

Perspective

Humor as a leverage in shark pop culture: keep the tool but change the message

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Abstract: The priorities for animal conservation are significantly influenced by public opinion. These opinions depend on perceptions that can be biased, particularly regarding the risk that certain animal predators pose to humans. Although they attack humans only about 100 times a year on average worldwide, resulting in fewer than 10 fatalities, sharks occupy an oversized media space that influences this perception. Artistic works such as “Jaws” (Spielberg 1974) have helped to integrate the shark risk into pop culture, as mindless and blood-thirsty killers. Faced with a danger that is as rare as it is terrifying, humor has played a central role in popularizing non-validated scientific knowledge, embodied by the “Mistaken Identity Hypothesis”, which assumes that sharks confuse humans with natural prey and that attacks are therefore unintentional mistakes that should absolve sharks of responsibility. However, this hypothesis, which is at the heart of humorous pop culture, is probably false and suggests an over-estimated risk, correlated with the millions of sharks capable of making mistakes. The fact it is unintentionally does not decrease the perceived risk. A new scientifically proven paradigm highlights the existence of very rare “problem sharks” which, like land big cats, are simply repeat offenders. They target humans purposely but extremely scarcely which mathematically significantly decrease the real risk. If well explained, this theory has the potential to change the perception of shark risk towards a certain calmness that is conducive to promoting their conservation. Provided that humorous pop culture takes it on board.

Keywords: Attack motivation; biased perception; cartoon; mistaken identity hypothesis; science popularization; scientific communication; shark conservation.

1. Introduction

Steven Spielberg's 1975 film *Jaws* is a landmark of pop culture, deeply embedding itself into public consciousness and forever changing the perception of sharks. The movie's relentless great white shark antagonist created a pervasive sense of fear, contributing to a phenomenon known as the “Jaws Effect” (Neff 2015). This effect led to a significant increase in shark culling and a decline in shark populations globally, driven by a media narrative of sharks as mindless killers. In reality, the average number of bites on humans per year is less than 150, with less than 15% fatalities, while dogs are killing each year more than 20,000 people around the world. Currently, authorities are taking advantage of this biased perception of risk to implement after human fatalities indiscriminate measures to regulate large shark populations through massive culling, and to avoid implementing suitable measures to decrease global overfishing of sharks. These processes affect their density and the major role they play in marine ecosystems (Dedman et al. 2024). Measures aimed at their conservation have been put in place, but they appear to be either insufficient or inadequately implemented (Sequeira et al. 2025).

The 1771 *Encyclopedia Britannica* gives two definitions of the concept of “humor”, one referring to a physiological and concrete dimension (the ‘fluid’) and another to a more abstract and intangible dimension (the ‘wit’) (Smellie 1771). This dual allegiance foreshadows the complexity of giving a precise and unanimous definition of what is ‘humor’. In the context of our reflection, I will consider it as an operational tool which consists in simultaneously evoking a concept in the target person while provoking a feeling of well-being (manifested by smiling or laughing) linked to an underlying interpretation involving a joke, pun, irony, parody, or satire (Evrard 1996). It has been

clearly demonstrated that, through the relaxed atmosphere it creates, the use of humor increases the appreciation and purchase of certain products (Strick et al. 2009). On another note, humor is a teaching tool that can create a more positive, fun, interesting environment that promotes class attendance and student learning (Deiter 2000). In the same vein, it was shown how humor can have a successfully “humanizing” effect upon science education, both formal and casual, in a wide variety of media. It argues for the effectiveness of a comedic approach to science in order to reach wider audiences (Scott 2012). Within the scientific community itself, the use of article titles with a touch of humor would have a greater impact and result in more citations (Heard et al. 2023).

Unfortunately, the powerful use of humor has been (mis)used among the popular culture to depict sharks as dangerous and aggressive animals. This has strongly reinforced the public's negative perception of sharks. By portraying them as simple-minded, predatory figures, these depictions reduce complex apex predators to a one-dimensional menace. This abusive simplification of their status, often seen in pop culture, has a lasting impact, as it reinforces the above mentioned "Jaws Effect" and perpetuates a cultural fear of sharks. For example, sharks in cartoons are frequently shown with exaggerated teeth, a menacing grin, and a thirst for human targets, which trivializes their ecological importance and overlooks the scientific reality of their behavior. This humorous but inaccurate representation can make the public more resistant to conservation efforts (Panoch and Pearson 2017). As some studies have shown, media portrayals significantly shape public attitudes (see Futer et al. 2019) and should then play critical roles for public ownership of conservation challenges.

Here, I propose to take the example of the general public's perception of shark risk to show i) how humor is a strong leverage to popularize scientific knowledge in the pop culture, but also ii) how relevant it is to carefully chose the right messages in terms of insuring appropriate public ownership of what is at stake and meet suitable conservation goals for highly threatened species in a changing world..

2. Emergence of the “Mistaken Identity Hypothesis” (MIH)

Humans have always tried to understand why and how marine predators such as sharks attack humans. World War II (1939-1945) was marked, particularly in the Indo-Pacific region, by numerous human casualties linked to shark bites during naval battles involving shipwrecks and plane crashes. At the end of this tragic period, the first studies, notably funded by the US military, appeared on shark behavior and the first hypotheses regarding the mechanisms underlying bites on humans. Among all hypothesis, the “mistaken identity hypothesis” (MIH) was raised by Balbridge (1974) and widely popularized, both in the scientific community and among the public, by two other American researchers (Tricas and McCosker 1984). Based on the underlying assumption that sharks had poor eyesight, and that their vision could also be impaired by the frequent turbidity of coastal marine waters, the two researchers, grappling with the issue of frequent attacks on Californian surfers, hypothesized that these athletes were victims of a mistake on the part of the marine predator, which confused them with their natural prey, such as seals and sea lions. According to them, this mistake was even more plausible given that i) humans practiced their sport near a colony of marine mammals, ii) humans wore black neoprene clothing reminiscent of the color of their fur, and iii) the shape of surfers, seen from below, resembled that of these animals swimming in open water. Furthermore, a behavior observed quite frequently in white sharks *Carcharodon carcharias* was that after superficially biting a surfer, they would release them (the “bite-and-spit” concept, see Klimley et al. 2023) and swim away, with the event almost never resulting in the death of the victim. Faced with this atypical behavior on the part of a large predator, scientists struggled to find a logical explanation until the emergence of the MIH, which implicitly suggested that this instant abandonment of the prey was due to the fact that, at the moment of the bite and the inherent stimuli (such as taste and texture), the shark realized it had mistaken the identity of its prey. Thus, ‘bite-and-spit’ conveniently reinforced MIH.

At first glance, these arguments are simple and understandable by a wide non-expert audience, reinforcing the credibility of the hypothesis. This intrinsic credibility allowed the hypothesis to spread rapidly, both in the scientific and public realms, but also caused it to lose its status as a “hypothesis,” i.e., a concept that needed to be validated. Given the frenzied media coverage surrounding shark attacks on humans, the communications industry has seized upon the concept and, particularly through humor, turned it into a pop culture icon.

3. The popularity and nature of the MIH

In order to assess the prevalence of MIH in humorous depictions of shark bites on humans and to narrow down the scope of a potentially very wide investigation, I conducted a web search focusing only on visual supports (vs only verbal ones), while choosing a crucial tool in terms of humor, namely the cartoon. To do this, I chose the following keywords: “shark+humor+cartoons,” using two of the most popular search engines. Each cartoon was analysed in order of appearance in the search results and classified according to recurring themes that emerged during the search. Among the first n=40 images that show up on internet, 30% (n=12) of the total answers show cartoons based on the MIH (Fig. 1), while 20% (n=8) are based on the concept that “people are preys for sharks”, 7.5% (n=3) are based on the concept of the “Shark week” (annual TV show in the USA) and the remaining 42.5% (n=17) cannot be grouped as they are linked to independent triggers (Pers. Obs.). These results are not necessarily replicable with extreme accuracy, but they seem pertinent as they probably represent the overall trend toward a major contribution by MIH in the sphere of graphic humor surrounding shark attacks on humans.

Regardless of the humorous angle used to present MIH as the motivation behind attacks on humans, the recurring theme remains the concept of “unintentional blunders,” which falls under the category of dark humor and the discrepancy between the seriousness of the outcome (the death of the human victim in usually horrible circumstances) and the quite light-heartedness of the action (a simple mistake) that led to this unfortunate result. The process is a manifestation of incongruous humor that exploits the cognitive dissonance generated by the trivialization of ultimate consequences, relying on the absurdity of causal mechanisms (Schopenhauer 1902). It is undeniably a means of minimizing the intrinsic atrocity that a shark attack on humans can represent. Nevertheless, while the objective remains laudable, I will show that the arguments used may ultimately prove counterproductive for sharks in the long term.



Figure 1. Examples of cartoons based on the MIH concept. Note A) evidence of the distortion of MIH, which was originally based on surfers, whereas the victim is a diver. B) Direct mention of the exemption from liability of biting sharks as soon as they “make a mistake.” C) Note the semantic shift between MIH, which originally only concerned sirenians (seal-like marine mammals) vs surfers, whereas today a multitude of water activities could lead to misjudgements by sharks (copyright ownerships are mentioned on the drawings).

4. The biased message of the MIH and its likely anthropomorphic fallacy

In addition to its simplicity, the MIH theory had a consequence that appealed to most shark advocates: if sharks made a mistake in biting a human, these predators could not be considered “responsible” for their actions. This argument may also seem appealing, but unfortunately it carries with it a disturbing subtlety: if sharks make mistakes, particularly for intrinsic reasons such as poor eyesight, then all sharks can make mistakes and every shark individual within a population is a potential biter. Therefore, the danger is omnipresent and embodied by all sharks, a realization that is particularly and unconsciously anxiety-provoking. Thus, by seeking to absolve sharks of all responsibility to increase empathy towards them, MIH advocates reinforce the bias that tends to exaggerate their real danger and, in fact, the fear they unduly generate.

A recent study attempted to validate the MIH hypothesis (Ryan et al. 2021). It was successfully published despite two major weaknesses. The first weakness is that the study remains highly theoretical, using computer simulations to demonstrate the “visual” similarity between the profile of a sea lion -as a natural prey- and that of a surfer -as an unexpected human target-, which, even if this resemblance exists, does not mean that it actually causes the animal to make a mistake in a predatory situation. The second, more serious weakness is that the study completely ignores the existence of highly effective senses such as hearing and mechanoreception, which enable sharks to easily distinguish between surfers and marine mammals. One of the authors of the study has in fact proven this in her thesis with a chapter focusing on hearing capacity to discriminate a natural prey from human sea-users (Chapuis 2017). In other words, MIH is based on the unproven assumption that sharks rely solely on vision to detect their prey, which is highly unlikely. These arguments led to the conclusion that MIH is an anthropomorphic fallacy, and it shouldn't get as much attention as it does (Clua and Meyer 2023). But if this hypothesis, which indirectly leads to equal probability for all individuals of a given shark population to bite humans, is not satisfying, how can we explain shark predation bites on humans?

5. A new science-based and virtuous paradigm

Based on research into personality traits that drive not only human behavior but also that of many non-human vertebrates, a hypothesis emerged that marine predators such as sharks might also obey this rule, which runs counter to the instinct-driven uniform and standardized behavior assumed by MIH. This approach gave rise to the application to the marine environment of the concept of the “problem individual”, which has proven itself in the terrestrial environment in the context of predation on humans by animals such as big cats, bears, and wolves (Swann et al. 2017). Without neglecting the importance for a shark targeting a human prey to be sufficiently hungry and to benefit from favorable environmental conditions (such as water turbidity or the fact that its potential victim is isolated and vulnerable), the “problem shark hypothesis” (PSH) highlights the idea that the risk of predation on humans at sea is mainly embodied by a few rare individuals (within large shark populations) who possess unusual personality traits in terms of boldness and risk-taking, enabling them to attack non-instinctive prey such as humans, which will remain inaccessible to 99.9% of the shark population, whatever the facilitating environmental factors. In reality only five species (the white, tiger, bull, oceanic whitetip and mako sharks) would consider humans as preys, and only very few individuals among these few species would take action, based on strong personalities (Clua and Linnell 2019). Following the validation of this hypothesis in 2019, the existence of these bold and potentially repeat offenders has recently been demonstrated (Clua et al. 2024). This paradigm shift regarding the origin of predatory bites (the most deadly) is also made coherent by the low number of annual attacks on humans, which, given the millions of interactions between humans and sharks each year, would undoubtedly be higher if these bites really depended on intrinsic deficiencies in the animal combined with favorable (and frequent) environmental conditions (for an attack) such as water turbidity or people vulnerability. In more concrete terms, this paradigm shift implies that MIH is probably false (Clua and Meyer 2023). As some new cartoons suggest in accordance with this new PSH, sharks are far from being able to confuse humans with their natural prey (Fig. 2A) and their multiple (in addition to vision) senses allow them to effectively discriminate between preys (Fig. 2B). Thus, the majority of bites are not the result of unintentional misjudgement but of a desire, on the part of a few rare sharks, to either purposely explore the palatability of an unknown prey by “tasting” it (Fig. 2C and 2D) or just, exceptionally, predate it directly, with a high probability of repeating if it was successful (Clua et al. 2024).



Figure 2. Humorous drawings based on the unlikeliness of the MIH by A) showing how different the shape and appearance of a urfer should be in reality compared to seals; B) suggesting that sharks have many other senses they can use to properly ID their prey. C) and D) are both suggesting the likeliness of the hypothesis of exploration which better fits to a top marine predator behavior (copyright ownerships are mentioned on the drawings).

Although worrying in principle due to the existence of sharks that are potentially predators of humans, the PSH represents an intuitive significantly lower probability of being bitten by a shark than that suggested by the MIH. However, the public still needs to embrace this reasoning which decreases significantly the shark risk and might facilitate their conservation through an improved public support.

6. Conclusion

In terms of the relationship between humans and nature, sharks occupy a special place in pop culture, partly thanks to the humorous approach embodied by cartoons. In a changing world, grappling with growing conservation challenges, a concerted effort is needed to align these two parallel worlds, ensuring in particular that the messages conveyed by pop culture are fully in line with conservation needs. In this context, humor should remain an essential tool.

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