Conservation Communication

An Analysis of Marine Conservation NGOs' Social Media Campaign Framing and Associated Media Performance

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ABSTRACT

Marine conservation non-governmental organizations (NGOs) face unique challenges when building effective communication pathways to cultivate meaningful support. Such obstacles include locational and socioeconomic gaps in public understanding of marine issues, and disparities in ocean literacy. This research explored the relationship between the framing of Social Media content disseminated by marine conservation organizations and the metrics that measure audience engagement. By identifying media frames that enhanced engagement, marine conservation organizations have a better opportunity to increase outreach and influence on Social Media platforms. This study employed quantitative content analysis with a qualitative visual analysis component, investigating 306 Social Media posts from three distinct marine conservation NGOs. The results indicated that posts with a positive frame generated higher engagement rates compared to posts adopting a solution-oriented frame. Engagement was measured using the Key Performance Indicators of likes, comments, and shares. This study's findings provided valuable insights for marine conservation organizations aiming to optimize Social Media strategies.

Keywords: *Social Media, marine conservation, communication, frame, non-governmental organization*

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1. INTRODUCTION

The environmental issues surrounding marine conservation, especially among coastal regions, draws significant attention worldwide, (Steel et al., 2005). Consequently, marine environmentalism generates extensive dialogue within various settings, such as political and private sectors. Public discussions concerning ocean preservation are often politicized and filled with ideological tension (Bennett, 2019). The resulting debates risk impacting the manifestation of effective marine conservation practices, either indirectly or directly. With the rise of Social Media use among the masses, the message and impact of marine conservation initiatives have the potential to reach a broader audience in more organic methods (i.e., non-governmental organization (NGO) campaigns, word-of-mouth, and organization sites) as compared to political discourse. The ability to directly target a greater number of people than previously possible makes the examination of marine conservation Social Media initiatives' performance metrics on multiple platforms increasingly pertinent. This study further examined the dynamics that drive marine conservation efforts and their public reception, and sought to reveal ways to enhance the influence and efficacy of these vital initiatives in the digital era.

1.1 Environmental Issues & Public Understanding

Marine ecosystems are facing serious threats from human sties (Brander et al., 2010). The relationship between humans and our environmental footprint is a delicate one, especially in aquatic environments. The effects of our actions on marine life, including marine pollution and increasing sea levels, have been on the rise over recent years (Nash et al. 2017). The resulting environmental disruption that takes place through forms of inland pollution and worldwide negligence (i.e., anthropogenic climate change) has a severely negative impact on ocean life (Brierley & Kingsford, 2009). Ocean acidification, increasing water temperature, and an increase in storms affect the ability for marine life to survive in certain areas, and creates problems for coastal dwellers (Sumaila et al. 2017). Considering this, there has been growing international attention to ocean governance, including the need for regulation within ocean spaces due to a decline in marine resources (Bennett, 2019). This widespread rise in focus on oceanic issues and threats to marine life means conservatory action is more necessary than ever. Maine conservation

NGOs are essential to the manifestation of ocean preservation and conservation measures as they fill five primary roles, acting as advocates, enablers, experts, managers, and watchdogs (Crosman, 2013). However, these roles and the ability for marine conservation NGOs to influence policy development, improve community engagement, and contribute to scientific knowledge regarding the oceans is dependent on public support – requiring volunteers and donors to operate (Vance & Rangeley, 2019). It is therefore necessary that marine NGOs maintain and improve public involvement in order to sustain the fight for marine conservation.

As marine NGOs require more public support to counter the exploitation and neglect faced by ocean and marine life, it becomes increasingly necessary for the public to understand marine environmental issues and their importance. This presents a concern for marine conservation NGOs as oceanic awareness has a unique 'linguistic' challenge to be discussed, and increasing awareness requires expanding the reach of knowledge. While specific research regarding the public understanding of marine environmental issues is limited, a number of studies provide some guidance. A study produced by Steel et al. (2005) sought to determine the 'ocean literacy' levels present among adults in the United States, as previous reports indicated the need to improve public literacy in order to increase public support for ocean conservation efforts. 'Ocean literacy' being the public knowledge regarding oceans and the understanding of issues faced by marine life. The results determined that coastal state inhabitants demonstrated a higher level of understanding and self-assuredness regarding concerns over marine and beachfront management policies, as compared to those living inland. Additionally, coastal residents outperformed those living in landlocked regions when evaluated through a quiz concerning ocean-related issues, as well as possessed a greater familiarity with oceanic terms (Steel et al., 2005). The study further noted a relationship between marine policy-relevant knowledge and socio-economic status. Specifically, people with a lower socio-economic status tend to possess significantly lower levels of policy-relevant knowledge as compared to persons with higher socio-economic status. The study suggested moreover that there is a connection between location of residence and one's familiarity with ocean related issues (Steel et al., 2005). Within the United Kingdom, a similar study determined that there exists a significant interest in marine environmental issues amongst UK inhabitants, but that "gaps exist in terms of issue-specific awareness and that the availability of independent information on marine issues is limited" (Fletcher et al., 2009, p. 370). These

disparities in understanding highlight the need for marine nonprofits to broaden their reach and engage with more individuals, aiming to reduce knowledge gaps and garner support.

Given the discrepancy in marine conservation knowledge among different groups, particularly those living further from the coastlines and those in less affluent socioeconomic statuses, it is clear that resolving marine issues calls for widespread collaboration and restoration efforts to revive and preserve these delicate ecosystems. Marine conservation organizations, therefore, rely on effective communication campaigns to achieve the activism necessary to safeguard marine life (Stoll-Kleemann, 2019). Social Media platforms offer a convenient solution to this problem. These platforms are oftentimes resorted to by NGOs to expand outreach and, as prior studies have demonstrated, to connect with economically disadvantaged groups. In line with these observations, marine organizations can utilize Social Media platforms which are widely accessible regardless of economic or locational barriers, to materialize their purpose and mission.

However, producing effective content can unfortunately prove especially difficult for marine conservation organizations compared to other NGOs. This is due to the highly complex and unfamiliar nature of marine ecosystems to the average viewer and reader (Kolandai-Matchett & Armoudian, 2020). The ability to put forth complex information in a way that is effectively received and understood by the public presents a unique communication challenge; although effective communication for marine NGOs is crucial for motivating change, this challenge is frequently overlooked within environmental communication (Kolandai-Matchett & Armoudian, 2020). As social movements have coevolved with media, it is important to acknowledge that marine conservation efforts are no exception and maintain high levels of media activism (Quin, 2022). It is therefore important to determine what media content performs best in spite of 'literacy' barriers to boost their public impact. Social Media has played an influential role in the achievements of non-profits, with many activist communities having built organizations, established legitimacy, and mobilized action through digital media (including movements such as Occupy Wall Street, the Spanish Indignados, and Black Lives Matter) (Caren et al., 2020). It is therefore crucial for marine conservation initiatives to fully leverage the opportunities offered by Social Media; this requires maximizing post performance to reach wider audiences.

1.2 Social Media Reception

Communication through Social Media may help overcome the knowledge divide among varying socioeconomic classes and those living inland versus coastally, as well as create more universally intelligible information as it is communicated in a colloquial setting. Research shows that Social Media has brought about greater inclusivity in conversations surrounding environmental conservation as these platforms have transformed how we communicate by encouraging dialogue between diverse groups (Piechota, 2014). Additionally, Social Media facilities inclusive dialogues accessible to everyone without bias, as opposed to politics which can feel inaccessible and static to some. Social Media Platforms (SMPs) have seen exceptional growth in usage over the past years and are increasingly popular. Since 2016, "97.5% of young adults reported using at least one Social Media site regularly" (Shannon et al., 2022, p.5). SMPs have significantly improved the ability for NGOs to communicate with a wider audience (Raja-Yusof et al., 2016). A study in India confirms this, finding that the majority of survey respondents believe Social Media is a major communication tool (Baruah et al., 2012). This is due to the ability of Social Media to allow people with diverse demographics to engage with one another, regardless of their location or background (Crawford, 2009). Additionally, Social Media allows for information to be quickly disseminated as a global scale, as media content can significantly amplify the impact and rate at which messages are received; this is achieved through post sharing, the use of hashtags, and the viral nature of popular content (Crawford, 2009). Interactions on Social Media have therefore become crucial to organizational performance (Lovejoy & Saxton, 2012). It is suggested that posting a variety of content, recognizing donors, and showcasing the organization's story, as well as its' achievements can encourage more Social Media users to donate (Lovejoy & Saxton, 2012).

Further research suggested that including a compelling person or story can significantly increase awareness, such as with the non-profit Invisible Children which developed the short film Kony 2012, receiving worldwide attention (Pun, 2022). According to one study, around 60 percent of mobile traffic to non-profit campaigns comes from Social Media (Pun, 2022). As a result, NGOs, such as UNICEF with 11.3 million Instagram followers, frequently use Social Media's powerful broadcasting power to promote their campaigns (Dumova & Fiordo, 2009). The higher a posts' interaction on Social Media, the more likely it is to be rewarded by the Social Media sites' algorithm through expansion of the posts' user reach (i.e. showing the post to more people) (Barnhart, 2023). This highlights the significance of interaction metrics within Social Media posts,

as it is influential in gaining the broader public awareness necessary to foster a movement and garner support.

1.3 Research Question

This research examined the performance of different categories (i.e. frames) of Social Media posts from marine conservation NGOs. As previously mentioned, non-governmental organizations require public support to achieve their missions, which can be greatly improved through the use of Social Media. With the communication challenges and 'literacy' gaps faced by marine conservation NGOs, the ability to streamline and optimize Social Media outreach is essential. In order to accomplish this, knowledge regarding what type of post performed the best, therefore reaching the most people, is valuable. Specifically, this study sought to answer:

What type of Social Media posts from marine conservation NGOs generate the highest rate of engagement, as measured by key performance metrics (i.e., likes, comments, shares)?

The relevance of this study for marine conservation NGOs lied in its potential to enhance campaign outreach. The goal of this study was to shed light on the features of Social Media posts that led to increased user engagement, which could help these organizations refine their Social Media communication strategies and subsequently improve organizational support. Due to the prevalence of Social Media as an integral part of today's communication and with the combined need for effective communication for marine NGOs, posting relevant Social Media content is key to successful marine conservation campaigns. Additionally, there were no existing studies which have explicitly determined the type of marine conservation media posts that present the highest performance metrics. A study by Kolandai-Matchett & Armoudian (2020) investigated message framing differences for effective marine conservation communication in articles, while studies such as Nah & Saxton (2012) explored the use of Social Media by non-profits. However, there was a lack of research regarding the performance of *Social Media* campaigns in the context of *marine conservation*. Since marine conservation poses unique challenges such as terminology, locational and socioeconomic obstacles, the type of content that performs well for other NGOs

may not directly apply to marine conservation. Hence, the insights provided by this study were necessary to reveal Social Media performance trends useful to marine NGOs specifically; as well as helped to guide future research by having provided greater insight to the differences in communication faced by marine conservation NGOs.

2. THEORETICAL FRAMEWORK

As knowledge regarding the challenges faced by marine ecosystems has increased in scientific communities over the years, ocean literacy within the public sector remains an issue. This is because ocean literacy concerns the ability to understand the symbiotic-nature of our relationship with the ocean, as well as making informed and responsible decisions regarding the ocean, which can be difficult given the linguistic hurdles of marine conservation (i.e., trouble within public understanding of complex and often foreign oceanic concepts) (Stoll-Kleemann, 2019; Cava et al., 2005). This creates a unique problem in that organizations within marine conservation must pay special attention to the type of communications they produce, in order to effectively communicate their mission and gain the necessary support (Stoll-Kleemann, 2019). Frequently, NGOs face challenges with evaluation (i.e., assessing the effectiveness and impact of their initiatives), media attention, and brand recognition, as establishing a strong and positive identity requires a strategic communication presence (Fisher-Liu, 2012). For marine conservation efforts, these obstacles are amplified with the added importance of effectively communicating intricate issues, as not all marine environmental challenges are readily observable (such as altered patterns of ocean circulation and modified oxygen content at the surface) (Stoll-Kleemann, 2019). To improve engagement on Social Media and consequently harness its advantages, determining what type of posts perform best for marine conservation NGOs is beneficial; particularly, what type of *frame* receives the most engagement. Framing is a rhetorical device which functions to shape the way individuals think about an issue; in the context of media, frames describe how media presents knowledge or stories (S. Kim, 2015). Framing is therefore a primary feature which has been shown to shape communication (Scheufele, 1999). Distinct subsets of framing are used to guide the research in determining what type of marine NGO content receives the most interaction within a Social Media context.

2.1 Theories and Background of Framing

The initial concept of framing is often attributed to the field of psychological studies. Specifically, the work of Bransford and Johnson (1972) tested the recall ability of participants when presented with a number of unrelated sentences, as compared to sentences presented with a contextual

element (picture or title). The latter of which were determined to significantly improve recall ability amongst participating individuals. The results of this study pointed to the significance of the relation between pre-existing knowledge, a mutual understanding between author and audience, and reader perspective. That is, people use frames to organize and understand the world.

Prior to frames being widely accepted as a distinct and researchable concept, many studies operationalized frames with concepts such as agenda setting and priming (Iyengar & Kinder, 1987). Agenda setting differs from frames as it concerns deciding what events, knowledge, or information are presented; it is often associated with politics and public relations ("Agenda Setting Theory," 2019). Priming, however, occurs when exposure to a stimulus later influences future responses to a stimulus (e.g., seeing the image of a fish when thirsty, then thinking about drinking when seeing future images of fish) (*Priming - the Decision Lab*, n.d.). Whereas framing refers to the set of information individuals use to mentally organize and look at the world (S. Kim, 2015). Later work by McCombs (1997) suggested that framing is a subset of agenda setting, using the term *second-level agenda-setting* to illustrate the influence of prominent features in media coverage on its audience. Due to the lack of a clear definition of framing, some studies such as Feld and Popkin (1992) did not differentiate between agenda setting, priming, and framing at all (Scheufele, 1999). Research conducted by Sheufele (1999) on the contrary, operationalized frames as distinct from other closely related concepts (i.e., agenda setting and priming), and established frames as either an independent or dependent variable. Furthermore, Scheufele (1999) distinguished between media frames and audience frames, asserting that both the media and the audience mutually influence each other's framing (this is discussed in greater detail in 2.2).

Frames, according to research conducted by Gamson and Modigliani (1989), are deeply embedded within media as they provide a conceptual structure that assists audiences with mentally arranging and understanding an event. The authors go as far as to suggest that the frame given to media through titles, captions, and images is more important than detailed and lengthy content itself (Giles & Shaw, 2009). The first literature regarding the use of framing in communication is often believed to begin with Gamson and Goffman's (1975) paper which examines the different types of frames that define social situations. While framing in media and communications has only recently begun to become popularized, the study of framing paradigms in psychology has been common practice for years (Giles & Shaw, 2009). Much of this can be attributed to the work of Tversky and Kahneman (1981) which explored the effects of negative and positive message frames

and their influence on the decision-making processes of participants. Ever since, the impact of negative and positive frames has been utilized in various fields including health psychology (as per Ferguson & Gallagher, 2007), economic psychology, and within the broader field of social psychology (Giles & Shaw, 2009). Although framing has held an important role in psychological research, much of it does not involve any direct reference to media. Often these studies consider media to be a peripheral factor in the process of how societal messages, such as health related ones, are constructed and delivered to audiences (Giles & Shaw, 2009).

2.2 Framing in Media

The history of research into framing and its effect on media begins in the early 1900s through World War I. This period was dominated by war propaganda which resulted in an increasing apprehension regarding the influence of media communications on people's perceptions. The present stage (beginning in the 1980s) is centered around 'social constructivism' which considers both the mass media and audiences as influencing the way information is presented (Scheufele, 1999). Specifically, the social constructivist approach refers to the use of frames in media to guide audiences on opinions regarding social issues (Hansen & Cox, 2015). Through this modern understanding of frames, media has been noted to play an important role in framing our perceptions of reality; however, effects are limited as public opinion partially guides media framing (Scheufele, 1999). That is, the frame assigned to media content shapes how we understand and respond to that information, while our collective public opinion also influences the type of frame given to content by the media. With regards to effective communication, framing is used to help shape public opinion (Scheufele, 1999). Entman (1991, 1993) was one of the earliest researchers to present a systematic methodology for conducting framing research within the field of media and communication; since then, many studies in framing communication and media reference his work. In his 1991 paper '*Framing U.S. Coverage of International News: Contrasts in Narratives of the KAL and Iran Air Incidents*', Entman analyzed the biases in US media coverage (newspapers, magazines, and network TV news) of two international air disasters; the first involved a South Korean passenger airliner that was downed by a Soviet fighter plane, and the second was an Iranian passenger plane being shot down by a US naval ship. Entman combined both quantitative and qualitative methods, investigating how interviewees categorized the events

('deliberate' or 'a mistake'), as well as an analysis of the associated media texts regarding the stories. His research found that the incident involving the US was framed as a technical and logistical mistake (i.e. miscommunication within the chain of command), whereas the Soviet disaster was framed as a moral discourse, blaming 'Moscow' as opposed to the military personnel (Giles & Shaw, 2009; Entman, 1991).

The studies conducted by Entman (1991, 1993) led him to the conclusion that there are three to four defining characteristics of frames. The first element identified was that of 'problem definition'. In this, the frame takes on an angle such as a violent event belonging to a particular sect. Second, the frame emphasizes a certain interpretation, pointing out that a specific organization is at fault. Finally, Entman suggests that there is an identifiable moral evaluation of the event. Additional features noted in the categorization of media-based frames include categorization of the content through adjectives, and generalization to previous content and discord (Giles & Shaw, 2009). Further studies have sought to expand the scope of framing to include the perspective of audiences, including that of Scheufele (1999).

Scheufele (1999) developed a model which visualized the process through which frames are developed. The continuous model (see figure 1) has no formal starting point and defines the relationship between the media and audience in relation to frames. The diagram highlights four key processes), including frame building, frame setting, the individual effects, and the connection between individual frames and media frames (i.e. journalists as audiences). Frame building examines the influence of factors on media systems and journalists that can affect the type of framing that occurs. Frame setting involves the transmission of the significant frames assigned to the media from media to audiences. The individual level effects of framing refer to the individual perceptions that affect reception to frames. Studies researching this are frequently interested in input-output relationships, such as the Nelson et al.

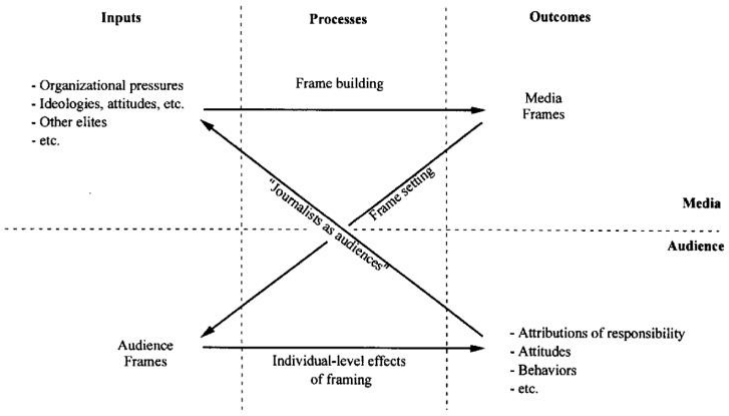

Figure 1. A process model of framing research.

(1997) study which analyzed how media frames can influence the importance of an issue based on individual frame beliefs, and how these individual level frames relate to tolerance for a Ku Klux Klan rally. Finally, 'journalists as audiences' refers to the ability for journalists themselves to be influenced by media frames, and take that bias into content development (Scheufele, 1999). One study noted this relationship through a 'news wave', a phenomenon in which a frame used by one news organization for an event is replicated by other media organizations. In this study, a small number of organizations framed a news story as a 'crime against the elderly', which was slowly replicated by other news organizations (Fishman, 1980). As a result of these relationships, mass media has a significant impact on the construction of social reality (Scheufele, 1999).

Although Entman's study on framing is seemingly unrelated to the application of frames in NGO content, there are still important lessons to draw from the discussed research. The findings consequently highlight the significance of framing media to elicit different results in both future media and the audiences. It is important to consider this as viewing different frame types of marine conservation media is assumed to also produce varied responses in support and interest.

2.3 Effectiveness & Framing in Climate Issues

The issue of climate change is saturated with emotion as it forces individuals to consider the potential of environmental destruction and the ensuing consequences for human life (Kleres & Wettergren, 2017). Therefore, the way in which climate issues are approached by activists, organizations, and media is fundamentally rooted in psychological strategies. Humans, by nature, tend to prefer doing as little thinking as possible, otherwise known as being 'cognitive misers' (Fiske & Taylor, 1991). Taking advantage of this desire, people will frequently subconsciously process information with the use of schema, which is a way of categorizing information related to each other. As frames also guide quick and easy interpretation, frames accentuate schema by encouraging different responses given the content and frame. As a result, the entity that framed the information can attempt to exploit the use of schemas as well, to more effectively influence how audiences will interpret the content (Entman, 1993). Particularly for news events, the framing process demonstrates how, out of various facets of a topic, a specific feature is selected over the others to define an issue or an event (Lee & McLeod, 2020).

Within climate change activism, 'dire messaging' is a frequently observed frame. However, it has been criticized as being too alarmist and pessimistic, which can lead to the dismissal of important messages (Feinberg & Willer, 2011). Specifically, dire messaging has been noted to negatively impact climate initiatives as they demotivate individuals, lower reported levels of concern, and decrease engagement (Markowitz & Shariff, 2012). Similarly, 'message fatigue' is the phenomenon of growing tired from receiving repetitive messages. Calder and Sternthal (1980) suggest that message fatigue is primarily brought about by extended and recurrent exposure. As message fatigue reduces attention and increases counter argumentation (So et al., 2017), NGOs may need to consider the frequency of posting and type of content.

The just-world theory is thought to explain some of the dismissal experienced by those who learn the negative impacts of climate change. This theory is a cognitive bias that assumes actions will have fitting consequences (i.e., positive actions rewarded, and negative actions punished). Research suggests that when an individual's idea of a just-world is threatened, they often become defensive and dismiss or rationalize the information that did not fit with the idea of a just-world (Feinberg & Willer, 2011). A 2017 paper by Kleres and Wettergren determined that there is a difference in how individuals in the global North consider climate change as compared to individuals in the global South. Activists interviewed in the global North viewed fear as a motivating factor but emphasized hope, positive messages, rejected guilt and approached anger cautiously. The study determined that while fear has been found to be an effective motivating tool in raising climate crisis awareness, the potential for fear to become paralyzing and result in the dismissal of action (e.g., dire messaging) is offset when mediated by hope. Essentially, "hope propels action while (collective) action generates hope and manages fear. The danger-alerting capacity of fear is embraced 'internally' but rejected as an effective emotion in mobilization" (Kleres & Wettergren, 2017, p.507). As compared to the global North, the South emphasized a combination of hope, guilt and anger to manage fear. Similar to the North, there is hope within collective action, however, interviewees felt more animosity towards the north, angrily ascribing responsibility to the North (Kleres & Wettergren, 2017). This suggests that a range of media posts containing fear-based as well as hope-based content will most effectively engage audiences and promote action.

2.4.1 NGOs in Social Media

Social Media possesses the unique ability to facilitate engagement among numerous individuals, allowing organizations to distribute interactive content to mass audiences. The ability for audiences to directly engage with content and organizations on Social Media increases individuals' perceived trust in and belief in the credibility of the organization (Heldman et al., 2013). While for-profit organizations (FPOs) and NGOs possess different end-goals, both exist within a competitive environment, and therefore must adopt strategies that adapt to new models in marketing, such as embracing Social Media (Given et al., 2013). Social Media platforms provide a wealth of opportunity to NGOs as they are available to be employed in campaigns at little to no cost. This is especially beneficial to small and mid-sized organizations that are found to battle most with large, well-established organizations, such as Peta (Given et al., 2013). Furthermore, Social Media allows organizations to more readily share their stories. This is an especially important factor as stories are powerful motivating tools for businesses (Baker & Grower, 2010). Stories are used to share knowledge and provide insight in ways which are more easily remembered and understood, as well as build more meaningful connections between organizations and viewers (Given et al., 2013). Stories, however, require a 'common language' to effectively convey messages. Storytelling on Social Media offers a solution to this as it provides a medium through which organizations can interact with audiences on a common ground (Whyte & Classen, 2012), which is especially important for marine organizations faced with ocean 'literacy' hurdles.

The opportunity for organizations to share a common language with audiences allows meaningful relationships between the organization and viewer to be formed. As such, Social Media engagement with organizations is seen as a strategic tool to create connections with audiences, and ultimately influence their decisions, interactions and levels of participation (Trunfio & Rossi, 2021). As media engagement allows organizations to develop more purposeful connections with audiences and expand their reach, it has become increasingly important to track Key Performance Indicators (KPIs) (Neiger et al., 2012). The primary reason for fostering brand engagement on Social Media is because it has a beneficial influence on customers' perceptions and emotions about a brand, such as their attachment to the brand or their attitude towards it. This favorable influence subsequently drives support, which ultimately leads to improved organization performance (Steinhoff et al., 2019; Gensler et al., 2013) In the context of Social Media, KPIs are commonly recorded as ratios or averages of likes, comments, and shares as they represent influence and

engagement (Neiger et al., 2012). KPIs are essential to an organizations' assessment of Social Media and the resulting benefits as they denote media engagement which, as previously mentioned, increases opportunity for media reach and therefore improves the opportunity for NGOs to gain more support and awareness (Sterne, 2010).

In summary: As the framing of an environmental issue can dictate the level of public attention it attracts, as well as shape public involvement (Hansen & Cox, 2015), it is important for NGOs to consider what type of media narrative is most effective in shaping public opinion in accordance with their desired outcome, i.e.: gaining public support and attention. Therefore, effective mass communication strategies that frame content to generate the highest performance metrics are key to garnering support, and essential to running a successful organization. The social constructivist nature of media suggests that the mechanisms utilized by NGOs shape the type of participation and awareness they receive. Consequently, the framing of Social Media posts is essential to the activity of an organization as different frames potentially garner higher performance metrics than others.

2.4.2 Hypotheses

Social Media provides a unique platform on which marine conservation NGOs can foster support among a wide audience, regardless of geographic location or socioeconomic status. At the same time, Social Media activism can improve ocean 'literacy' through an interactive and casual setting, creating more opportunity for support within public audiences. Social Media engagement creates more opportunities for organizations to connect with viewers, potentially increasing support and awareness (Trunfio & Rossi, 2021). The way marine environmental issues are presented online can influence public involvement (Hansen & Cox, 2015), making it imperative for NGOs to determine the most effective framing approach. Communication that successfully frames content to improve performance metrics are crucial for attracting support. In this setting, tracking Key Performance Indicators (likes, comments, shares) is essential as they represent influence and outreach opportunity (Neiger et al., 2012). Given that different presentations may lead to varying interaction outcomes, the framing of Social Media posts has the potential to significantly influence an organization's operations and effectiveness. Recognizing the relationship between frames and effective communication, a study by Kolandai-Matchett & Armoudian (2020) took a step forward

by identifying the relevant communication frames that heighten the effectiveness of messages related to marine conservation. Nine major communication frames were identified: emotional frames (negative and positive), problem-solution frames (severity and solution), outcome frames (loss and gain), value-based frames (anthropocentric), distance frames, and social norm frames. In Kolandai-Matchett & Armoudian's (2020) study, the most effective features of each frame were subsequently assessed, and the analysis of each frame included suggestions for environmental interest groups on how to ideally use them. The study found that 'negative emotional' frames (i.e., fear, guilt, shame) produced evidence of both improved or decreased responses. However, 'positive emotional' frames (i.e., love, empathy) suggests high effectuality.

This led to the first hypothesis:

> H1: Social Media posts by marine conservation NGOs containing emotionally negative framing will generate lower performance ratings than posts with emotionally positive framing.

The 'problem-solution' frame suggests that 'severity' frames which focus on the extremeness of an issue can overwhelm audiences and promote hopelessness when used too frequently (Lotze et al., 2018). It should therefore be reserved for issues with less public awareness, such as ocean acidification (Buckley et al., 2017). Whereas 'solution' frames - which positively frame actions - are more suited to conservation agendas with greater existing awareness, such as pollution and overfishing (Bolsen & Shapiro, 2018).

> H2: Social Media posts by marine conservation NGOs with solution framing for marine conservation issues perform higher than those with severity frames.

'Outcome' frames are based on the gains or losses from conservation action or inaction, respectively. Loss frames draw attention to the loss of environmental components in an effort to encourage conservation, whereas gain frames focus on improvements (Kolandai-Matchett & Armoudian, 2020). Blasiak et al. (2015) finds that increased awareness of the loss of marine life predicts willingness to use sustainable products, suggesting loss framing promotes action. Thus:

H3: Social Media posts by marine conservation NGOs with loss of environmental components framing perform higher than gain framing.

The ‘anthropocentric value-based’ frame holds that humans are the most valuable and that resources are there to support us (Kopnina et al., 2018). As people are often motivated to action by self-interest (Miller, 1999), content that appeals to anthropocentric self-interest such as the oceans’ ability to improve mental and physical health, as well as its ecological, economic and social benefits may appeal to audiences and therefore receive higher degrees of engagement. Ecocentrism, however, holds nature as the most significant with intrinsic value outside of (Kolandai-Matchett & Armoudian, 2020). For example, this can manifest as veganism, saving bees, or ecotourism (Drew, 2023).

H4: Social Media posts by marine conservation NGOs that employ the anthropocentric value-based frame perform higher than posts that do not include the anthropocentric approach.

The ‘distance’ frame offers a way to address the psychological issues of distance. To those that live physically distant to the oceans (spatial distance), marine conservation may not seem as tangible or significant (Schuldt et al., 2016). This may be improved upon by “providing examples of local impacts resulting from distal ocean problems” (Kolandai-Matchett & Armoudian, 2020, p.2450). This suggests the increased effectiveness of campaigns that utilize land-based impacts.

H5: Social Media posts by marine conservation NGOs that mention specific impacts to onshore activity perform higher than posts that are spatially distant without mention of land-activities.

Lastly, ‘social norm’ frames are based upon the tendency of people to conform to the behaviors of the majority (Kolandai-Matchett & Armoudian, 2020). The use of phrasing and imagery that suggests a collective can create a sense of social certainty that others are also participating in a

call-to-action (Straats et al., 1996). This suggests that communicating the popularity of a movement can help gain more support.

> H6: Social Media posts by marine conservation NGOs that feature the 'social norm' frame (i.e., framing the sense of collective action) will perform higher than posts with a call-to-action without mention of the majority.

Furthermore, previous research found the use of celebrity endorsements for humanitarian organizations to be an effective tool in gaining attention in advertising, such as Michael J. Fox advocating for Parkinson's disease associations (Del Mar Garcia De Los Salmones et al., 2013). Celebrities are often perceived as familiar by viewers, consequently appearing more trustworthy than non-recognizable figures; this reinforces a sense of legitimacy and significance to the campaign (Stibel, 2017). The use of celebrities in Social Media posts, therefore, may result in more positive perspectives within the audience.

> H7: Social Media posts by marine conservation NGOs containing celebrity presence will perform higher than posts without.

Due to the importance of framing within the social constructivist approach and the associated impact on public opinion, it is increasingly beneficial to have analyzed the performance of a post regarding the types of frames presented by marine conservation organizations through Social Media.

3. METHODOLOGY

3.1 Research Design

To effectively analyze the performance of different communication frames in the context of marine conservation SMP posts, this study employed the use of quantitative content analysis with a qualitative visual analysis component used in the analysis of certain frame types. Specifically, qualitative analysis was necessary for the analysis and coding of four frame types (positive, negative, severity, and solution) as the corresponding definitions did not provide an objective enough lens through which to categorize them; as compared to the remaining frame types which had non-subjective defining language (further described in 3.3.1: Operationalization of Frames). Qualitative visual analysis was essential to the determination of the four frame types, as visual analysis enhances multidimensional data (i.e., Social Media posts) by capturing the nuances of imagery and what this indirectly suggests to the audience (Glaw et al., 2017). Qualitative visual analysis was therefore used in conjunction with quantitative methods to more accurately identify frame types of subjective nature.

Quantitative content analysis was used throughout the study. Quantitative content analysis can be defined as a technique for the "systematic, objective, and quantitative description" of communication content (Rourke & Anderson, 2004, p.5). In this process, communication (i.e., text, images, and video) was broken down into categories that allowed each feature to be quantifiably processed (Rourke & Anderson, 2004). This method was therefore ideal for assessing and quantifying the performance metrics of Social Media posts as posts are reduced to the associated frames and quantified along with the engagement statistics and covariates (platform, organization, and follower count). As the hypotheses were based on between group differences, the employment of a quantitative framework was essential. While the qualitative visual analysis aspect was necessary in the operationalization of frames and to credibility code subjective frames, quantitative measures provided hard evidence for marine conservation NGOs to utilize.

3.2 Sample and Sampling Strategy

The posts of NGOs analyzed in this study consisted of the top three performing organizations solely devoted to marine conservation in the world, as defined by their number of

Instagram followers. Leading global marine conservation organizations as recorded by Marine Bio were each individually identified on Instagram, with the three organizations with the most followers being selected (*Marine Conservation*, n.d.). As this study aimed to analyze the performance regarding communication frames on Social Media outlets, Instagram popularity was considered a good measure as the NGOs consistently had the highest follower counts on Instagram as compared to other Social Media platforms. The three organizations identified were: 1) Oceana (3 million followers), 2) Sea Shepherd (1.1 million followers), 3) Ocean Conservancy (450k followers). The Instagram accounts of each of these organizations were verified by the platform, meaning the account is 'notable'[1] and representing a well-known and highly searched for person, brand or business (Meta, n.d.). Inclusion criteria therefore consisted of being in the top 3 follower counts on Instagram for marine conservation NGOs, being verified on Instagram, and being a global organization that is solely associated with marine life conservation. It is for the final reason that organizations such as World Wildlife Fund and Greenpeace were not included, given their multi-issue focus.

The Social Media platforms of the selected organizations assessed included Instagram, Facebook, and Twitter. Research indicated that NGOs worldwide consider Social Media as one of the most effective tools for fundraising; with most first-time donors coming from Social Media referrals ("2018 Global: Trends in Giving Report," 2001). Instagram is a primarily visual site, with photos and video as the main focus; however, the platform provides ample space for users to write captions, text and include audio with their post. Users are able to like, comment on, and share videos, although it is not possible for outside observers to see the amount of shares a post has received; share count was therefore not included in the data collection of Instagram. Instagram has become especially popular for connecting with brands, celebrities, and friends (Delfino & Antonelli, 2022). Facebook is more multifaceted, and focuses on allowing users to share images, written text, and articles. Users are able to interact with posts by sending a 'reaction' which is akin to 'liking' an image on Instagram but with more emotive options; commenting on and sharing posts are also possible. Twitter is a microblogging platform that prioritizes short text (limited at 280 characters) but allows for video, photo, and link options as well. Posts on this site are known as 'tweets' and are able to be liked, re-tweeted (shared), or commented on (*Twitter Overview*, n.d.).

[1] The word 'notable' is used by Meta in the requirements for profile verification; however, they give no clear definition of what makes a profile or person notable (Meta, n.d.).

Each of the organizations' main accounts were used, as opposed to country specific ones. This is because the main accounts consistently had the highest level of followers and posting frequencies, making them more suitable to answer the research question as higher follower counts and a greater number of posts were likely to provide greater interaction data.

Previous papers that employed content analysis made use of web scraping tools to gather mass data on posts, however, given the limited scope of this study, posts were analyzed manually (Xu et al., 2020). Thirty-four posts per platform per organization (306 total posts) were categorized into one of the nine frames identified in previous literature, as well as the additional 'celebrity' category. Once assigned a category according to the coding book as developed through the definitions provided by Kolandai-Matchett & Armoudian, 2020, post-performance was assessed (further defined in 'operationalization'). Text, images, and video clips that were part and parcel of the media posts sampled were included in the analysis. For every organization - Oceana, Sea Shepherd, and Ocean Conservancy - across all platforms - Instagram, Facebook, and Twitter - the initial 34 posts beginning January 1, 2023, were chosen for the study sample. If an organization did not make a post on this date, the post nearest this starting date (in 2023) was selected.

3.3 Operationalization of Relevant Constructs

3.3.1 Operationalization of Frames: Qualitative & Quantitative Features

Frames served as the primary independent variable. Each frame was operationalized based on the Kolandai-Matchett & Armoudian (2020) study and the following definitions, as well as qualitative visual analysis techniques for certain frame types. Specifically, emotional frames (positive and negative) and severity-solution frames were analyzed with the addition of visual analysis as the concepts and corresponding definitions are based on emotions which are not easily defined, and are open to interpretation by audiences (i.e., what is considered positive may differ between viewers). As seen with the constructivist approach, our perceptions influence how experience information (Hansen & Cox, 2015), it was therefore important that a framework was established in the interpretation of subjective stimuli. Since these four frames required an aspect of inductive reasoning, the use of qualitative visual analysis allowed for a comprehensive coding scheme that considered a variety of determinant aspects per frame type. Per Lu (2016), emotional frames are

used to persuade audiences by eliciting strong emotional reactions. As the emotional nature of a post can be considered subjective (Nummenmaa et al., 2018), an intensive analysis of imagery, colors, objects, and captions present in the post was used in tandem with the definitions per the Kolandai-Matchett & Armoudian (2020) study to determine the frame of the content. Specifically, as used by the Kolandai-Matchett & Armoudian (2020) study, negative emotional frames utilize guilt, fear and shame to guide viewers, such as by showing images of mutilated seal pups (Dauvergne & Neville, 2011). While posts that explicitly mentioned or showed dying and/or injured marine life were recorded as negative framing per the definition, there was ambiguity within posts that solely depicted 'guilt, fear and shame' as feelings are considered subjective (Nummenmaa et al., 2018). However, by analyzing the mood and imagery presented, it was possible to draw a conclusion.

According to Gilbert et al. (2016) negative emotions are commonly associated with darker colors such as black, brown, purple and blue. Considering the visual aspects such as color and tone helped to guide the assessment of post frames. Similarly, the definition of positive emotional frames required the use of visual interpretation in order to more suitably identify the frame. Positive emotional frames highlight love and empathy-based narratives (Kolandai-Matchett & Armoudian, 2020). While 'love' and 'empathy' can be partially identified through the text narrative and positive language (Trancă, 2018), there was room for subjectivity. It was therefore necessary to assess the mood of the post when determining the frame type. Positive emotions are frequently perceived by viewers as being brighter and/or lighter colors, such as yellow, red, orange, green and blue (Gilbert et al., 2016). It is worth noting, however, that while blue appeared in both negative and positive associations there exists a difference in the shade and brightness of a color in how it is understood. When making determinations, people often unconsciously associate brightness or lightness as positive, and dark with negative (Meier et al., 2004). Furthermore, severity frames were primarily identified through text and captions, as they made an urgent call-to-action; whereas solution frames were identified through text that emphasized the value of action (Jarreau et al., 2017). While these definitions generally allowed for objective analysis, a few instances required the use of visual analysis to better determine if the request for action was negatively (severity) or positively (solution) framed. In this case the same color, shade and overall imagery associations were applied (Meier et al., 2004, Gilbert et al., 2016).

The subsequent frames were more clearly identifiable based on the definition. Posts within the outcome frame category were identified by mention of the gain or loss of something due to environmental behavior (Cheng et al., 2011). Anthropocentric value-based frames were categorized when humans (specifically economic and human health benefits) are positioned as the main focus of the post (Aggestam, 2015). Distance frames were determined by the mention of inland effects of marine environmentalism (Jarreau et al., 2017). Social norm frames were identified when a post referred to existing or perceived behavioral norms (Lapinski & Rimal, 2005). Lastly, celebrity endorsements were categorized when a post featured a celebrity (Del Mar Garcia De Los Salmones et al., 2013). Overall, the primary traits identified within a post given its image and text determined what frame(s) the post was placed into (see figure 2). For example, an image that included a specific call-to-action in the caption was placed in the severity or solution frame based on whether that call to action was centered on an 'urgent call' (severity) or emphasized the more positive 'value of action' (solution). As some posts occasionally possessed multiple frames, the secondary frame was noted as well.

Figure 2. Frame Codebook

Frame	Meaning
Celebrity	*Content includes a verified* celebrity (verified on the respective platfrom)*
Positive (emotional)	*Content is based on positive feelings (i.e. love, empathy, celebration)*
Negative (emotional)	*Content is based on negative feelings (i.e. fear, guilt, shame)*
Severity (problem-solution)	*Content focuses on the extremeness of an issue and an urgent call to action*
Solution (problem-solution)	*Content focuses on the value of action (positive assocation)*
Gain (outcome)	*Content focuses on the gain of something due to environmental behavior*
Loss (outcome)	*Content focuses on the loss of something due to environmental behavior*
Anthropocentric	*Content focuses on humans (especailly economic & health benefits)*
Distance	*Content mentions inland effects of marine evironmentalism*
Social Norm	*Content refers to exisiting or percieved behavioral norms*
Visual Notes	*Dark colors (black, brown, purple and blue) suggest negative;*
	Yellow, red, orange, green, blue suggest positive;
	Dark shades suggest negative; light and bright shades suggest positive

3.3.2 Operationalization of Interaction

Interaction served as the dependent variable and was assessed in relation to frame type. Once all posts had been categorized, post-performance was measured based on quantitative success metrics - Key Performance Indicators (KPIs) - utilized in previous research, including number of likes, number of shares, and number of comments (Gräve, 2019). Performance was therefore assessed

through a quantity of measurable interaction indicators visibly present in the post; the total interaction (sum of KPIs) received on a post was combined with those of the same frame to create a total interaction variable per frame. In order to gain a holistic view of the influence of frame type on interaction within Social Media, Key Performance Indicators and associated frame types were analyzed as an aggregate, as opposed to analysis per each organization or platform. KPIs were quantified explicitly numerically; the content within a comment was not assessed, only the overall number of comments visible on a post. As Facebook makes use of 'reactions' as opposed to 'likes', any reaction type (i.e. like, heart, smile, etc.) was considered as a 'like' and was counted as an interaction. Similarly, the Twitter version of sharing, re-tweeting, was included as part of the share count.

3.3.3 Control Variables

Information was collected on the marine conservation organization, Social Media platform, and platform follower counts in accordance with the post and associated frame. Different marine conservation organizations may have posted a greater number of certain frame types given their brand image (e.g., Sea Shepherd is recognized as an intense hands-on and direct-action organization (*Who We Are*, 2023)). Therefore, posting content out of the ordinary in regard to the organization's image might have had a positive or negative influence the associated KPIs for certain frame types. Furthermore, the platform on which content was posted may have affected the overall engagement levels per frame type as Instagram, Facebook, and Twitter all report varying levels of engagement. Specifically, Instagram's average engagement rate per post is the second highest amongst Social Media platforms, at 0.83%, Facebook reports 0.13%, and Twitter with 0.05% (Statista, 2022). Additionally, follower count may have affected the ratio of interaction per post, as those with greater follower counts were more likely to receive greater rates of engagement. These covariates were included in the ANCOVA to determine if there was any significant interaction.

3.4 Reliability and Validity

Data was analyzed using SPSS Statistics. The validity of data gathered on interaction is increased as the Key Performance Indicators used (likes, comments, shares) have been used in previous researchers to effectively measure media post success (Gräve, 2019; Neiger et al., 2012; Sterne, 2010). The frame codebook was based on the findings of a previous communication frame study, specific to marine conservation media (Kolandai-Matchett & Armoudian, 2020), which further supported the validity of frame identification. The frames identified by Kolandai-Matchett & Armoudian (2020) for marine conservation media, however, appeared to have not yet been replicated by other studies; therefore, the codebook based on Kolandai-Matchett & Armoudian's (2020) definitions and observations may not have been completely inclusive of all features observed in marine conservation media and may have produced inconsistent results. As a limited number of studies exist regarding the use of media specific frames, and to add credibility to the qualitative aspect of frame identification, frame determination was reinforced by a second reader (intercoder reliability). A second reader assessed the selected posts using the frame codebook and ascribed a frame. If a difference was found in the type of frame selected for a post, both types were noted and included in analysis. An intercoder reliability test was not performed on the variables of post interaction, follower count, organization, and platform as they were entirely objective. Furthermore, to address the potential effect of time period differences (e.g., the day the post was made) on interaction rates, this research selected posts within a similar time frame to ensure relevancy and consistency in start time amongst the platforms and organizations. As this study sought to compare frames from multiple organizations across multiple platforms, selecting posts from similar time periods was necessary to reduce any potential positive or negative effect time period may have on frame and interaction; this increased the validity of results.

With regard to qualitative credibility, previous research regarding trends in what people visually perceive as positive and negative (e.g., color and brightness) were utilized to guide decisions in accordance with the definition from Kolandai-Matchett & Armoudian's (2020) study. Although this did not necessarily ensure that the frame type was exempt from differing interpretation, the joint use of definitions and qualitative visual analysis did provide a more sound and credible framework for frame analysis. As previously mentioned, the use of a second reader strengthened frame assignments. While this is beneficial, it is important to note that there still existed a degree of subjectivity in frame assignment.

3.5 Processing and Analysis of Data

Data collection began with gathering the thirty-four chronological posts (that met inclusion criteria) from each platform for each organization. This was done by screenshotting each post and transferring it to a chart (see Appendix A), separated by organization and media platform. Within the chart, interaction metrics were recorded including likes, comments, shares, and total interaction. Dates, follower count, and frame identifications were noted. After frame types per each post were established, data was transferred to an excel sheet by individual post identification, platform, organization, frame type(s), and total interaction (sum of the three KPIs). Upon uploading to SPSS, data was cleaned to remove any frame type that included fewer than 10 posts as the lack of data related to these frames would cause validity challenges; data was also checked for any missing or incorrect information (i.e., transfer errors) as compared to the original data collection. Data cleaning resulted in a reduction from 306 posts to 288. Descriptive statistics were first produced, then a Kruskal-Wallis H test was performed to compare variance of means for the different frames instead of an ANOVA due to limitations within the necessary assumptions (defined in 4. Results). Specifically, the Kruskal-Wallis H test compared the mean interaction associated with a frame type against the other corresponding frame and interactions. Prior to performing the necessary test, the assumptions for ANOVA were checked and considered insufficient (further described in 4. Results). As the assumption for 'same variance' of distributions was not met by the collected data, the post hoc test Kruskal-Wallis H test was run; this test negates the need for this assumption. In order to address the potential effects of covariates, an ANCOVA was run to determine possible effects of other categorical variables (platform, organization) on total interaction per frame.

4. RESULTS

Data from Excel was directly uploaded and cleaned in SPSS to avoid transfer errors. The categorical data of frames, platform and organization were re-coded into numbers so the proper tests could be performed. All results were interpreted under the significance level $p \leq 0.05$. Data analysis began with producing descriptive statistics then checked the three primary assumptions for ANOVA (*10.2.1 - ANOVA Assumptions | STAT 500*, n.d.):

1. There is a normal population distribution between each factor.
2. Distributions have the same variance.
3. Data is independent.

The first assumption was met according to the p-values of the Kolmogorov-Smirnov normality test for variable total_interaction (<.001) and Shapiro-Wilk Normality test (<.001). The third assumption was met as the data was collected as a randomized sample (i.e., posts were selected according to inclusion criteria at random). However, the second assumption, the assumption of same variance, was not met prior to and following data cleaning. This assumption was not met as the ratio between the sample standard deviations of the highest and lowest sample did not fall between 0.5 and 2 (severity at a SD of 1804.764 and positive at a SD of 18847.777; ratio of 0.096). To account for this, the non-parametric post hoc Kruskal-Wallis H test (otherwise known as a one-way non-parametric ANOVA) was performed as this statistical test did not require the assumption of equality (*One-way ANOVA - Violations to the Assumptions of This Test and How to Report the Results | Laerd Statistics*, n.d.). This test also required data to meet three assumptions (*Kruskal-Wallis H Test in SPSS Statistics | Procedure, Output and Interpretation of the Output Using a Relevant Example.*, n.d.):

1. The dependent variable is measured at the ordinal or continuous level (interval or ratio).
2. The independent variable consists of two or more categorical or independent groups.
3. Data is independent.
4. Groups have the same shape distributions.

The Kruskal-Wallis H test required four assumptions to be met. The first assumption was met as the dependent variable in this study (interaction) was measured at the continuous level (i.e. total number of likes, comments, and shares). The second assumption was met as the independent variable (frame type) consisted of five[2] (originally ten) separate groups. The third assumption was met as it was in ANOVA, with the data collected as a randomized sample. Finally, the fourth assumption was checked as part of the test in SPSS. Once the assumptions were confirmed to be met or accommodated, a Kruskal-Wallis H test was run to test the hypotheses, with an additional ANCOVA to determine the influence of covariates including platform, organization, and the follower count for each organizations' platforms. Factor analysis was not necessary as the observed variables (likes, comments, shares) had already been previously determined to measure observable post interaction (Gräve, 2019; Neiger et al., 2012; Sterne, 2010).

4.1 Descriptive

Descriptive data was run on the remaining 288 posts (299 including secondary frame assignments) following cleaning; this included only five of the original ten frames: loss (N = 13), negative (N = 45), positive (N = 188), severity (N = 13), and solution (N = 40). Due to this, any hypothesis regarding one of the excluded frames (celebrity, distance, social norm, anthropocentric, and gain) was rejected as there was insufficient data to conclude whether a significant relationship existed. The mean total interaction per frame resulted with solution reporting the lowest average (μ = 996.90, σ = 1513.73), followed by severity (μ = 1080.31, σ = 1637.12), loss (μ = 1273.69, σ = 1814.81), negative (μ = 2966.62, σ = 5967.37), and positive (μ = 4145.61, σ = 18751.30).

4.2 Kruskal-Wallis H Test

Prior to the Kruskal-Wallis H test, an ANOVA was run to verify the associated Brown-Forsythe test which checked the assumption of equality of variances (*Brown-Forsythe Test: Definition - Statistics How To*, 2019). The results of this test resulted in a significant p-value below 0.05 (p = 0.04), re-confirming that the variances were not homogenous and that the Kruskal-Wallis H post

[2] Frame types were reduced from ten to five as the categories celebrity (N = 2), distance (N = 5), social norm (N = 1), anthropocentric (N = 9), and gain (N = 1) as the associated sample sizes were insufficient to produce significant results ($p \leq 0.05$).

hoc test was necessary. The results of the hypothesis test summary for the Kruskal-Wallis H test resulted in a significance of p = 0.019 which rejected the null hypothesis that the distribution of total interaction is the same across categories of frame type. Specifically, it indicated a significant difference between at least one of the frames in relation to associated interaction. The assumption of independent samples (assumption 3) was further confirmed by the independent samples test summary output, which indicated a significance of p = 0.019.

The pairwise comparison only identified a significant relationship between solution frames and positive frames (p = 0.009). This suggested that there was a notable difference in the interaction received on these types of posts ($M_{difference}$ interaction total = 3177.19). The comparison did not determine any other significant relationships (≠ H1, ≠ H2, ≠ H3, ≠ H4, ≠ H5, ≠ H6, ≠ H7). That is: hypothesis one predicted that Social Media posts by marine conservation NGOs containing emotionally negative frames generated lower performance metrics than posts with positive frames; testing reported a negative effect between negatively and positively framed posts, indicating positive posts may perform better, however the p-value was insignificant at p = 0.053. The second hypothesis predicted that solution frames performed better than severity frames; results indicated a negative effect between severity and solution frames, suggesting solution frames obtained higher levels of engagement, though this was not statistically significant (p = 0.748). Hypothesis three speculated that loss frames would gain more interaction than gain frames; prior to removing frames with small sample sizes (gain, distance, anthropocentric, social norm, and celebrity) were initially tested. Gain in relation to loss reported a negative effect (loss may perform better than gain), with an insignificant p-value of p = 0.854. Similarly, hypothesis four forecast anthropocentric frames as a positive indicator of improved engagement compared to those without. All anthropocentric frames in relation to the others were statistically insignificant: severity-anthropocentric - positive effect with p = 0.487, solution-anthropocentric - positive effect with p = 0.505, gain-anthropocentric – positive effect with p = 0.882, negative-anthropocentric – positive effect with p = 0.791, anthropocentric-loss – negative effect with p = 0.937, anthropocentric-positive – negative effect with p = 0.542, anthropocentric-distance – negative effect with p = 0.517, anthropocentric-celebrity – negative effect with 0.335, anthropocentric-social norm – negative effect with p = 0.344. Hypothesis five predicted that posts which employed the distance frame (mentions inland effects) performed higher than posts that did not mention inland effects; the initial Kruskal-Wallis H test reported insignificant results. Specifically, severity-distance: positive effect with p = 0.214,

solution-distance: positive effect with p = 0.201, gain-distance: negative effect with p = 0.637, negative-distance: positive effect with p = 0.332, anthropocentric-distance: negative effect with p = 0.517, loss-distance: positive effect with p = 0.546, positive-distance: positive effect with p = 0.736, and distance-celebrity: positive effect with p = 0.639. Hypothesis six predicted that social norm frames that emphasized collective action would perform higher than posts with a call-to-action without the mention of the majority (i.e., social norm frames perform better according to KPIs than severity and solution frames). All were insignificant; severity-social norm reported a negative effect with p = 0.210, and solution-social norm indicated a positive effect with p = 0.220. Finally, the seventh hypothesis suggested that celebrity frames would perform higher compared to frames without. Results were statistically insignificant; severity-celebrity: positive effect with p = 0.166, solution-celebrity: positive effect with p = 0.168, gain-celebrity: positive effect with p = 0.458, negative-celebrity: positive effect with p = 0.240, anthropocentric-celebrity: negative effect with p = 0.335, loss-celebrity: positive effect with p = 0.350, positive-celebrity: positive effect with p = 0.443, distance-celebrity: positive effect with p = 0.639, and celebrity-social norm: negative effect with p = 0.843. Frames involved in hypotheses three through seven (omitting loss framing) were not used in the final Kruskal-Wallis H test as the sample sizes were insufficient; the five frames (gain, distance, anthropocentric, social norm, and celebrity) were therefore removed from further analysis, including the ANCOVA.

4.3 ANCOVA

An ANCOVA analysis was run to test the between-subject effects of various covariant factors on the independent and dependent variables (Statistics Solutions, 2021). Specifically, it checked the between-subject effects of platform type, organization, and follower count on interaction and frame. As part of the ANCOVA, Levene's test produced an insignificant p-value (p = 0.389) which indicated that the group variances were likely homogeneous, as the null hypothesis (the error variance of the dependent variable was equal across groups) was accepted. The ANCOVA therefore met the assumption of same variances, and the test was valid to be carried out. The tests of between subject effects produced no significant results; platform type p = 0.845, organization p = 0.219, and follower count p = 0.375. This suggested that the covariates did not account for any significant variation in the dependent variable (interaction).

5. DISCUSSION & CONCLUSION

This research explored the engagement impact of different framing strategies on Social Media posts from marine conservation NGOs. Specifically, the study examined the niche of marine conservation communication through Social Media content. It analyzed various types of content shared by these organizations on Social Media and evaluated the influence of different kinds of posts based on the level of engagement with that content. This study hypothesized that different frame types would perform better (as measured by interaction through Key Performance Indicators) compared to other frame types identified within marine conservation communication, based on previous research including that of Lotze et al. (2018) and Kolandai-Matchett and Armoudian (2020). Specifically, it hypothesized that: (H1) Social Media posts by marine conservation NGOs with emotionally negative frames would produce lower performance metrics than posts with emotionally positive frames; (H2) solution frames would perform better than severity frames; (H3) loss frames achieved higher rates of interaction than gain frames; (H4) anthropocentric framed posts preformed higher than posts without an anthropocentric frame; (H5) inland focused distance frames preformed higher than posts without mention of onshore effects; (H6) social norm frames that highlight a sense of collective action would generate higher levels of engagement compared to posts without a mention of the majority; and (H7) posts containing a celebrity presence would perform higher than posts without. Although the findings of this study did not conclude any statistically significant results in direct support of the hypotheses, it did determine that there was a significant difference in the interaction received on positively framed posts in relation to solution framed posts.

According to this study's analysis, positive posts received higher average rates of engagement compared to solution posts. This result does align with one of the previous findings by Kolandai-Matchett and Armoudian (2020) which indicated 'positive emotional' frames as having a high degree of effectuality. Therefore, while positive posts may not generate the highest levels of engagement as compared to most other frame types, they did appear to be more effective than solution frames in the context of marine conservation. Accordingly, it can be suggested that marine conservation NGOs should prioritize posting positively framed posts as opposed to solution-based posts. Furthermore, as previously mentioned by Kleres and Wettergren (2017), a combination of fear and hope messages are ideal for motivating action; while positive posts

performed higher than solution, ascribing to one post type may not be the best course of action for organizations. Given this, it may behoove marine conservation NGOs to post positively framed content more frequently in place of solution-based posts, while also presenting a variety of 'fear' inspiring posts (e.g., negative, severity, loss), along with 'hopeful' posts such as positive, gain, and solution, to best motivate action.

5.1 Implications of Research

The primary goal of this study was to determine what frame type of Social Media posts from marine conservation NGOs generated the highest level of engagement, as measured by the associated Key Performance Indicators. While this question was unable to be explicitly answered as the majority of the pairwise comparisons produced statistically insignificant results, the lack of significant results may lend greater insight into the type of frames marine conservation NGOs tend to post. That is, certain frames may not be utilized as frequently on Social Media sites for various reasons, such as the frame may not fit the organization image as well (e.g., Sea Shepherd) or that the organization is potentially unaware of the differences in frames (e.g., it appears rare for marine conservation organizations to post social norm framed content). While previous research suggested social norm content is an effective tool for creating a sense of collective action (Straats et al., 1996), it may be that marine conservation organizations are unaware of its associated benefits. Additionally, the ad hoc determinate of positive frames performing higher than solution frames did provide useful knowledge; consequently, marine conservation NGOs may opt to post positive frames more frequently than solution frames. It is worth noting that the positive frame category inadvertently received the greatest number of post samples. This may suggest that marine conservation organizations are being careful not to overload audiences with negative content that may result in dire messaging and subsequent loss of interest (Feinberg & Willer, 2011). Similarly, as hope is an important feature in motivating action (Kleres & Wettergren, 2017), marine NGOs may be using positive frames to increase feelings of hope, thereby encouraging involvement.

It is difficult to determine if 'framing' as the guiding theory behind this study was effective as the majority of the relationships returned statistically insignificant. However, given the previous literature and the historical connection between media and framing, the lack of statistically significant results in relation to the proposed hypotheses may be due to a study limitation. In

relation to the effective ‘marine conservation media frames’ identified by Kolandai-Matchett and Armoudian (2020), which came from conservation articles, the results of this study may also be indicative of a difference in the type of frames present and/or effective on Social Media for these types of organizations. That is, the frames previously determined by Kolandai-Matchett and Armoudian (2020) in articles and literature may not be as effective or prevalent within Social Media campaigns. This would provide new insight into the work of Kolandai-Matchett and Armoudian (2020), distinguishing between effective media frames in marine conservation articles versus Social Media. However, the lack of use of specific frame types by Social Media campaigns may also suggest an insufficient differentiation or definition of the frames identified by Kolandai-Matchett and Armoudian (2020), or error in coding. As the study of media frames in the marine conservation context is still an emerging field, more research is required to better define frames present on social media. This would improve identification and consistency within studies, as well as provide insight into what frames are primarily utilized.

In regard to the study process, the method for data analysis proved appropriate as the assumptions for each test were met and significant data was produced. Although the analysis did not explicitly support all previous research, it did lend more insight into the relationship between frames and Social Media for marine conservation NGOs; specifically, positive posts tend to perform better than solution frames, and a lack of certain frame types may suggest Social Media is better fit for fewer of the frame types analyzed in this study, or utilizes frames unidentified by Kolandai-Matchett and Armoudian (2020). The statistically insignificant results may be due to a number of potential limitations, such as a limited sample size per frame type, overall difference in the way frames are interacted with on Social Media, or the coding of frames.

5.2 Limitations and Future Research

A primary limitation of this study was the reduction of overall sample size due to insufficient frame specific sample sizes. Increasing the sample size so that a larger number of posts can be included within frame types would likely increase the significance value and may provide more information on the types of frames primarily used by marine conservation NGOs on Social Media. However, frame categories that received very few samples (i.e., less than 10) may have indicated that the frames themselves are not popular on the Social Media site for marine conservation organizations.

Additionally, a notable number of posts identified as positive shared similar characteristics that may warrant the addition of a new frame for marine conservation Social Media; notable traits included a light-hearted picture of an animal, and a 'did you know' or otherwise engaging fun-fact. Although these pictures elicited positive emotions, they may have performed differently as they included an engaging element (i.e., did you know?) and positive aspects; this may be referred to as an 'engagement frame'.

Additional potential limitations included the time of day and frequency of posting. Although the time period was moderated by selecting the posts within a similar time period (i.e., approximately the same begin date (January 1), and monitored across the same following months), the time of day the post was made was unable to be accounted for as only the poster can see the timestamp. However, the time of day a post was released at may have had an effect on the post engagement as the majority of users may be online at different hours of the day. This difference would potentially benefit posts made at peak hours as compared to posts made during less active hours, which may have consequently received less engagement due to fewer users being online. T frequency of posting may have further affected the observed interaction rate as message fatigue can reduce interest in the content (Calder and Sternthal, 1980). If an organization posted multiple times a day, it had the potential to wear-out users and reduce the overall level of interaction received per post. For this study, organizations that posted multiple times in a day may have inadvertently harmed the amount of interaction received on posts, thereby affecting the ability to have accurately determined the varying degrees of influence of frames on interaction.

As noted by Kleres & Wettergren (2017), there are differences in the way the global North and global South respond to conservation content, with the South more often emphasizing fear and guilt as motivating factors compared to the North. Geographical differences in the primary audiences responding to posts may have, therefore, affected interaction received per frame type. If an organization had a primarily North audience, for instance, they may have responded less frequently to negative frames as compared to Southern audiences. Therefore, understanding where the majority of an organization's audience is based may improve engagement.

Given the limitations and observations obtained through this study, it is recommended that future research be conducted to further determine the relationship between frames and effective Social Media content for marine conservation organizations. Future studies should consider increasing the sample size to confirm or reject the significance of more frames on interaction.

Additionally, it may benefit future research to include another frame ('engagement frame') as it may be that these types of posts perform better than emotionally positive posts (without a positive engaging feature). This would allow marine conservation NGOs to more accurately determine the frame type that maximizes their ability to gain widespread support. Finally, future research should consider the frequency of posting per day and what area of the world (global North or South) the organization's primary audience is most active in order to minimize the influence of potential confounding variables.

Social Media has been shown to be an effective tool in promoting environmental causes and prompting activism. Determining the best course of action for marine conservation NGOs to improve engagement on Social Media has the potential to greatly benefit marine conservation causes by bringing wider awareness to the world regarding marine issues, and by reaching potential donors and advocates that make their mission possible. It is imperative that marine conservation NGOs are able to enhance their online presence into the most effective positions possible, in order to take advantage of Social Media's global reach and ability to foster support. As research into effective media communication frames for marine conservation NGOs is a still emerging field, it is necessary that studies continue to uncover the relationships between frame and interaction in the context of Social Media.

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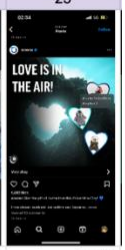
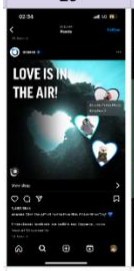
APPENDIX A:

Data Collection Chart

Oceana	4.5M		1	2	3	4	5	6
	Instagram	*Image*						
		Date	Jan 1	Jan 1	Jan 3	Jan 4	Jan 5	Jan 5
		Likes	1,661	5,628	1,082	2,613	2,622	4,195
		Comments	11	24	8	16	14	22
		Shares	x	x	x	x	x	x
		Total Interaction	1672	5652	1090	2629	2636	4217
		Frame Categorization	Solution	Solution	Solution	Social Norm	Positive	Positive

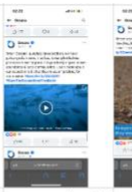
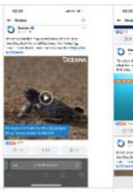
7	8	9	10	11	12	13	14	15
								
Jan 6	Jan 7	Jan 8	Jan 9	Jan 10	Jan 11	Jan 12	Jan 12	Jan 13
2,696	4,236	3,780	3,688	3,222	5,052	1,317	3,402	3,262
17	13	24	13	11	160	7	42	14
x	x	x	x	x	x	x	x	x
2713	4249	3804	3701	3233	5212	1324	3444	3276
Positive	Loss	Soltuion	Negative	Loss	Negative	Positive	Negative	Solution

16	17	18	19	20	21	22	23	24	25
									
Jan 15	Jan 17	Jan 18	Jan 18	Jan 19	Jan 20	Jan21	Jan 22	Jan 24	Jan 24
1,924	4,801	2,816	2,906	3,993	2903	1072	3251	1568	1482
17	64	85	26	62	17	21	14	7	13
x	x	x	x	x	x	x	x	x	x
1941	4865	2901	2932	4055	2,920	1093	3265	1575	1495
Distance	Positive	Negative	Severity	Solution	Positive	Positive	Anthro	Positive	Positive

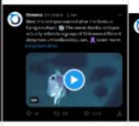
25	26	27	28	29	30	31	32	33	34
									
Jan 24	Jan 25	Jan 26	Jan 27	Jan 27	Jan 28	Jan 29	Jan 30	Feb 1	Feb 2
1482	27136	2463	2322	2333	2836	2282	4547	6284	2397
13	807	18	3	20	31	12	23	56	17
x	x	x	x	x	x	x	x	x	x
1495	27943	2481	2325	2353	2867	2294	4570	6340	2414
Positive	Negative	Positive	Positive	Severity	Solution	Positive	Positive	Positive	Positive

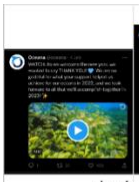
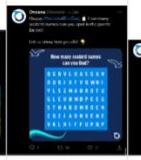
Facebook	*Image*								
	Date	Jan 1	Jan 1	Jan 2	Jan 3	Jan 4	Jan 4	Jan 4	Jan 5
	Likes	107	219	452	522	59	178	110	145
	Comments	7	5	11	9	0	6	4	3
	Shares	14	47	112	110	12	41	19	38
	Total Interaction	128	271	575	641	71	225	133	186
	Frame Categorization	Solution	Positive	Positive	Positive	Negative	Positive	Positive	Positive

									
Jan 5	Jan 6	Jan 6	Jan 7	Jan 7	Jan 8	Jan 9	Jan 10	Jan 10	Jan 11
119	99	111	102	162	82	40	290	116	455
4	4	3	7	0	7	9	8	5	17
8	25	22	47	24	19	8	101	15	76
131	128	136	156	186	108	57	399	136	548
Positive	Negative	Positive	Negative	Solution	Solution	Severity	Positive	Positive	Positive

										
Jan 11	Jan 11	Jan 12	Jan 12	Jan 12	Jan 13	Jan 14	Jan 15	Jan 15	Jan 17	Jan 18
117	129	151	25	124	99	177	178	33	211	76
2	8	3	0	12	1	3	3	3	15	2
19	19	57	1	14	10	43	34	3	53	13
138	156	211	26	150	110	223	215	39	279	91
Positive	Negative	Positive	Positive	Negative / loss	Positive	Positive	Positive	Distance	Positive	Positive

				
Jan 18	Jan 19	Jan 20	Jan 20	Jan 21
47	10000	179	98	62
1	87	2	0	2
5	2000	44	6	12
53	12087	225	104	76
Negative / loss	Positive	Positive	Positive	Positive

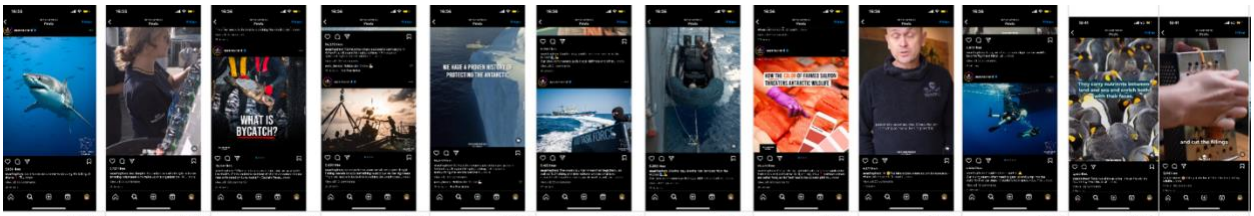
Twitter	*Image*								
	Date	Jan 1	Jan 1	Jan 2	Jan 2	Jan 3	Jan 3	Jan 4	Jan 4
	Likes	550	326	48	1018	264	81	36	199
	Comments	5	78	5	14	7	2	0	3
	Shares	121	1	1	197	61	13	7	46
	Total Interaction	676	405	54	1229	332	96	43	248
	Frame Categorization	Positive	Positive	Positive	Positive	Positive	Positive	Loss	Positive

									
Jan 4	Jan 5	Jan 5	Jan 5	Jan 6	Jan 6	Jan 6	Jan 7	Jan 7	Jan 7
100	51	275	165	103	227	107	175	284	273
1	5	3	4	2	2	1	3	3	22
37	10	65	36	23	63	24	66	63	41
138	66	343	205	128	292	132	244	350	336
Positive	Positive	Loss	Positive	Positive	Positive	Solution	Negative	Solution	Positive

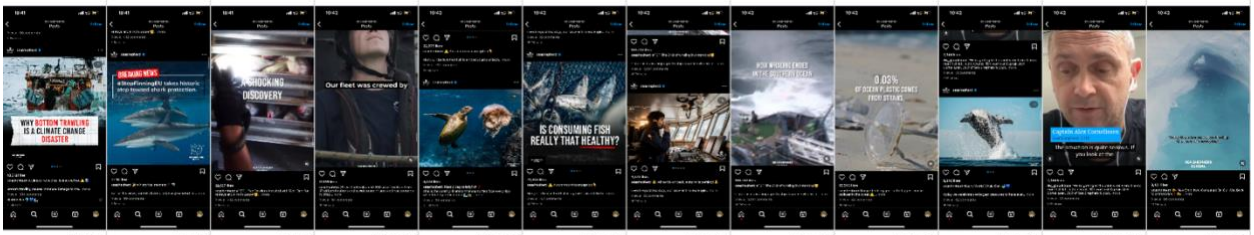
										
Jan 7	Jan 8	Jan 8	Jan 9	Jan 9	Jan 9	Jan 10	Jan 10	Jan 10	Jan 10	Jan 10
77	172	116	174	604	32	180	47	144	21	255
0	3	3	0	6	1	1	1	2	0	6
16	65	28	37	114	16	44	15	30	7	49
93	240	147	211	724	49	225	63	176	28	310
Solution	Negative	Positive	Positive	Positive	Solution	Positive	Negative	Positive	Positive	Positive

Jan 11	Jan 11	Jan 11	Jan 11	Jan 12
500	56	71	94	17
8	2	0	10	1
117	19	30	44	5
625	77	101	148	23
Positive	Solution	Severity	Negative	Solution / pos

Sea Shepard	2.5M		1	2	3	4	5	6	7	8	9	10
	Instagram	*Image*										
		Date	Jan 3	Jan 5	Jan 9	Jan 10	Jan 12	Jan 13	Jan 16	Jan 17	Jan 18	Jan 19
		Likes	5,299	13,863	7,161	7,432	7,493	5,194	8,353	16,530	4,508	8,329
		Comments	13	141	135	26	46	38	26	325	8	114
		Shares	x	x	x	x	x	x	x	x	x	x
		Total Interaction	5312	14,004	7296	7458	7539	5232	8379	16,855	4516	8443
		Frame Categorization	Solution	Positive	Anthro	Positive	Negative	Loss	Positive	Negative	Positive	Positive



Jan 22	Jan 23	Jan 24	Jan 25	Jan 26	Jan 27	Jan 30	Jan 31	Feb 1	Feb 2	Feb 3	Feb 6
7,950	5,727	19,769	5,251	64,572	5,425	8,266	26,576	4,177	5,609	5982	5148
42	28	188	13	1,151	55	61	461	23	18	22	68
x	x	x	x	x	x	x	x	x	x	x	x
7992	5755	19,957	5264	65,723	5480	8327	27,037	4200	5627	6,004	5,216
Positive	Positive	Negative	Severity	Positive	Positive	Positive	Distance	Positive	Negative	Loss	Anthro

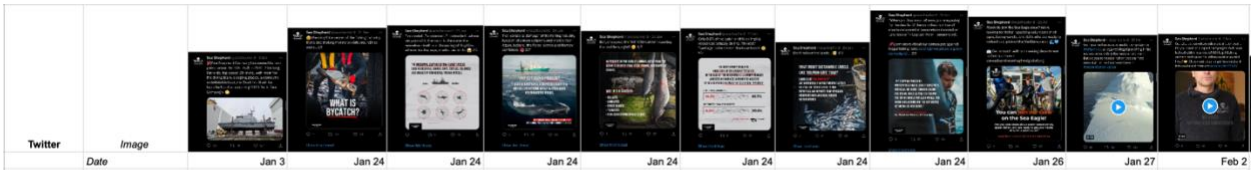


Feb 7	Feb 8	Feb 9	Feb 10	Feb 13	Feb 14	Feb 15	Feb 16	Feb 18	Feb 19	Feb 20	Feb 21
13312	7412	22107	11016	6229	22905	4270	184742	10943	9846	2044	8421
134	99	412	94	19	787	12	3134	84	52	31	80
x	x	x	x	x	x	x	x	x	x	x	x
13,446	7,511	22519	11110	6248	23692	4282	187876	11027	9898	2075	8501
Negative	Positive	Positive	Positive	Negative	Anthro	Positive	Positive	Negative	Positive	Loss / neg	Positive

Facebook	*Image*											
	Date	Jan 5	Jan 9	Jan 10	Jan 11	Jan 11	Jan 12	Jan 13	Jan 16	Jan 17	Jan 18	Jan 19
	Likes	1k	388	1.1k	398	543	458	244	395	160	294	476
	Comments	38	14	23	1	9	37	2	18	6	5	13
	Shares	116	14	24	26	26	79	61	35	51	22	87
	Total Interaction	1154	416	1147	425	578	574	307	448	217	321	576
	Frame Categorization	Positive	Solution	Solution	Positive	Positive	Negative	Gain	Solution	Negative	Positive	Positive

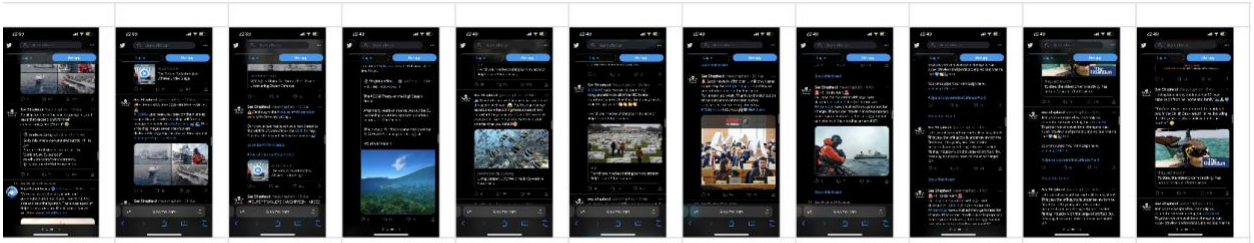
Jan 20	Jan 23	Jan 24	Jan 25	Jan 26	Jan 27	Jan 30	Jan 31	Feb 1	Feb 1	Feb 2	Feb 3	Feb 6
770	1k	277	206	568	465	264	328	115	153	430	149	165
14	14	7	9	25	5	9	37	20	1	4	9	5
36	39	65	41	116	38	24	136	14	13	9	15	7
820	1053	349	259	709	508	297	501	149	167	443	173	177
Positive	Positive	Loss	Solution	Positive	Positive	Solution	Distance	Negative	Solution	Positive	Loss	Severity

Feb 6	Feb 7	Feb 8	Feb 9	Feb 10	Feb 13	Feb 13	Feb 14	Feb 15	Feb 16
644	495	1400	410	140	144	609	198	164	576
9	13	29	5	2	0	7	9	4	36
35	124	137	23	12	11	35	97	18	90
688	632	1566	438	154	155	651	304	186	702
Positive	Negative	Negative	Positive	Positive	Positive	Solution	Anthro / neg	Positive	Positive



Twitter	Image											
	Date	Jan 3	Jan 24	Jan 24	Jan 24	Jan 24	Jan 24	Jan 24	Jan 24	Jan 26	Jan 27	Feb 2
	Likes	571	331	39	55	37	37	88	84	101	412	115
	Comments	10	7	1	3	1	1	3	2	3	26	9
	Shares	76	185	9	19	11	8	41	30	50	129	50
	Total Interaction	657	523	49	77	49	46	132	116	154	567	174
	Frame Categorization	Positive	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Solution	Positive	Solution

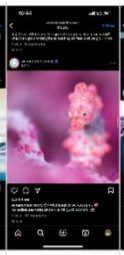
Feb 15	Feb 17	Feb 21	Feb 22	Feb 22	Feb 23	Feb 24	Feb 28	March 1	Mar 3	Mar 8	Mar 9
64	174	203	366	117	92	124	165	81	77	233	195
2	5	9	8	2	7	4	3	1	5	3	7
21	54	50	75	30	44	83	46	44	25	42	102
87	233	262	449	149	143	211	214	126	107	278	304
Severity	Loss	Positive	Positive	Positive	Loss	Negative	Positive	Solution	Positive / sol	Positive	Negative



Mar 13	Mar 13	Mar 16	Mar 21	Mar 22	Mar 24	Mar 30	April 4	April 4	April 4	April 6
182	225	162	101	96	255	161	183	54	41	316
5	8	7	3	4	25	5	3	2	0	8
72	127	92	37	55	70	54	77	12	10	70
259	360	261	141	155	350	220	263	68	51	394
Negative	Negative	Negative	Solution / pos	Loss / Severity	Positive	Positive	Negative / Sev	Negative / Sev	Severity	Positive

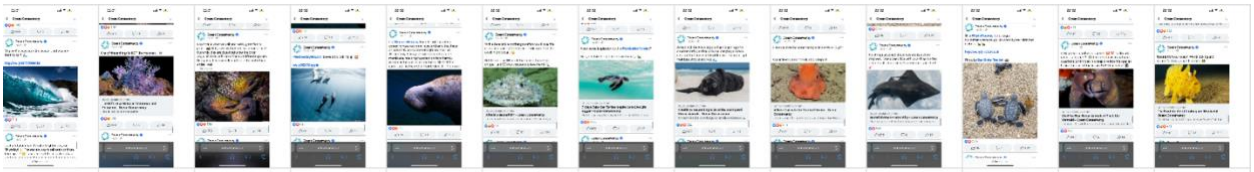
Ocean Conservacy	2M		1	2	3	4	5	6	7	8	9	10
	Instagram	*Image*										
		Date	Jan 1	Jan 4	Jan 9	Jan 17	Jan 24	Jan 27	Jan 30	Feb 6	Feb 10	Feb 13
		Likes	528	4,770	2,314	2,719	6,351	2,272	3,053	1,447	5,776	1,181
		Comments	4	32	21	30	96	24	18	18	41	8
		Shares	x	x	x	x	x	x	x	x	x	x
		Total Interaction	532	4802	2335	2749	6447	2296	3071	1465	5817	1189
		Frame Categorization	Solution	Positive	Positive	Positive	Positive	Severity	Positive	Positive	Positive	Positive

11	12	13	14	15	16	17	18	19	20	21	22	23
												
Feb 15	Feb 20	Feb 21	Feb 23	Feb 25	Feb 26	Feb 28	March 1	March 4	March 13	Mar16	Mar 17	Mar17
1,384	2,989	161,497	2,410	5,138	2,054	28,857	x	2,351	1,485	3359	1928	5195
9	21	803	22	39	16	206	7	18	12	17	12	43
x	x	x	x	x	x	x	x	x	x	x	x	x
1393	3010	162,300	2432	5177	2070	29,063	n/a	2369	1497	3376	1940	5238
Positive	Solution	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Distance	Positive	Positive	Positive

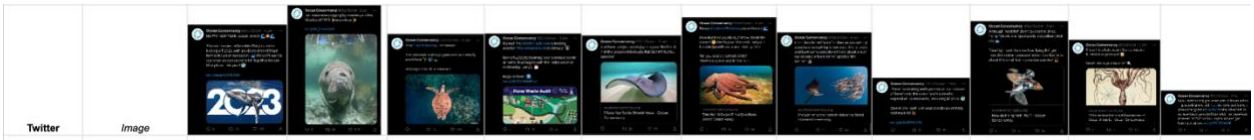
Mar 18	Mar 19	Mar 23	Mar 27	Mar27	Mar 29	Mar 30	April 6	April 7	April 12	April 16
										
2985	2861	1324	2006	1842	1829	2754	1588	2712	2316	1441
23	20	16	23	14	22	25	19	13	19	6
x	x	x	x	x	x	x	x	x	x	x
3,008	2881	1,340	2,029	1,856	1,851	2,779	1,607	2,725	2,335	1,447
Positive	Positive	Positive / sol	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive

Facebook												
	Image											
	Date	Jan 1	Jan 1	Jan 1	Jan 6	Jan 17	Jan 18	Jan 18	Jan 26	Jan 26	Jan 26	Jan 27
	Likes	131	1k	197	270	883	844	68	1k	500	115	162
	Comments	0	17	3	6	12	28	1	8	26	1	1
	Shares	4	54	14	38	148	98	0	114	59	9	21
	Total Interaction	135	1071	214	314	1043	970	69	1122	585	125	184
	Frame Categorization	Solution	Solution	Positive	Positive	Positive	Positive	Anthro	Positive	Positive	Positive	Positive

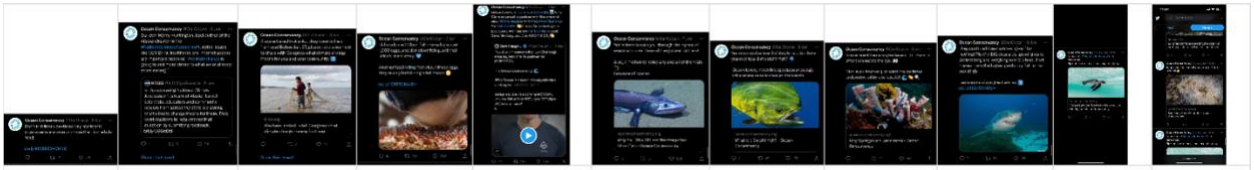
Jan 27	Jan 29	Jan 29	Jan 30	Jan 30	Jan 30	Jan 31	Jan 31	Feb 2	Feb 2
3k	1k	177	1k	2k	903	2k	526	532	679
87	23	1	41	72	24	44	12	14	9
745	103	17	496	476	89	344	33	91	73
3832	1126	135	1537	2548	1016	2388	571	637	761
Positive	Positive	Solution	Positive	Positive	Positive	Positive	Positive	Positive	Positive



Feb 4	Feb 5	Feb 5	Feb 8	Feb 13	Feb 16	Feb 20	Feb 26	Feb 27	Feb 27	Feb 28	Mar 1	Mar 2
715	149	550	681	1000	1000	655	222	611	198	3000	157	941
22	5	13	8	20	51	7	2	21	1	71	4	22
71	18	68	47	117	159	79	40	43	13	609	14	112
808	172	631	736	1137	1210	741	264	675	212	3680	175	1075
Positive	Positive	Positive	Positive	Positive	Positive	Positive	Solution / pos	Positive	Positive	Positive	Positive	Positive



Twitter	Image											
	Date	Jan 1	Jan 2	Jan 3	Jan 3	Jan 3	Jan 4	Jan 4	Jan 4	Jan 5	Jan 5	Jan 6
	Likes	287	645	206	21	90	96	60	90	66	139	23
	Comments	6	8	1	2	0	4	0	0	1	5	1
	Shares	53	99	32	13	28	19	11	18	10	39	3
	Total Interaction	346	752	239	36	118	119	71	108	77	183	27
	Frame Categorization	Positive	Positive	Positive	Solution	Positive	Positive	Positive	Positive	Positive	Positive	Solution



Jan 6	Jan 6	Jan 6	Jan 7	Jan 7	Jan 7	Jan 8	Jan 8	Jan 8	Jan 9	Jan 9
48	23	11	298	1952	138	174	83	181	172	40
0	1	0	8	101	3	11	1	2	2	0
12	9	7	43	229	27	32	22	22	28	7
60	33	18	349	2282	168	217	106	205	202	47
Positive	Anthro	Anthro	Positive	Celebrity	Positive	Positive	Positive	Positive	Positve	Positive

Jan 9	Jan 10	Jan 10	Jan 10	Jan 10	Jan 11	Jan 12	Jan 12	Jan 12	Jan 12	Jan 12	Jan 13
257	324	148	91	102	51	1271	101	58	35	79	67
9	10	2	2	1	2	26	3	1	0	1	2
27	48	53	24	24	11	123	35	24	10	16	14
293	382	203	117	127	64	1420	139	83	45	96	83
Positive	Solution	Loss	Anthro / neg	Positive	Positive	Celebrity / sol	Negative	Negative	Severity / Neg	Positive	Solution

APPENDIX B:

Frame Codebook

Frame	Meaning
Celebrity	*Content includes a verified* celebrity (verified on the respective platfrom)*
Positive (emotional)	*Content is based on positive feelings (i.e. love, empathy, celebration)*
Negative (emotional)	*Content is based on negative feelings (i.e. fear, guilt, shame)*
Severity (problem-solution)	*Content focuses on the extremeness of an issue and an urgent call to action*
Solution (problem-solution)	*Content focuses on the value of action (positive assocation)*
Gain (outcome)	*Content focuses on the gain of something due to environmental behavior*
Loss (outcome)	*Content focuses on the loss of something due to environmental behavior*
Anthropocentric	*Content focuses on humans (especailly economic & health benefits)*
Distance	*Content mentions inland effects of marine evironmentalism*
Social Norm	*Content refers to exisiting or percieved behavioral norms*
Visual Notes	*Dark colors (black, brown, purple and blue) suggest negative;*
	Yellow, red, orange, green, blue suggest positive;
	Dark shades suggest negative; light and bright shades suggest positive

APPENDIX C:

Kruskal-Wallis H Test Pairwise Comparison

Pairwise Comparisons of Frame_Numeric

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Severity-Solution	-8.852	27.602	-.321	.748	1.000
Severity-Negative	20.444	27.223	.751	.453	1.000
Severity-Loss	22.346	33.911	.659	.510	1.000
Severity-Positive	48.260	24.794	1.946	.052	.516
Solution-Negative	11.592	18.788	.617	.537	1.000
Solution-Loss	13.494	27.602	.489	.625	1.000
Solution-Positive	39.409	15.054	2.618	.009	.089
Negative-Loss	1.903	27.223	.070	.944	1.000
Negative-Positive	-27.817	14.348	-1.939	.053	.525
Loss-Positive	-25.914	24.794	-1.045	.296	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.