/projects/the-potential-of-compost-and-compost-tea-on-athletic-turfgrass/methods	EC
SCV20	15/08/18	An expedition in search of one of Australia's most mysterious marsupials	https://experiment.com/projects/an-expedition-in-search-of-one-of-australia-s-most-mysterious-marsupials	B + EC
SCV21	25/09/18	A noninvasive approach to monitor the health of Maine's black bear population	https://experiment.com/projects/what-is-the-best-way-to-monitor-the-health-of-the-black-bear-population-in-maine	B + EC
SCV22	01/11/18	CRISPR Cas9 testing model	https://experiment.com/projects/crispr-cas9-testing-model	B
SCV23	20/09/18	Ticks and tick-borne pathogens of the Mojave Desert Tortoise	https://experiment.com/projects/ticks-and-tick-borne-pathogens-of-the-mojave-desert-tortoise	B + EC
SCV24	20/09/18	Do Pacific Northwest marine mammals carry antibiotic-resistant bacteria from land animals?	https://experiment.com/projects/do-urban-marine-mammals-of-the-pacific-northwest-carry-antibiotic-resistant-bacteria-from-humans-or-terrestrial-animals	B + M
SCV25	20/10/18	Are Costa Rican salamanders susceptible to Batrachochytrium salamandrivorans?	https://experiment.com/projects/are-costa-rican-salamanders-susceptible-to-batrachochytrium-salamandrivorans	B + EC
SCV26	25/10/18	How do amphibious fishes find their way around on land?	https://experiment.com/projects/how-do-amphibious-fishes-find-their-way-around-on-land	B + EC
SCV27	10/01/19	Creating a neural network that classifies Dinoflagellate species	https://experiment.com/projects/creating-a-neural-network-that-classifies-dinoflagellate-species	B
SCV28	22/12/18	Refining and improving techniques to increase survival of macaw chicks using foster macaw parents in the wild	https://experiment.com/projects/refining-and-improving-techniques-to-increase-survival-of-macaw-chicks-using-foster-macaw-parents-in-the-wild	B + EC
SCV29	15/02/19	How do lichens withstand desiccation?	https://experiment.com/projects/how-do-lichens-withstand-desiccation	B
SCV30	5/04/19	Can intensive forestry benefit the threatened Rusty Blackbird?	https://experiment.com/projects/can-intensive-forestry-benefit-the-threatened-rusty-blackbird	B + EC
SCV31	21/06/19	Do hummingbirds use cool perches so they can fly in the heat?	https://experiment.com/projects/do-hummingbirds-use-cool-perches-so-they-can-fly-in-the-heat	B + EC
SCV32	03/07/19	Effects of lead exposure in Scandinavian brown bears	https://experiment.com/projects/effects-of-lead-exposure-in-scandinavian-brown-bears	B + EC

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SCVx	FUNDED ON	PROJECT TITLE	URL TO PROJECT PAGE	FIELD*
SCV33	03/07/19	Can we utilize natural bat colony behavior as a vaccination strategy?	https://experiment.com/projects/can-we-utilize-natural-bat-colony-behavior-as-a-vaccination-strategy	B + M
SCV34	26/07/19	Can we grow a supply of red blood cells by differentiating stem cells to replace donor blood?	https://experiment.com/projects/can-we-grow-a-supply-of-red-blood-cells-by-differentiating-stem-cells-to-replace-donor-blood	B + M
SCV35	28/07/19	Uncovering the cryptic ecological diversity of Caribbean sponges	https://experiment.com/projects/uncovering-the-cryptic-ecological-diversity-of-caribbean-sponges	B + EC
SCV36	10/10/19	Using energy dispersive x-ray spectroscopy to characterize the proboscis of mosquitoes	https://experiment.com/projects/using-energy-dispersive-x-ray-spectroscopy-to-characterize-the-probosicis-of-mosquitoes	B
SCV37	07/11/19	What is in endangered bat poop?	https://experiment.com/projects/what-s-in-endangered-bat-poop	B + EC
SCV38	24/11/19	How does ocean acidification affect carbon dioxide sequestration in coccolithophores?	https://experiment.com/projects/how-does-ocean-acidification-affect-carbon-dioxide-sequestration-in-coccolithophores	B + EC
SCV39	04/12/19	Does the palo santo tree consist of multiple distinct species?	https://experiment.com/projects/does-the-palo-santo-tree-consist-of-multiple-distinct-species	B + EC
SCV40	29/12/19	Can we increase human safety by understanding the language of bears?	https://experiment.com/projects/can-we-increase-human-safety-by-understanding-the-language-of-bears	B
SCV41	18/12/19	Could teeth and scale chemistry reveal threatened Amazonian mega-fish movements?	https://experiment.com/projects/could-teeth-and-scale-chemistry-reveal-threatened-amazonian-mega-fish-movements	B + EC
SCV42	22/03/20	Mercury is in our fog, so what about our food?	https://experiment.com/projects/mercury-is-in-our-fog-so-what-about-our-food	EC
SCV43	30/08/20	Growing edible algae on the Moon	https://experiment.com/projects/growing-edible-algae-on-the-moon	B
SCV44	30/09/20	Can blood lactate levels help guide treatment for birds suffering from monofilament line entanglement injuries?	https://experiment.com/projects/can-blood-lactate-levels-help-guide-treatment-for-seabirds-suffering-from-monofilament-line-entanglement-injuries	EC + M
SCV45	30/09/20	Is lead toxicity a contributing factor to large scale songbird population decline?	https://experiment.com/projects/is-lead-toxicity-a-contributing-factor-to-large-scale-songbird-population-decline	B + EC

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SCVx	FUNDED ON	PROJECT TITLE	URL TO PROJECT PAGE	FIELD*
SCV46	29/11/20	Modelling Zika virus transmission from mother to child using uterine mini-organs	https://experiment.com/projects/modeling-zika-virus-transmission-from-mother-to-child-using-uterine-mini-organs	M
SCV47	01/07/21	Restoring native oysters to Biscayne Bay, as a tool to mitigate algal blooms	https://experiment.com/projects/can-native-oyster-be-restored-at-select-sites-which-have-new-freshwater-flow	B + EC
SCV48	04/02/21	Discovering and monitoring manta rays in the remote Conflict Islands	https://experiment.com/projects/discovering-and-monitoring-manta-rays-in-the-remote-conflict-islands	B + EC
SCV49	22/02/21	Are cryptic characteristics preventing the protection of two similar Sphingidae moths?	https://experiment.com/projects/are-cryptic-characteristics-preventing-the-protection-of-two-similar-sphingidae-moths/labnotes	B + EC
SCV50	09/03/21	Community-based Leishmaniasis research in Sri Lanka	https://experiment.com/projects/community-based-leishmaniasis-research-in-sri-lanka	B + M

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About the author

Ana Cristina Vivas-Peraza is a Lecturer of English at the University of Zaragoza (Spain). In her PhD, she examined the multimodal manifestations of persuasion in digital science communication, with the pedagogical purpose of training scientists and practitioners. Her main research areas include digital genres, persuasive science communication, multimodality, and English for specific purposes. Some of her publications on these research interests can be found in Language Value, Visual Review, Fachsprache, Círculo de Lingüística Aplicada a la Comunicación, and ESP Today.

avivasperaza@unizar.es

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