JOÃO PEDRO CORREIA DAS NEVES

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REPRESENTAÇÕES SOCIAIS E MODELO DE CONTEÚDO DO ESTEREÓTIPO COMO CONTRIBUTOS FUNDAMENTAIS PARA A CONSERVAÇÃO DOS TUBARÕES

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"Declaração de autoria de trabalho"

Declaro ser o autor deste trabalho, que é original e inédito. Autores e trabalhos consultados estão devidamente citados no texto e constam da listagem de referências incluídas.

Dedicatória

Para a Joana e Mara!

Para o Sharky, o Sr. Tubarão, que desde sempre acompanhou e protegeu os sonhos da Joana.

Until you make the unconscious conscious,
it will direct your life and you will call it fate.
Carl Jung

Agradecimentos

A toda a minha família porque, segundo consta, é socialmente correto começar por aqui.

Às minhas princesas, que são três...

Ao meu orientador, pela coragem em aceitar este tema em particular. Pela paciência no acompanhamento de um biólogo. Pela sapiência na condução da linha de investigação.

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Por fim, e para que não corra o risco de me esquecer de alguém, agradeço, do fundo do coração, a ..... (escrever nome completo aqui).

Resumo

Tubarões, raias e quimeras, juntos conhecidos como peixes cartilagíneos (devido ao seu esqueleto de cartilagem), enfrentam hoje "uma crise de extinção global". Cerca de 40% das mais de 500 espécies conhecidas de tubarões encontram-se hoje sob ameaça de extinção. Elementos essenciais para o bom funcionamento dos ecossistemas em que se inserem, este marcado declínio populacional dos tubarões pode originar desequilíbrios sistémicos que nos afetam, direta e indiretamente, de forma incontornável. Mas para lá do necessário reforço de medidas mitigatórias na exploração dos recursos marinhos, há ainda uma outra dimensão, a humana, de capital importância para o futuro dos tubarões. A imagem negativa que o tubarão carrega na sociedade em geral é, na realidade, um importante travão a muitas das medidas de conservação até hoje implementadas. Pese embora seja notório, nos últimos anos, um acréscimo na dedicação científica em temas relacionados com a conservação dos tubarões, pouca atenção tem sido dada a esta dimensão humana do problema. É, pois, fundamental compreender em maior detalhe a imagem partilhada dos tubarões na sociedade, nomeadamente na sua representação social e no seu estereótipo. Para além disto, é ainda crucial compreender a relação entre esta imagem negativa e as atitudes em relação à sua conservação, bem como nos comportamentos de ajuda direta (e.g., apoio financeiro a projetos de conservação).

O presente trabalho teve como principais objetivos investigar e caracterizar alguns dos fatores psicológicos envolvidos na perceção dos tubarões, identificar os fatores que podem influenciar esta perceção, determinar possíveis relações entre esta e as atitudes e comportamentos de apoio na conservação. Por fim, compreender como estes fatores podem ser usados para modificar esta perceção marcadamente negativa. Através de uma sequência de 6 investigações, integradas em 3 estudos empíricos, foram amostrados um total de 1681 participantes (979 estudo 1a; 60 estudo 1b; 144 estudo 2; 45 estudo 3a; 150 estudo 3b; e 303 estudo 3c). O estudo 1a descreve, pela primeira vez, a representação social do tubarão. O estudo 1b identifica o estereótipo de género no qual o tubarão é percecionado, assim como as suas marcadas características agênticas. O estudo 2, através do Modelo do Conteúdo do Estereótipo e do mapa BIAS, descreve em maior detalhe o estereótipo do tubarão nas duas dimensões super-ordinais, Calor e Competência, e como estas influenciam a predisposição emocional e comportamental de quem o perceciona. O estudo 3a valida alguns dos instrumentos de investigação para aplicação no estudo 3b, o qual explora o uso de uma narrativa das características sociais do tubarão, aliado ao uso do humor como distrator emocional, na modificação da dimensão Calor. Por fim, o estudo 3c procura replicar os resultados anteriores em contexto experimental naturalista.

Os resultados obtidos ao longo deste trabalho permitem relevar a importância do conhecimento mais aprofundado dos fatores psicológicos por detrás da perceção geral do tubarão, fatores estes que condicionam sobremaneira as estratégias de conservação do grupo zoológico. Entre os vários

resultados, destacam-se a existência de estereótipo ambivalente, o seu consistente estereótipo de género e a relevância da dimensão Calor para uma melhoria na perceção geral deste animal. As implicações gerais destes resultados são discutidas.

Palavras-chave: Tubarão; Conservação; Representação social; Modelo de Conteúdo do Estereótipo; BIAS Map; *Warmth* e *Competence*.

Abstract

Sharks, rays and chimeras, together known as cartilaginous fish (because of their cartilage skeleton), face today "a crisis of global extinction". About 40% of the more than 500 known species of sharks are now under threat of extinction. Essential elements for the proper functioning of the ecosystems in which they operate, this marked decline in the population of sharks can lead to systemic imbalances that affect us, directly and indirectly, in an unavoidable way. But beyond the necessary reinforcement of mitigation measures in the exploitation of marine resources, there is still another dimension, the human one, of capital importance for the future of sharks. The negative image that the shark carries in society in general is, in fact, an important barrier on many of the conservation measures implemented to date. Despite the fact that, in recent years, there has been an increase in scientific dedication to issues related to the conservation of sharks, little attention has been paid to this human dimension of the problem. It is therefore essential to understand in greater detail the shared image of sharks in society, namely in their social representation and stereotype. In addition, it is crucial to understand the relationship between this negative image and attitudes towards conservation, as well as direct help behaviors (e.g., financial support for conservation projects).

The main objectives of the present work were to investigate and characterize some of the psychological factors involved in the perception of sharks, identify the factors that may influence this perception, and determine possible relationships between this and attitudes and behaviors in support of conservation. Finally, understand how these factors can be used to modify this markedly negative perception. Through a sequence of 6 investigations, integrated in 3 empirical studies, a total of 1681 participants were sampled (979 study 1a; 60 study 1b; 144 study 2; 45 study 3a; 150 study 3b; and 303 study 3c). Study 1a describes, for the first time, the social representation of the shark. Study 1b identifies the gender stereotype in which the shark is perceived as well as its markedly agentic characteristics. Study 2, through the Stereotype Content Model and the BIAS map, describes in detail the shark stereotype in the two super-ordinal dimensions, Warmth and Competence, and how these influence the emotional and behavioral predisposition of those who perceive it. Study 3a validates some of the research instruments for application in Study 3b, which explores the use of a narrative of the shark's social characteristics, combined with the use of humor as an emotional distractor, in modifying the Warmth dimension. Finally, study 3c seeks to replicate the previous results in a naturalistic experimental context.

The results obtained throughout this work allow us to highlight the importance of a deeper knowledge of the psychological factors behind the general perception of the shark, factors that greatly affect the conservation strategies of the zoological group. Among the various results, the existence of an ambivalent stereotype, its consistent gender stereotype and the relevance of the

Warmth dimension to an improvement in the general perception of this animal stand out. The general implications of these results are discussed.

Keywords: Shark; Conservation; Social representation; Stereotype Content Model; BIAS Map; Warmth and Competence.

ÍNDICE GERAL

ÍNDICE DE TABELAS

ÍNDICE DE FIGURAS

1. INTRODUÇÃO

‘*Por que razão algumas criaturas nos fazem dizer 'Aah' e outras nos fazem dizer ‘Ugh!'?’* (Morris, 1967, p. 153). O autor continua, afirmando que esta *'não é uma consideração trivial. Uma grande quantidade de energias interespecíficas da nossa cultura atual está envolvida aqui. Somos apaixonados por animais e detestamos animais, e estes envolvimentos não podem ser explicados apenas com base em meras considerações económicas e exploratórias. Claramente, algum tipo de resposta básica inesperada se desencadeia dentro de nós pelos sinais específicos que recebemos. Iludimo-nos de que estamos a responder ao animal como um animal. Declaramos que é fascinante, irresistível ou horrível, mas o que o torna assim?*' (Morris, 1967, p. 153).

Parece estar profundamente enraizado na nossa natureza tentar identificar e definir padrões de comportamento e/ou temperamento em muitos animais. Há, pois, um diálogo íntimo, implícito e constante entre humanos e animais que define muito do nosso imaginário comum e que influencia, de forma indelével, contos, histórias e lendas. Assim como Edward O. Wilson afirmou (Wilson & Kellert 1993, p.31) ‘*da atração à aversão, da admiração à indiferença, da paz à ansiedade gerada pelo medo’*, os animais sempre foram uma fonte de estereótipos carregados de emoções e preconceitos.

Atitudes, estereótipos e preconceitos em relação aos animais, especialmente em relação à vida selvagem, não apenas influenciam a coexistência entre seres humanos e animais (Bencin et al., 2016), mas também são uma questão de maior importância em termos de conservação da natureza (Batt, 2009). É precisamente o diálogo entre atitudes e comportamentos assumidos que define grande parte do sucesso (ou insucesso) dos esforços de conservação. Isto é particularmente importante nos casos em que as interações animal-humano resultam em conflitos, portanto, compreender alguns dos processos psicológicos de definem e orientam a perceção de um determinado problema (seja ele um animal ou outro objeto focal) é um pré-requisito fundamental para desenvolver estratégias eficazes para o delineamento de programas de conservação (Kretser et al., 2009). É uma imagem marcadamente negativa, e culturalmente difundida, que define atualmente uma das questões mais importantes no que concerne a conservação dos tubarões a nível mundial (Simpfendorfer et al., 2011; Neff & Hueter, 2013). É, pois, precisamente no passar desta linha entre a conservação (biológica) e a psicologia que este trabalho se desenvolve.

De notar que o tubarão, no contexto deste trabalho, tem uma abordagem não individualizada a qualquer espécie mas ao conceito individual e socialmente aceite do mesmo. Como tal, todo o desenho metodológico do presente trabalho aborda o conceito lato de tubarão como imagem mental, repleta de conteúdo cognitivo e emotivo.

1.1 Tubarões em perigo

Fortemente influenciado por notícias, slogans e documentários cada vez mais disponíveis, o tubarão aparece como um protagonista natural na cultura popular. Mas nem sempre assim foi ao longo da história humana. Olhando para relatos históricos, e embora algumas das representações (mapas ou descrições) incluíssem imagens que hoje associamos a tubarões, não havia uma conotação objetivamente negativa e globalizada associada a estes peixes. Até mesmo quando as áreas costeiras começaram a ser procuradas para atividades recreativas, mitos e histórias contadas de geração em geração não comprometeram o interesse na exploração lúdica dos ecossistemas marinhos. De facto, ao longo do século XX, vários autores descreveram a perceção geral dos tubarões como oposta aos animais perigosos que agora imaginamos (Coppleson, 1958; Cortney, 1962; Whitley, 1940).

Atualmente, os tubarões, para além de importantes recursos para a indústria pesqueira, também são de interesse acrescido ao representarem um dos poucos grupos de animais que interagem negativamente com o homem de forma regular, embora bastante incomum. Apesar de uma marcada escassez nos dados dessa interação negativa, qualquer ataque de tubarão é um fenómeno que atrai intenso interesse público nos meios de comunicação social, apoiado em mitos e equívocos perpetuados na televisão, em revistas e jornais (Midway et al. 2019). Pode-se mesmo afirmar que, a partir dos anos 70, houve um ponto de inflexão na perceção ocidental dos tubarões e que originou com um efeito cascata na narrativa popular. As imagens vívidas e a banda sonora do filme 'Tubarão' (1975) ainda reverberam na mente de muitos, desencadeando emoções, influenciando comportamentos e gerando efeitos societais secundários, como o medo aos tubarões (Bryant et al. 2012). Hoje, sabemos que as estatísticas de contactos acidentais entre tubarões e humanos ficam muito aquém daquele imaginário da sociedade ocidental, como comprovam os dados de fatalidades a estes associados. Por exemplo, na última década (2010-2019), num acumulado de 799 ataques não provocados em todo o mundo, apenas 54 resultaram em mortalidade humana (uma média de 5,4 mortes por ano) (ISAF, 2020). Esta é uma taxa infinitamente inferior a tantos outros riscos a que estamos sujeitos no nosso quotidiano. Esta perceção negativa tem vindo a contribuir, cumulativamente com a visão utilitarista do ecossistema marinho, para o acréscimo da pressão na sustentabilidade futura deste grupo zoológico. Hoje sabe-se que os humanos são diretamente responsáveis por muitos dos impactos nas populações (ainda) saudáveis de tubarões.

1.2 Conservação

Do ponto de vista conservacionista, as populações de tubarões estão a enfrentar um marcado declínio, principalmente como resultado da exploração excessiva pela pesca, com cerca de 100

milhões de tubarões capturados todos os anos (Worm et al., 2013). Esta sobre-exploração é impulsionada principalmente pela procura por barbatanas de tubarão (prática internacionalmente chamada de *finning*) na Ásia (Dulvy et al., 2014). Acrescido ao anterior, a poluição, o desenvolvimento costeiro ou a pesca acessória são consideradas algumas das maiores ameaças à sobrevivência deste grupo zoológico. Um número crescente de espécies estão hoje catalogadas como ameaçadas de extinção segundo a UICN, União Mundial para a Conservação (Camhi et al., 2009). Segundo esta organização, em 2009 cerca de um quarto das espécies de elasmobrânquios (tubarões e raias) estava já ameaçado de extinção, isto é, avaliado ou estimado como vulnerável, em perigo ou criticamente ameaçado de extinção, e a sobre-exploração ocupava o lugar cimeiro como principal ameaça ao decréscimo das populações (Dulvy et al., 2014). Mais recentemente, um estudo realizado por Pacoureau e colegas (2021) atualiza esta realidade para uma diminuição de 71% na população mundial de tubarões e raias oceânicas desde 1970, devido a um aumento de 18 vezes na pressão relativa da pesca. Estes números colocam hoje 75% de todas as espécies conhecidas deste importante grupo zoológico em risco de extinção.

A opinião pública desempenha hoje um papel crucial na definição de políticas ambientais ao nível global e é, portanto, um fator-chave para alcançar compromissos de conservação consideráveis (Fletcher & Potts, 2007). Neste sentido, e pese embora as ciências sociais não tenham sido uma área de especial relevância para a conservação até finais do séc. XX, o corpo de conhecimento nestas áreas tem vindo a aumentar nos últimos anos, com o notório esforço acrescido no sentido de compreender os mecanismos psicológicos envolvidos nos processos de decisão em diferentes atores direta ou indiretamente envolvidos (e.g. Thomson & Mintzes, 2002; Crossley et al., 2014; O'Bryhim & Parsons, 2015; Tsoi et al., 2016; Drymon & Scyphers, 2017; Acuña-Marrero et al., 2018).

Para além desta, e de particular importância para o presente estudo, está ainda a influência, nas últimas décadas, da participação ativa de diferentes atores sociais (escolas, espaços zoológicos, ONG, etc.). Estes têm trabalhado, individualmente ou em colaboração, para mudar a perceção social dos tubarões com o objetivo da sua proteção e sustentabilidade. Espaços zoológicos e aquários em todo o mundo têm um reconhecido potencial para sensibilizar, educar e se envolver em esforços diretos de conservação, para além de ajudar a inverter alguns preconceitos em muitas espécies. Com mais de 700 milhões de visitantes por ano (WAZA 2005), a maioria destas instituições implementa vários programas e estratégias de educação para a conservação, oferecendo aos visitantes experiências únicas e diferentes quando comparadas às experiências de ensino tradicional e mais formal (Belle 1982; Colardyn & Bjornavold 2004). Esta estratégia permite ainda que os visitantes tenham um contacto sensorial próximo com muitas espécies, entre elas tubarões, em programas disponíveis para interpretação ou complemento de métodos de educação formal, contribuindo para

um aumento da consciência acerca da conservação orientada às espécies (WAZA 2005; Ogden & Heimlich 2009; Packer & Ballantyne 2010). Embora espaços zoológicos implementem muitas das suas atividades diárias de forma independente e individual, existem vários esforços internacionais concentrados focados nos tubarões. Estes esforços, muitas vezes na forma de campanhas internacionais, envolvem governos, ONG e escolas em sinergias estratégicas e intersectoriais. E embora as estratégias de comunicação de hoje já não se coadunam com aquelas do séc. XX, (como exemplo de mudança de estratégia está a adoção da abordagem 'Love, not Loss' da União Mundial para a Conservação (IUCN)), estas instituições ainda procuram formas, eficazes e consistentes, para conciliar a perceção social, nomeadamente os estereótipos e os preconceitos, acerca dos tubarões com a verdadeira natureza destes.

1.3 Objetivos do trabalho

O presente trabalho tem como objetivo geral investigar e caracterizar alguns dos fatores psicológicos envolvidos na perceção do tubarão e compreender como estes constructos teóricos se podem aplicar em estratégias de comunicação transversais que promovam a conservação do grupo zoológico. Os estudos empíricos apresentados, publicados ou submetidos para publicação, procuram dar resposta a questões de investigação específicas:

a) como é constituída a representação social do tubarão, de que forma se estrutura mentalmente o conceito e como pode ajudar a compreender atitudes e estereótipo subjacentes?

b) de que forma as duas dimensões super-ordinais, Calor e Competência, definem o seu estereótipo e influenciam a intenção para proteger? e

c) poderá a manipulação da dimensão Calor levar a uma alteração na predisposição para a conservação dos tubarões?

1.4 Estrutura Geral do Trabalho

O presente trabalho é composto por um conjunto de seis estudos empíricos sequenciais, devidamente integrados em três estudos independentes, seguindo um encadeamento lógico na linha de investigação. O trabalho inicia-se, no entanto, com um enquadramento teórico de vários conceitos fundamentais à linha de investigação implementada. Dentre os vários conceitos, realçam-se, pela sua importância académica, conceitos como representação social (Moscovici, 1973), atitudes face aos animais e estereótipos, com especial destaque para o Modelo do Conteúdo do Estereótipo e BIAS Map (Fiske et al., 2002; Cuddy et al., 2007), conceitos estes que conduzem grande parte da linha de investigação deste trabalho. Destaca-se ainda uma breve descrição do conceito de humor, aqui usado como distrator emocional e integrado no terceiro estudo empírico.

Com particular interesse para o contexto concreto dos objetivos da tese destaca-se ainda a importância de compreender a perceção do público, seja ele visitante de espaços zoológicos (público este com particular interesse profissional para o autor do presente trabalho) ou genérico, em relação ao conceito 'tubarão'. Neste sentido, apresenta-se também uma breve revisão de algumas perspetivas culturais, conservacionistas e atitudinais do conceito 'tubarão' que influenciam a perceção psicológica do público e que condicionam a disponibilidade deste para a sua conservação.

O primeiro estudo empírico aqui apresentado focou-se na identificação, pela primeira vez, da representação social do tubarão como base de compreensão da construção psicológica do mesmo. Aprofunda o conhecimento da representação social do conceito 'tubarão' como objeto social, i.e., no detalhe da sua construção psicológica social, permitindo uma melhor compreensão da sua imagem pública e, consequentemente, identificando oportunidades de melhoria na perceção deste na sociedade. No seguimento dos resultados obtidos neste primeiro estudo, foi realizado um segundo e subsequente estudo que procurou compreender de que forma conceitos como a comunalidade e agência caracterizam e de que forma influenciam a percepção deste animal. Para além disso, identificou-se ainda uma importante ligação ao estereótipo de género, que traz consigo um conjunto de preconceitos e atitudes que afetam a disponibilidade do público em envolver-se na sua conservação. Ambos estes estudos dão corpo ao Estudo 1, intitulado '*Social Representations of Sharks, Perceived Communality, and Attitudinal and Behavioral Tendencies Towards Their Conservation: An Exploratory Sequential Mixed Approach*' e devidamente descrito na secção dos estudos empíricos.

Com base nos resultados obtidos, sentiu-se necessidade de dar seguimento à validação do estereótipo de género e inerente impacto nas atitudes e comportamentos pró-conservação. Acrescido, e no contexto de uma clara dualidade entre comunalidade e agência encontrada no segundo estudo, optou-se por aprofundar o estudo do estereótipo para lá daquele de género, através da aplicação do Modelo de Conteúdo do Estereótipo (Fiske et al., 2002) e BIAS Map (Cuddy et al., 2007) neste contexto em concreto e ainda por descrever na literatura disponível. Para tal, realizou-se um terceiro estudo, no qual se estendeu aquele modelo ao conceito aqui em estudo, dando origem a uma descrição do estereótipo mais aprofundada e devidamente fundamentada. Intitulado '*Applying the Stereotype Content Model (SCM) and BIAS Map to Understand Attitudinal and Behavioral Tendencies Toward Sharks' Conservation*', este estudo está descrito na secção correspondente como Estudo 2.

Uma vez identificado o estereótipo do tubarão, e por inerência dos resultados à luz do quadro teórico em questão (elevada Competência e baixo Calor - estereótipo 'ameaça / predador'), o qual associa o tubarão a sentimentos de admiração, medo e evitamento e gerador de

comportamentos prejudiciais / dano ativo (Sevillano & Fiske, 2016b), optou-se pela realização de um terceiro estudo integrado, no qual se procurou modificar o estereótipo através do aumento da perceção da dimensão Calor. Este estudo integrado (Estudo 3) foi composto por três estudos sequenciais: um primeiro estudo que compreendeu um pré-teste para validação do material de investigação; um segundo estudo experimental, em contexto de condições controladas (junto de uma amostra de estudantes), que permitiu testar a influência de um distrator emocional (humor) na recetividade de uma mensagem focada na dimensão Calor; e por fim, um terceiro estudo experimental *in situ* e que permitiu testar, em contexto naturalista e com particular interesse profissional para o autor, o efeito do distrator emocional, assim como do reforço da mensagem focada na dimensão Calor. O Estudo 3, intitulado de *'Humor me (or not): can humor promote positive attitudes and donation intentions toward shark conservation?'*, encontra-se submetido para publicação.

Por fim, uma conclusão integradora de todos os resultados obtidos ao longo do trabalho é apresentada, na qual se identificam ainda algumas implicações práticas e limitações decorrentes da realização deste trabalho.

2. ENQUADRAMENTO TEÓRICO

2.1 Representações sociais

Desde os anos sessenta, Serge Moscovici (1961) iniciou o campo teórico de estudo das representações sociais, um campo de pesquisa e aplicação que, desde então, tem vindo a multiplicar-se. Devidamente apoiadas pela teoria, inúmeras investigações foram entretanto realizadas, seja em busca de conhecimento de novas representações em vários campos interdisciplinares, como no marketing (e.g., de Rosa, Bocci & Dryjanska, 2019), saúde (e.g., Robieux et al., 2018), obediência social (e.g., Pozzi et al., 2014), educação (e.g., Danermark et al., 2014), tecnologia (e.g., Piçarra et al., 2016), economia (e.g., Gangl et al., 2012), como no desenvolvimento teórico e metodológico do próprio campo (e.g., Howarth, 2006).

Conhecer as representações sociais é verdadeiramente importante para que possamos compreender a forma como processamos informação física e social e damos significado a tudo o que nos rodeia. Funcionam como reguladoras e orientadoras do comportamento individual em sociedade, permitindo aos indivíduos comunicarem e compreenderem-se entre si. Segundo Moscovici (1973, p. 13), representações sociais são "*sistemas de valores, ideias e práticas com uma função dupla: primeiro, para estabelecer uma ordem que permite aos indivíduos orientarem-se a si próprios no seu mundo material e social e sentirem-se confortáveis; segundo, para permitir a comunicação entre membros de uma comunidade ao proporcionar-lhes um código de trocas sociais e um código de nomenclatura e classificação de forma objetiva os vários aspetos do seu mundo e da sua história individual e de grupo*". São, numa explicação mais simplificada, conjuntos de explicações, de crenças e ideias, elaboradas a partir de modelos culturais e sociais que dão quadros de compreensão e interpretação do mundo que nos rodeia e ao qual denominamos de realidade. São também características de uma determinada época, contexto histórico e, inclusive, região geográfica, por isso, devem ser consideradas como dinâmicas, não estáticas, ainda que a sua alteração ocorra muito lentamente.

As representações sociais, também consideradas, num sentido mais amplo, como pensamento social, são essenciais nas relações humanas pois dão uma explicação e um significado à realidade (uma função do conhecimento). Além disso, atuam como reguladores e guias comportamentais (a função orientadora), permitindo que indivíduos comuniquem e se entendam (Moscovici, 2001).

Também existe uma função de identidade nas representações sociais, assim como os estereótipos, que nos permitem construir uma identidade social do grupo porque, na mesma sociedade, existem grupos diferentes que têm representações diferentes sobre a mesma realidade. Desta forma, as representações sociais não são homogéneas dentro de uma sociedade e também são uma maneira de os indivíduos explicarem e substanciarem as suas opiniões e comportamentos (Moscovici, 2001).

2.1.1 Objetivação e Ancoragem

Na formação deste tipo de pensamento existem dois processos que trabalham em parceria: objetivação e ancoragem. Em primeiro lugar, ocorre a objetivação, processo que permite a formação de um todo coerente, por meio da seleção e remoção do objeto do seu contexto, seguido pela fase de esquematização, que visa a construção de um esquema, um "núcleo figurativo" onde estão organizados, num padrão de relações, os principais elementos do objeto de representação (Abric, 1996). Objetivação é, portanto, um processo de simplificação, no qual muita informação é perdida. No entanto, esta riqueza de informações perdidas durante o processo é compensada na compreensão. Após a objetivação, o processo de ancoragem tem início. As imagens criadas pela objetivação são assimiladas e integradas em categorias que o sujeito possui como resultado de experiências anteriores (Abric, 1996). A objetivação e ancoragem trabalham como um todo no processo de formação de representações sociais. As representações sociais, quando ancoradas, funcionam como um filtro cognitivo, pois as novas representações são interpretadas de acordo com os quadros de representação preexistentes. Assim, influenciarão o comportamento e tornam-se um componente social importante, com o objetivo de criar objetos coletivos e equilíbrio (Abric, 1996).

2.1.2 Teoria do Núcleo Central

A abordagem estrutural das representações sociais evoluiu muito do ponto de vista teórico no final dos anos 80 e início dos anos 90. A Teoria do Núcleo Central começou com o trabalho de Abric em 1976 e foi desenvolvida e publicada nas décadas de 1980 e 1990 (Abric, 1987, 1994; Lheureux, Rateau, & Guimelli, 2008; Rateau, 1995a, 1995b, 1995c; Sá, 1996).

Segundo a Teoria do Núcleo Central de Abric (1976), e como o nome indica, a representação social organiza-se em torno de um núcleo central, que é constituído por um ou mais elementos que dão significado específico à representação em estudo. Assim, as representações sociais são organizadas internamente em dois sistemas - um sistema central e um sistema periférico. O núcleo central de uma representação específica é composto por um (ou vários) elemento(s) que é (são) estável(eis), coerente(s) e resistente(s) à mudança, sendo fortemente marcado pelo sistema de normas de um grupo. O significado de toda a representação, incluindo os elementos periféricos, é menos sensível a contextos sociais variáveis. Do ponto de vista comportamental, o núcleo central desempenha um papel charneira na organização de valores, atitudes e comportamentos (Abric, 1993).

Ao contrário da rigidez do núcleo central, o sistema periférico é considerado flexível, permitindo a integração de experiências e histórias individuais, suportando variações, contradições entre indivíduos, subgrupos e ao longo do tempo (Flament, 1994). É funcional, fundamentando a

representação na realidade, transformando-a em comportamentos e práticas sociais concretas. Dada esta flexibilidade, é o sistema periférico que funciona como uma almofada, protegendo o núcleo central de transformações circunstanciais. Quando novas informações e eventos desafiam as principais prescrições das representações, o sistema periférico permite a integração de tais elementos, mantendo-os organizados em torno do núcleo central compartilhado pelo grupo social.

A forma como percecionamos e interpretamos um objeto começa, portanto, na forma como representamos mentalmente esse mesmo objeto. Uma vez conhecendo as características da representação, é possível partir para um quadro mais contextualizado de atitudes e estereótipos pré-existentes, assim como os fatores cognitivos e emocionais em relação ao objeto de estudo.

2.2 Atitudes face aos animais

Segundo Eagly e Chaiken (1993, 2007), atitude é uma tendência, estado interno ou condição de uma pessoa que se predispõe a respostas avaliativas (comportamentos) que são, em certa medida, favoráveis ou desfavoráveis. Esta configuração permite distinguir uma tendência interna, que é a atitude em si, das respostas avaliativas que expressam atitudes (Eagly & Chaiken, 1993, 2007). Primeiramente proposto por Rosenberg e Hovland (1960), a atitude é composta por três componentes interdependentes: componentes cognitiva (pensamento), afetiva (sentimento) e comportamental (ação). Este modelo, denominado assertivamente de Modelo Tri-Componente da Atitude ou mais recentemente Modelo ABC (do inglês, *Affective, Behavioral, Cognitive*), argumenta que uma atitude só pode existir se todos os 3 componentes (afetivo, comportamental e cognitivo) estiverem envolvidos. As crenças que as pessoas mantêm sobre o objeto de uma atitude correspondem à componente cognitiva. A componente afetiva compreende os estados emotivos estimulados por um objeto de pensamento. Finalmente, a componente comportamental inclui várias aptidões ou predisposições para agir de determinada forma em relação a um objeto (Weiten, 2013).

Reconhecer as atitudes das pessoas em relação à vida selvagem tem vindo a ser objeto de um crescente número de investigações, concentrando-se, no entanto, em resultados atitudinais de programas educativos (e.g., Erickson, 1971; Kellert, 1980; Tarrant et al., 1987; Herzog & Burghardt, 1988; Morgan & Gramann, 1989). Stephen Kellert, que dedicou mais de quatro décadas ao estudo das atitudes em relação à vida selvagem e fatores que as afetam (e.g. Kellert, 1976, 1985, 1996, 2002; Kellert, 1980; Kellert & Westervelt, 1983), definiu um conjunto de dimensões atitudinais em relação à natureza e à vida selvagem (Kellert, 1976). Sem procurar explicar o valor intrínseco de cada dimensão, Kellert identificou originalmente 10 categorias, que são 'pensadas para refletir uma gama de expressões físicas, emocionais e intelectuais da tendência biofílica de se associar à natureza' (Kellert, 1996, p. 26) e pode ser encontrado resumido na Tabela 1.

Segundo este autor, as atitudes de crianças e adultos tendem a aumentar com a idade e conhecimento. Inicialmente, as crianças tendem a mostrar relações emocionais com os animais, progredindo de um entendimento mais cognitivo e factual dos organismos, e por fim para uma visão que inclui uma preocupação ética e atenção ao funcionamento ecológico das várias espécies e da sua importância geral na natureza.

Tabela 1 - Dimensões atitudinais em relação à vida selvagem e ambiente (Kellert, 1996)

Dimensão atitudinal	**Definição**
Utilitarista	Exploração prática e material da natureza (por exemplo, alimentos, medicamentos, roupas, etc.)
Naturalística	Experiência direta e exploração da natureza (por exemplo, observação de aves, pesca, caça, etc.)
Negativista	Orientação para um evitamento ativo de animais por associação de medo ou antipatia
Ecologista	Preocupação com o meio ambiente como sistema e com as inter-relações entre espécies silvestres e habitats naturais (por exemplo, polinização, predação, sobre-exploração de espécies, etc.)
Científica	Interesse nos atributos físicos e no funcionamento biológico da vida (por exemplo, órgão, célula, etc.)
Estética	Apelo estético e beleza da natureza (por exemplo, cor, luz, beleza, etc.)
Simbólica	Uso da natureza para comunicação e pensamento (por exemplo, história, fantasia, sonho, etc.)
Dominionista	O domínio, o controlo físico, o domínio da natureza (por exemplo, subjugar, controlar, etc.)
Humanista	Forte apego emocional e "amor" (por exemplo, carinho, vínculo, respeito, admiração, etc.)
Moralista	Reverência espiritual e preocupação ética com a natureza (por exemplo, lealdade, proteção, propósito, etc.)

Desde a sua conceção original, a escala de Kellert e Westervelt (1983) para dimensões atitudinais tem sido usada e adaptada em muitos outros estudos, concentrando-se numa ampla variedade de animais (e.g., sapos (Tomazic, 2011), aves (Prokop et al., 2008), golfinhos (Barney et al., 2005) ou cobras (Ballouard et al., 2013)). Thomson e Mintzes (2002) exploraram os efeitos do nível académico e do género no conhecimento e atitudes em relação aos tubarões, bem como na relação entre conhecimento e medidas de atitude. Estes autores foram os primeiros a adaptar o Inventário Atitudinal de Kellert para o contexto particular dos tubarões, com descobertas

consistentes com o trabalho anterior dos autores originais (Kellert, 1980; Kellert et al., 1996). O acréscimo de conhecimento revelou uma predominância de atitudes científicas e naturalistas, assim como de um decréscimo nas atitudes utilitaristas / negativistas. No que se refere ao género, as mulheres mostraram predominância nas atitudes moralistas e os homens nas atitudes naturalísticas e utilitárias (Thomson & Mintzes, 2002).

Mais recentemente, vários estudos têm vindo a ser desenvolvidos na perspetiva de identificar e conhecer as atitudes de diferentes atores fundamentais na conservação, entre eles a população usuária do oceano (e.g, Crossley et al., 2014; Friedrich et al., 2014; Gibbs & Warren, 2015; O'Bryhim & Parsons, 2015; Tsoi et al., 2016; Acuña-Marrero et al., 2018; Lucrezi et al., 2019) e a indústria associada (pesca e turismo) (Gallagher et al., 2015; Drymon & Scyphers, 2017; Mcclellan Press et al., 2015; Richards et al., 2015; Shiffman et al., 2017). Alguns destes estudos têm vindo a evidenciar o aparecimento de uma atitude ligeiramente positiva em relação aos tubarões, apesar do medo ainda suscitado por estes (Friedrich et al. 2014; O'Bryhim & Parsons, 2015; Acuña-Marrero et al., 2018; Lucrezi et al., 2019). Esta mudança na perceção, entre outras, está associada a uma transformação no seu uso, que passou de extrativo (pesca) para não-extrativo (turismo), ligada ao aumento do interesse no ecoturismo e do contacto direto com estes animais (Mazzoldi et al., 2019).

2.3 Estereótipos

Para lá das atitudes, é igualmente importante salientar a relevância dos estereótipos e preconceitos eventualmente existentes, que condicionam a predisposição comportamental. E tal como as representações sociais anteriormente mencionadas, o uso de estereótipos é uma outra forma de simplificarmos o nosso mundo social; estes permitem reduzir a quantidade de processamento cognitivo que temos que fazer ao encontrar uma nova pessoa.

De acordo com Cardwell, um estereótipo é "*...uma crença fixa e generalizada acerca de um determinado grupo ou classe de pessoas*" (Cardwell 1996, p. 227). Através da estereotipização, inferimos que um indivíduo possui um conjunto de características e habilidades que os restantes membros do seu grupo têm. Os estereótipos levam à categorização social, que é uma das razões para a criação de preconceitos, levando a processos de agregação (associados ao *ingroup*) ou segregação (associados ao *outgroup*). Sendo os estereótipos fenómenos culturais que se transmitem através dos meios de comunicação, educação, lendas populares, entre outros, e que podem influenciar a forma como percecionamos, de forma quase imediata, os outros, é certo que também aqui o objeto em investigação se enquadra facilmente. Embora estas generalizações possam geralmente ser acerca de

culturas, nacionalidades ou grupos sociais, a verdade é que se aplicam à forma como percecionamos os animais e, consequentemente, nos nossos comportamentos a eles dirigidos.

O preconceito é, por sua vez, um conceito formado antecipadamente e sem fundamento que envolve fatores emocionais negativos e que, normalmente, usa estereótipos de carácter negativo para justificar uma determinada atitude (Dovidio et al., 2008). Os preconceitos, assim como os estereótipos, adquirem-se durante o processo de socialização, mas também podem ser construídos a partir dos nossos processos cognitivos, na tentativa de explicar a complexidade do mundo social. São juízos estáticos que, geralmente, perduram por muito tempo. Diferem dos estereótipos na medida em que estes são considerados uma componente afetiva e os estereótipos uma componente cognitiva. Os preconceitos nascem quando os indivíduos, sem ter consciência e baseando-se em estereótipos, interiorizam as atitudes dos outros indivíduos. Nesse caso, forma-se um preconceito de acordo com as características que se atribui às atitudes observadas (Dovidio et al., 2008).

É fácil, portanto, encontrar uma relação entre o tubarão e os vários constructos psicológicos onde encontramos as atitudes, estereótipos e preconceitos que muitos de nós temos, e a sua implicação na predisposição para um comportamento adequado em função da necessidade de conservação daquele grupo de animais.

2.3.1 Agência e Comunalidade

Duas dimensões de fundamental relevância no contexto da formação de estereótipos são a Agência e Comunalidade (Bakan, 1966). Na realidade, estes são dois meta-conceitos de valores, motivos, características e comportamentos humanos, duas 'modalidades genéricas na existência de formas de vida' como dois agrupamentos temáticos nas narrativas da vida de cada um de nós, cada qual articulando importantes objetivos, esforços, necessidades e desejos (McAdams, 1985; McAdams et al., 1996).

David Bakan, em 1966, propôs, pela primeira vez, a existência destas duas dimensões fundamentais para a existência humana, uma dualidade entre a individualidade e a pertença em relação ao mundo social. '*Adotei os termos "agência" e "comunalidade" para caracterizar as duas modalidades fundamentais na existência de formas vivas, agência para a existência de um organismo como indivíduo e comunalidade para a participação do indivíduo em algum organismo maior do qual o indivíduo faz parte. A agência manifesta-se em auto-proteção, auto-afirmação e auto-expansão; a comunalidade manifesta-se no sentido de estar em harmonia com outros organismos. A agência manifesta-se na formação de separações; comunalidade na falta de separações. A agência manifesta-se em isolamento, alienação e solidão; comunalidade em*

contacto, abertura e união. A agência manifesta-se no desejo de dominar; comunalidade em cooperação não contratual.' (Bakan, 1966, pp. 14-15).

Agência refere-se, assim, à capacidade de um indivíduo dominar o meio ambiente, afirmar a sua individualidade, demonstrar competência, conquista e poder. Indivíduos orientados para a agência alcançam satisfação através da realização pessoal e do sentido de independência e separação (Bakan, 1966; Guisinger & Blatt, 1994; McAdams, 1993). A comunalidade, por sua vez, refere-se ao desejo do indivíduo de se relacionar e cooperar com os outros, em sociedade. Neste caso, os indivíduos orientados para esta dimensão experimentam a realização por meio de relacionamentos com os outros e o consequente sentido de pertença (Bakan, 1966; Guisinger & Blatt, 1994; McAdams, 1993).

Desde a sua origem, e construída sobre estas noções, as dimensões de agência e comunalidade têm sido relacionadas a diferentes processos psicológicos, incluindo estilos de pensamento, avaliação de estatuto social, traços de personalidade, socialização dos papéis sexuais e autoconceito. Alguns investigadores salientaram que as orientações de agência e comunalidade também são expressas nas dimensões cognitivas e morais dos indivíduos (Belenky et al., 1986; Gilligan, 1982) e na perceção social e comportamento do grupo (Conway et al., 1996). Conway e colegas (1996) também mostraram que as orientações de agência e comunalidade são difundidas nas perceções sociais das pessoas (por exemplo, perceção do estatuto social) e na atribuição de características de personalidade a indivíduos de alto e baixo estatuto social. Contando com uma grande quantidade de trabalhos e amplo uso no campo psicológico, esta teoria da perceção social abre-se agora para uma extensão mais ampla de dimensões de conteúdo. Tal como proposto por Abele et al. (2016), a estrutura agência-comunalidade foi ampliada, de acordo com dados de autoconceito aferido em cinco diferentes culturas, num modelo que divide cada dimensão em duas facetas, desdobrando portanto as duas (Agência e Comunalidade) em quatro dimensões principais: Comunalidade incluindo Calor e Moralidade; Agência incluindo Competência e Assertividade. Este modelo aborda esta natureza multifacetada das dimensões fundamentais que misturam o Modelo do Conteúdo do Estereótipo (Fiske et al., 2002), no qual a Competência é emparelhada com Calor, e o Modelo de Competência e Moralidade (Wojciszke, 2005), emparelhando Competência com Moralidade.

2.3.2 Modelo do Conteúdo do Estereótipo

Como mencionado anteriormente, as duas principais dimensões do Modelo do Conteúdo do Estereótipo (SCM, do inglês *Stereotype Content Model*) (Fiske et al., 2002), o Calor e a Competência, têm precedentes noutros quadros teóricos, sendo, por ventura, aqueles mais

relevantes a Agência e Comunalidade, no contexto da psicologia e da religião (Bakan, 1966), bem como no contexto da formação de impressões (Rosenberg et al., 1968; Fiske, 2018). De especial importância para o presente estudo, e proposto inicialmente por Fiske e colegas (2002), o SCM sugere que os estereótipos de grupo surgem destas duas dimensões principais: Calor e Competência. Segundo esta teoria, nem todos os estereótipos e grupos estereotípicos são iguais. Neste estudo seminal (Fiske et al., 2002) e num contexto cultural norte-americano, alguns grupos foram percecionados como incompetentes e inúteis, como os sem-abrigo. Outros, como os asiáticos ou pessoas ricas, devido a uma perceção de competência excessiva, talvez até ameaçadora, foram associados a respeito. Grupos estereotipados como gentis e inofensivos, como donas de casa ou idosos, foram associados a piedade e simpatia. Por fim, aqueles pertencentes ao *in group*, foram percecionados com admiração e orgulho (Fiske et al., 2002) (Tabela 2).

Nas últimas décadas, este quadro teórico tem sido objeto de muitos estudos em psicologia social. Os resultados de tais esforços mostram que o estereótipo negativo, de incompetência ou subordinação, às vezes combina com o estereótipo positivo de calor ou empatia. Esta combinação mista origina um conjunto único de preconceitos em relação a vários grupos da sociedade e grupos étnicos em geral. Estudos subsequentes têm vindo a validar, lenta mas seguramente, o SCM como uma abordagem válida para muitos contextos e situações culturais diferentes, permitindo, assim, a previsão de reações afetivas a uma variedade de grupos diferentes.

Tabela 2 - Tipos de grupos, combinações de estatuto e competição, e correspondentes formas de preconceito em função do Calor e Competência (adaptado de Fiske et al., 2002)

	Competência	
Calor	Baixo	Alto
Alto	**Paternalista** Estatuto social baixo, não competitivo Piedade, simpatia (e.g, idosos, pessoas com deficiência, donas de casa)	**Admiração** Estatuto social alto, não competitivo Orgulho, admiração (e.g., in group, aliados próximos)
Baixo	**Desprezo** Estatuto social baixo, competitivo Desprezo, nojo, raiva, ressentimento (e.g., beneficiários de assistência social, pobres)	**Invejoso** Estatuto social alto, competitivo Inveja, ciúme (e.g., asiáticos, judeus, ricos, feministas)

2.3.3 Calor e Competência

Num estudo clássico, Solomon Asch (1946) considerou as razões por detrás da perceção interpessoal e da formação de impressões de personalidade. Ele compreendeu que, ao manipular as características de calor de uma pessoa enquanto mantinha os traços de competência, alterava drasticamente a perceção de outras pessoas desse indivíduo. Calor e competência seriam, portanto, as duas dimensões fundamentais em que indivíduos e grupos são avaliados e, portanto, a base do SCM. O princípio geral do quadro estrutural desta investigação é baseado nas informações específicas que temos acerca de uma pessoa, como as características que acreditamos ter, e serão, porventura, o fator mais importante para estabelecer a nossa principal perceção dessa pessoa. De relevância especial, calor e competência são duas dimensões separadas, conceitualmente ortogonais, portanto nunca se sobrepõem e se influenciam. Desta forma, um resultado baixo ou alto numa destas dimensões pode ser combinado com um resultado alto ou baixo na outra dimensão. Existem, portanto, quatro combinações possíveis encontradas neste modelo: estereótipo de preferência social ou admiração (alto calor e competência); estereótipo de inveja (baixo calor e alta competência); estereótipo paternalista (alto calor e baixa competência); e estereótipo de desprezo (baixo calor e competência) (Fiske et al., 2002).

Uma nova característica que o SCM trouxe para o cenário dos estereótipos é a possibilidade de hierarquização subtil entre os sujeitos-alvo. De acordo com esta estrutura, o preconceito não é apenas uma antipatia ou desprezo uniforme em relação a um grupo externo, mas propõe que alguns grupos sejam percebidos de maneira ambivalente, alto numa dimensão estereotipada e baixo noutra, criando assim uma espécie de hierarquia na cognição social (Durante et al., 2010).

2.3.4 O SCM em diferentes áreas

Nos últimos anos, a aplicação deste modelo do estereótipo tem vindo a ganhar um verdadeiro impulso em várias áreas do saber, originando acesas discussões em muitos temas sociais. Recentemente, vários estudos foram realizados aplicando o SCM em diversas áreas, como o marketing de marcas (Aaker, Vohs & Mogliner, 2010; Fournier & Alvarez, 2012), julgamento no crowdfunding (Johnson et al., 2018), integração de imigrantes (Froehlich & Schulte, 2019; Kil et al., 2019), comportamento organizacional (Rast et al., 2018), robótica social (Mieczkowski et al., 2019; Oliveira et al., 2019), estereótipos de etnia (Grigoryev et al., 2019) e até personalidades em televisão (Sink et al., 2017). Não existe, no entanto, muita investigação realizada na perceção de animais usando o SCM, uma vez que este modelo foi fundamentado pela primeira vez na perspetiva humana. Do nosso conhecimento, apenas um pequeno grupo de estudos foi realizado com o

objetivo específico de adaptar e aplicar o SCM à perceção de alguns animais (Sevillano & Fiske, 2016a,b, 2019).

2.3.5 Mapa BIAS (Behaviors from Intergroup Affect and Stereotypes)

Estendendo o SCM, Cuddy, Fiske e Glick (2007) propuseram o mapa BIAS (do inglês, *Behaviors from Intergroup Affect and Stereotypes*), e mostraram que as combinações de Calor percebido (baixo vs. alto) e Competência (baixo vs. alto) associados aos diferentes estereótipos se relacionam com diferentes emoções (estados emocionais de aproximação vs. evitamento) e, finalmente, a comportamentos intergrupo que podem ser categorizados ao longo da dimensão ativo vs. passivo e dimensão facilitador vs. prejudicial (Figura 1).

Figura 1 - Representação esquemática do mapa BIAS em função dos estereótipos propostos pelo SCM. (Adaptado de Cuddy et al., 2007)

Segundo este mapa, grupos cujos elementos encaixam num estereótipo representado como muito afetivo (por exemplo, atenciosos, honestos) e competente (por exemplo, dominantes, inteligentes) são tipicamente encarados como membros do grupo ou aliados. São, por isso mesmo, percecionados como não competitivos e com um estatuto elevado. Geram, portanto, emoções de aproximação (por exemplo, admiração, atração, respeito, orgulho), bem como facilitação ativa (por exemplo, ajudar, proteger, defender) e facilitação passiva (por exemplo, cooperar com, associar-se com/a). Membros de grupos caracterizados por elevado calor e baixa competência (por exemplo, mulheres, idosos) estão associados a emoções negativas (por exemplo, pena) e facilitação passiva. Membros de grupos caracterizados por um baixo calor (por exemplo, egoísta, frio) e uma elevada competência são percebidos como competitivos e com um estatuto elevado (por exemplo, homens, advogados, pessoas ricas). São considerados potencialmente perigosos e com competência para

executar. Eles provocam emoções como inveja, ciúme ou desconfiança, bem como facilitação passiva (por exemplo, cooperação, associação com), mas também dano ativo (por exemplo, luta, ataque). Finalmente, os membros de grupos caracterizados por baixo calor e baixa competência (por exemplo, sem-abrigo) estão associados a emoções negativas (por exemplo, desprezo) e dano ativo (por exemplo, repressão). De acordo com o mapa BIAS, estados emocionais relacionados têm um papel de mediadores na relação entre estereótipos e tendências comportamentais, e são preditores de comportamentos mais fortes do que estereótipos (Cuddy et al., 2007).

2.3.6 O estereótipo e consequentes intenções comportamentais em animais

Ao abordar os animais como sujeitos-alvo, a cognição social está constantemente em jogo, formando estereótipos e levando consigo preconceitos e intenções comportamentais. Conforme mencionado por Sevillano e Fiske (2016a), '*os animais exploram, atacam ou ignoram os seres humanos. Como resultado, a identificação das intenções dos animais (Calor) tem implicações na maneira como os humanos interagem com eles: estar ciente de um ataque iminente por um animal implicaria um comportamento defensivo em relação a este. Mas os animais também apresentam capacidades diversas (Competência) para realizar as suas intenções (por exemplo, tamanho, força, mecanismos de defesa).*'

Recentemente, Sevillano e Fiske (2016a,b, 2019) sugeriram que o SCM e o mapa BIAS também poderiam ser aplicados a animais para descrever e explicar as relações humano-animal. Sevillano e Fiske (2016b) confirmaram assim que, dos 25 animais em estudo, todos eles se encaixavam num dos quatro estereótipos predefinidos: 1) estereótipo de subordinação / estereótipo de presa (alto calor e baixa competência; por exemplo, animais de quinta) associado à aproximação e emoções positivas (por exemplo, tranquilidade) e mas motivador de comportamentos passivo-facilitadores (por exemplo, ignorar); 2) estereótipo de ameaça / predadores (baixo calor e alta competência; por exemplo, tigre, urso) associado a sentimentos de admiração, medo e evitamento e gerador de comportamentos prejudiciais / dano ativo (por exemplo, matar); 3) estereótipo de desprezo / praga (baixo calor e baixa competência; por exemplo, invertebrados) associados a emoções de evitamento (por exemplo, nojo) e comportamentos de dano ativo (por exemplo, matar, envenenar). Finalmente, 4) o estereótipo protetor / companheiro (alto calor e alta competência; por exemplo, cães, gatos, cavalos, macacos) associado com emoções de aproximação (por exemplo, amor) e gerador de comportamentos ativos de facilitação (por exemplo, interagir, cuidar).

2.4 Humor como ferramenta de persuasão e distração

2.4.1 Definição de humor

Embora não exista uma única e holística definição de humor, existe um consenso generalizado de que o humor envolve a comunicação de significados múltiplos e incongruentes e que, de alguma forma, divertem e descontraem o recetor da mensagem (Martin & Ford, 2018). Desde uma incongruência social não séria (Gervais & Wilson, 2005) ao uso intencional de comportamentos de comunicação verbal e não verbal que provocam respostas positivas como riso e boa disposição (Booth-Butterfield & Booth-Butterfield, 1991), seja qual for a sua descrição como conceito, a comunicação humorística geralmente conduz ao riso e à descontração. Existem, no entanto, várias outras funções, com importantes implicações psicológicas, associadas ao humor que vão para além da diversão.

2.4.2 Funções do humor

Não sendo um conceito homogéneo, o humor serve a uma variedade de funções positivas, como aumentar a coesão do grupo e lidar com o stress. Pode, no entanto, ter ainda funções (e consequências) sociais negativas, como a ridicularização ou até mesmo o isolamento social.

Uma função genérica da comunicação humorística é a influência social. Segundo esta perspetiva, o humor é um comportamento de procura de afinidade e as pessoas mais socialmente aceites tendem a ser mais influentes (Cialdini, 2001). Esta ideia de influência social é suportada por investigações acerca do humor na publicidade, que estima que entre 10 a 30% dos anúncios usam o humor como estratégia para influenciar os consumidores (Beard, 2005; Cafanescu & Tom, 2001; Weinberger et al., 1995). O humor pode ter uma influência positiva, como quando é usado para criar coesão de grupo por meio da diversão e satisfação partilhadas (Martin & Ford, 2018). Além de aumentar a coesão ao criar um ambiente agradável, o humor pode facilitar a coesão ao suavizar a crítica, pois a ambiguidade inerente do humor fornece uma espécie de proteção quando uma observação específica (fora da norma social vigente) não for bem recebida (Keltner et al., 2001). O humor pode ainda relacionar-se com um mecanismo de proteção individual. Indivíduos que conseguem ver o lado divertido dos problemas são mais hábeis em lidar com o stress (Booth-Butterfield et al., 2007).

Em contraste com o aumento da coesão do grupo, o humor também pode ser usado para depreciar os outros. O humor pode, assim, ser um meio de controlo, já que a ridicularização pode reforçar diferenças de poder e estatuto e suprimir ações indesejadas (Martin & Ford, 2018).

Resumidamente, o humor pode servir uma variedade de funções, além da simples diversão. O humor pode facilitar a empatia e reforçar laços sociais, no entanto, pode também ser usado para menosprezar os outros e isolá-los socialmente.

2.4.3 Diferentes tipos de humor

Martin e colegas (2003) desenvolveram uma ferramenta que avalia quatro dimensões relacionadas aos diferentes usos ou funções do humor na vida quotidiana. Duas destas dimensões são consideradas favoráveis ao bem-estar psicossocial, enquanto duas estão relacionadas como menos benignas e potencialmente até prejudiciais para o bem-estar. Esta ferramenta, o Questionário de Tipos de Humor (HSQ, do inglês *Humor Styles Questionnaire*), distinguiu quatro tipos de humor em duas linhas contínuas perpendiculares: 1) humor para melhorar o eu vs. relacionamento com os outros; 2) humor benigno vs. potencialmente prejudicial. Neste contexto, os tipos de humor identificados, em parte definidos pelos padrões comportamentais a eles associados nomeadamente no bem-estar e nas relações sociais, estão resumidos na figura 2.

Figura 2 - Quatro tipos de humor, adaptado de Martin et al. (2003)

No quadrante inferior direito, o humor de afiliação (*affiliative humor*) reflete um estilo de humor que é usado para melhorar o relacionamento com os outros de uma forma relativamente benigna. É a tendência de contar piadas ou se envolver em brincadeiras espirituosas espontâneas para criar diversão, diminuir tensão interpessoal e facilitar relacionamentos. No quadrante superior direito, encontra-se o humor de melhoria pessoal (*self-enhancing humor*), sendo, como o nome indica, o humor para melhorar a si mesmo de uma forma tolerante e conta com uma tendência de manter uma visão bem-humorada da vida. No polo oposto (inferior esquerdo), já numa tendência

potencialmente prejudicial, encontra-se o humor auto-depreciativo (*self-defeating humor*) é usado para melhorar os relacionamentos com outros em prejuízo e detrimento de si mesmo. Um uso auto-depreciativo do humor passa por fazer pouco de si mesmo para o desfruto dos outros, ou seja, usar o humor de forma auto-depreciativa, ou rir junto com os outros quando é ridicularizado. Por último, no quadrante superior esquerdo, o humor agressivo (*aggressive humor*) é uma forma hostil de humor para valorizar o eu às custas dos outros e inclui o humor sarcástico ou crítico.

2.4.4 Humor como influência emocional

O humor tem sido usado como uma importante alavanca emocional na publicidade, sendo usado como uma ferramenta de persuasão do consumidor. Também é sugerido que o humor tem uma qualidade única para superar a resistência a mensagens persuasivas, aumentar a consciência sobre um tópico específico abordado, disseminar informações e incentivar atitudes e comportamentos positivos, ao mesmo tempo em que minimiza conflitos e resistência (Nabi et al., 2007). Sem detalhar acerca das muitas teorias do processamento cognitivo em como o humor funciona, pois isso estaria longe dos objetivos da presente tese (para uma revisão sobre humor, ver Martin, 2010), muitos investigadores definem o humor como tendo duas fases distintas, uma cognitiva e outra afetiva. Na fase cognitiva, que inclui o chamado estágio de resolução da incongruência, duas imagens ou conceitos contraditórios do mesmo objeto são mantidos, ao mesmo tempo, na mente de uma pessoa, implicando alguma exigência cognitiva. A união destas duas ideias, conceitos ou situações normalmente díspares resulta num desconforto mental surpreendente ou inesperado, que precisa de resolução. Isto leva à apreciação do humor, ou à fase afetiva, diretamente associada à experiência de emoções positivas e à excitação emocional (Martin, 2010). Num estudo que usou humor em publicidade, Strick e colegas (2009) encontraram o humor como um distrator e um motivador para emoções positivas e no comportamento de aproximação e, desta forma, levando à quebra na resistência à persuasão.

Como o estímulo que entusiasma é lembrado melhor do que aquele mais emocionalmente inerte (Kensinger & Corkin, 2004), o humor funciona como outras experiências emotivas (por exemplo, medo) direcionando a atenção cognitiva para estes estímulos (por exemplo, predadores) em detrimento de outros menos entusiasmantes. A investigação na área do humor evoluiu muito desde as suas origens e está agora presente em muitas áreas do mundo social. No campo da gestão, verificou-se que o humor tem uma relação positiva com o desempenho (Avolio et al., 1999) e na eficácia da liderança (Priest & Swain, 2002; Mao et al., 2017). Foi também identificado como eficaz em muitas outras áreas como, por exemplo, no ensino (Allen, 2014; Billah et al., 2019), bem-estar (Szabo et al., 2005) e até na gestão da dor física (Dunbar et al., 2012; Rotton & Shats, 1996). No domínio da cognição social, alguns estudos descobriram que o humor (pejorativo ou

depreciativo) é contraproducente em alguns contextos (Warren et al., 2018; Abrams & Bippus, 2011), especialmente naqueles relacionados com a identidade *ingroup* / *outgroup*.

3. REVISÃO DA LITERATURA

3.1 Revisão da Literatura: Crenças e atitudes relativas ao tubarão e implicações na conservação

Até à data, e pese embora um notório acréscimo nas últimas duas décadas, ainda poucos são os estudos disponíveis dedicados à descrição e enquadramento psicológico do conceito 'tubarão' no contexto das ciências sociais e, dentre aqueles existentes, são maioritariamente no estudo das atitudes. Estas, no entanto, não procuram explicar a perceção coletiva mas a individual, i.e., a maneira como os indivíduos se orientam em relação aos objetos no seu ambiente. A compreensão de que a imagem percecionada (e marcadamente negativa) do tubarão é um produto cultural social é, pois, o ponto de partida para um entendimento deste como objeto social e, por conseguinte, realçando a importância do conhecimento da sua representação social e do seu estereótipo.

3.1.1 Breve visão cultural

Os tubarões, devido à sua natureza enigmática e aparência física, têm sido uma escolha óbvia para figuras mitológicas, contos e folclore. Diferentes culturas em todo o mundo compartilham visões de tubarões como divindades ou monstros marinhos. Especialmente nas sociedades em que as pessoas viviam perto da costa, os tubarões povoaram a mitologia e o folclore de muitos lugares do mundo, desde aborígenes australianos, tribos indonésias, ilhas do Pacífico, índios da América do Norte e até mais tarde, a Grécia Antiga. Como é possível constatar, nem todas as regiões percecionam o tubarão como algo negativo e dispensável. Há, inclusive, perspetivas culturais que ainda hoje perduram e que, ao contrário do que as sociedades denominadas ocidentais, colocam o tubarão num local de destaque pela positiva.

3.1.2 Perspetivas do Oceano Pacífico

Cercados pelo Oceano Pacífico e dependentes dos recursos naturais, os havaianos desenvolveram mitos detalhados e ricos, centrados nos animais, com uma clara predominância de animais marinhos. Há um número significativo de histórias e mitos sobre tubarões na cultura havaiana, que vão desde transformações do tubarão-homem a ataques de tubarões precedidos por avisos (Aranda, 2008).

No Havai, e embora ainda vigente em pequenas bolsas de cultura local, matar ou comer tubarões era considerado um ato de desrespeito, pelo qual o 'aumakua' (familiar ou deus ancestral que possui ou habita o tubarão) puniria os infratores, trazendo doenças ao violador (Loebel-Fried, 2002). Esta ligação ao mar e aos tubarões não se cingem, no entanto, ao Havai. Outras ilhas do Pacífico também têm, ainda hoje, os seus próprios contos e lendas com tubarões. Nas ilhas

Melanésias, por exemplo, acredita-se que os tubarões possuam espíritos poderosos dos ancestrais (Nichols, 1993). Nas ilhas Fiji, a lenda mais prevalente relacionada aos tubarões é o 'Dakuwaqa', um tubarão de 12 metros considerado o deus do mar e protetor da ilha de Kadavu. Muito respeitado pelos pescadores, 'Dakuwaqa' protege dos perigos no mar todos aqueles que o adoram (D'Arcy, 2006). Similarmente, os polinésios costumavam retratar tubarões como divindades ou guardiões, que protegiam de danos os pescadores e membros da tribo local (Beckwith, 1917; Collocot, 1921). Na Samoa, os tubarões também eram vistos como superlativos, em reverência dos quais os habitantes locais colocavam nos jardins um artefacto de coco, de forma triangular, semelhante a uma barbatana de tubarão. A intenção deste ritual era espantar potenciais ladrões, transmitindo a mensagem de que, se comida fosse roubada, o ladrão seria devorado por tubarões (Baughman, 1948).

Os aborígenes australianos também mencionam tubarões nos seus contos populares, embora em menor extensão em comparação com outras culturas do Pacífico. O conto mais conhecido é o de 'Bangudja', um tubarão-tigre, que depois de atacar outra criatura mitológica, o homem-golfinho, deixou uma grande mancha vermelha de sangue que deixou as rochas da Ilha Chasm pintadas daquela cor (Ellis, 2012).

Os índios da costa do Pacífico da América do Norte também integraram tubarões na cultura, embora de maneira menos extensa. Um dos poucos exemplos é a história de uma mulher que foi levada por um tubarão e depois se tornou ela própria num tubarão (Ellis, 2012). No geral, os tubarões no Pacífico eram vistos principalmente com significados simbólicos.

3.1.3 Perspetiva chinesa

Na China, o contexto cultural associado ao tubarão centra-se fundamentalmente no âmbito gastronómico, com um propósito marcadamente de estatuto social, e não em contos e lendas.
Por mais de mil anos, provavelmente desde a dinastia Sung (960 a 1279), a cultura chinesa integrou o tubarão, especificamente as barbatanas de tubarão, nos seus hábitos alimentares (Fabinyi, 2011). Mais tarde, foi instituído oficialmente como *haute cuisine* na dinastia Ming (1368-1644), servindo como sopa em banquetes formais a candidatos que prestavam os exames do governo imperial em Pequim (Rose, 1996). Na dinastia Qing (1644-1911), a sopa de barbatana de tubarão tornou-se uma parte tradicional em banquetes formais, sendo considerada um dos 'oito melhores' e o segundo entre os 'oito tesouros da culinária' do mar (Rose, 1996). Tornou-se tão estabelecido na alta sociedade chinesa que foi integrada nos banquetes Manchu-Han, um banquete tradicional raro, muito prestigiado e caro, que ampliaram as reuniões de culinária social para um público mais amplo, embora limitado a quem pudesse pagar (Rose, 1996).

Perto do final da dinastia Qing, a barbatana de tubarão tornou-se mais popular e, desde então, foi adotada como um famoso prato de banquete na culinária cantonesa e em Hong Kong (Phipps, 1996, in Rose, 1996). Já no século XX, em meados dos anos 80, devido à abertura da economia chinesa, à crescente disponibilidade financeira da sociedade chinesa e à aceitação geral da barbatana de tubarão como recurso alimentar, a procura doméstica aumentou dramaticamente. Isto levou a um impacto mundial na procura e no comércio de barbatanas com a China a desempenhar um papel de alavanca no comércio mundial de barbatanas de tubarão com sua própria indústria de pesca e processamento (Rose, 1996).

Além de serem considerados recursos alimentares de luxo, os tubarões também estão intimamente ligados à medicina tradicional chinesa como alimentos 'Bu'. Os alimentos 'Bu' são vistos como fortalecedores e suplementos, tendo a capacidade de equilibrar o corpo de volta à harmonia (Newman, 2004), além de possuir características tónicas e afrodisíacas (Clarke et al., 2007). Por serem animais selvagens, os tubarões também são vistos como mais 'Bu' que outros alimentos não selvagens, uma vez que são percebidos como 'não poluídos', 'preciosos' e 'especiais' (Anon., 2010).

3.1.4 Perspetivas atlânticas e mediterrânicas

Embora com menos relevância cultural que nas regiões anteriores, a inclusão de tubarões nos mitos da Grécia Antiga pode, eventualmente, ser resumida em três contos, demonstrativo da sua importância relativa. O Mito de Lamia, filha do deus do mar Poseidon, que foi transformado num monstro gigante com a forma de tubarão para que esta pudesse devorar crianças inocentes (Morjetta et al., 2018; Seltman, 1920). O Mito de Cetus, no qual um monstro gigante tubarão / baleia foi enviado para capturar a princesa Andrómeda, filha de Cassiopeia (Burnham & Tirion, 2003). O Mito de Akheilos, filho de Zeus e Lamia, que se transformou num tubarão como punição depois de se gabar de ser mais atraente que o deus da beleza, Afrodite (Christou & Ramenah, 2019).
Já nas culturas atlânticas, os tubarões eram vistos principalmente como um recurso ou mesmo como uma fonte de perigo. Do conhecimento do autor, não existe qualquer lenda ou mito europeu relevante sobre tubarões. Menções a estes incluíam descrições em histórias naturais ou nos diários das marés, como criaturas quiméricas, muitas vezes misteriosas e ameaçadoras (Ellis, 2012; Castro, 2013). Na costa sudeste da América do Norte, especificamente no sul da Flórida, restos arqueológicos de tubarões foram encontrados, indicando que os tubarões eram um importante recurso alimentar para os índios (Ellis, 2012).

3.2 Da descrição biológica às implicações psicológicas

Considerado o pai da classificação biológica, as obras de Aristóteles *Historia Animalium* e *De Generatione Animalium*, datadas de 330 a.C., começaram a organizar e descrever os animais de acordo com suas características físicas e fisiológicas. Aves, peixes (com uma referência especial aos tubarões), golfinhos, cães e muitos outros foram alguns dos animais descritos (Castro, 2013). Embora a classificação e descrição científica inicial dos tubarões provavelmente tenha começado na Grécia Antiga, foi apenas no século XX que o conhecimento científico sólido progrediu. Começando com a mera identificação de espécies de tubarões, o conhecimento aumentou para descrições detalhadas da sua anatomia, biologia, fisiologia e comportamento, principalmente devido a dois ictiólogos, Bashford Dean (1867-1928) e Eugene Willis Gudger (1866-1956) (Castro 2013). Estes dois investigadores lançaram as bases para mais conhecimentos surgirem. Principalmente devido ao financiamento de pesquisa do Gabinete de Pesquisa Naval americano entre 1950 e 1980, o conhecimento acerca da biologia, mecanismos sensoriais e comportamento dos tubarões aumentou consideravelmente, permitindo uma perceção biológica e desprovida de mitos destes peixes (Castro, 2013). Os tubarões começaram, então, a ser vistos, pelo menos pela comunidade ictiológica, como alguns dos mais relevantes predadores marinhos com uma importância ecológica fundamental. Esta alteração influenciou sobremaneira a comunidade científica e os tubarões estão hoje sujeitos a uma ampla variedade de abordagens de investigação. Desde as ciências biológicas às ciências sociais, os tubarões são agora um tema recorrente em muitas revistas académicas. E embora o conhecimento sobre tubarões seja gradualmente mais abrangente e disponível para a comunidade científica, a perceção deste grupo de peixes, no contexto cultural e societal ocidental, continua um pouco oposta à sua verdadeira biologia e ecologia. Existe, portanto, ainda um desfasamento entre o conhecido do percecionado. Para os não especialistas, informações gerais sobre tubarões têm sido, nas últimas décadas, fortemente influenciadas por notícias, slogans e documentários. Alguns conceitos psicológicos fundamentais que moldam pensamentos e comportamentos quotidianos em relação à vida selvagem entram aqui em jogo.

Neste contexto, um estudo de revisão bibliográfica foi elaborado, e que se apresenta de seguida, e que permite um enquadramento integrado das influências cultural, psicológica e política que condicionam atualmente as estratégias de conservação deste grupo zoológico.

Changing trends: Beliefs and attitudes toward sharks and implications for conservation[1]

Abstract:

As history shows, and contrary to modern western society's feelings, sharks were once respected and worshiped. Today, media outlets and other forms of mass communication perpetuate the image of the shark as the scary man-eating machine, leading to an increasing pressure on shark populations, which face serious conservation challenges in the immediate future. Understanding that people's attitudes about sharks will influence their willingness to find a way to coexist with them, it is essential to acknowledge these attitudes when developing conservation measures. Just as risk management policies must adapt to new evidence-based information, so must shark conservation efforts adapt to the realities of public opinion.

This perspective review highlights some of the current research on the beliefs and attitudes people have toward sharks, hoping to help policymakers and stakeholders, such as Environmental Non-Governmental Organizations (ENGOs) and the zoological community, among others, to better address some of the shark conservation challenges ahead.

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Introduction

Early scientific classification and description of sharks started in Ancient Greece, but it was only in the 20th century that sound scientific knowledge progressed (Castro, 2013). Starting with the mere identification of shark species, knowledge increased to detailed descriptions of their anatomy, biology, physiology and behavior (Castro, 2013). Mostly due to the research funding from the US Office of Naval Research between 1950 and 1980, knowledge on shark biology, sensory mechanisms and behavior grew considerably, enabling a more biological and myth-free appreciation of these fish and an understanding of their importance to a balanced ecosystem (Castro, 2013). This trend shift has greatly influenced the scientific community and sharks are now subject to a wide array of research approaches which may lead to an equally wide array of publications which can help to broaden the public's perception. Ranging from biological to social sciences, sharks are now a recurring theme in academic journals, news bulletins, movies and documentaries (for a review, see Pepin-Neff, 2019).

The purpose of this essay is to present some of the current relevant topics and areas that help us better understand the social framework of sharks and its consequences for conservation efforts. By highlighting some of the most recent literature on public perception and management of sharks, we explore factors such as media influence, policy management, knowledge and attitudes toward sharks, as well as, for the first time, the stereotypical traits of the shark that affect public opinion and shark conservation. While public prejudice toward sharks, enhanced by inaccurate media reporting, is detrimental to future shark survival and current conservation efforts, history shows us that perceptions can be changed. In centuries passed, marine mammals - now revered and loved - were once vilified. As our feelings toward these animals changed, so did our motivation to protect them.

Current conservation status

Today, shark populations face the threat of extinction worldwide due to many factors, one of which is overfishing driven by the high demand for shark fins (Dulvy et al., 2014). By-catch fishing, where sharks are caught as a non-target species, recreational fishing, fishing for the cosmetic or health supplement industry or destruction of habitat are amongst other real and current threats to sharks. Removing sharks in an unsustainable way, either through targeted fishing or by-catch, will result in cascading effects in the trophic structure of the entire ocean (McCauley et al., 2010; Estes et al., 2011). As shark populations decrease, ocean biodiversity diminishes leading to a decrease in fish stocks. Since we, as humans, increasingly depend on fish as a protein source, any decrease in fish availability has a global effect on global nutrition (FAO, 2014). Although there is a general lack of reliable reporting on the number of sharks caught annually, according to the Food

and Agriculture Organization (FAO), shark fisheries worldwide increased threefold between 1950 and 2000, reaching a peak of 888,000 tons per year. Since then a decreasing trend can be observed with about 11% fewer catches in 2014, although this decline was not directly related to fisheries management (Davidson et al., 2015). In fact, this decrease was mostly due to fishing pressure and ecosystem attribute measures. Despite this decrease in shark catches, an increasing number of shark species are already listed as endangered according to the International Union for Conservation of Nature (IUCN). By 2009, around 24% of shark species were considered to be endangered by the IUCN Red List (Dulvy et al., 2014). More recently, Pacoureau and colleagues (2021) showed a dramatic 71% decrease in the world population of sharks and ocean rays since 1970. Due to an 18-fold increase in fishing pressure throughout the last decades, 75% of all sharks and rays are at risk of extinction.

From a distant reality to a close threat

Public perception, especially in the last decades, has greatly contributed to this negative decline in shark populations. Although public sentiment and species decline may seem disconnected, the indirect influence of the public's negative perception of sharks has led to an overall vilification of these animals and subsequent anthropogenic threats on their survival.

Once upon a time, in a not so distant past, when the coastal areas began being used for recreational activities, myths and stories about marine life, told from generation to generation did not compromise the interest in playful exploration of the marine ecosystems. Indeed, throughout the 20th century, several authors described the general perception of sharks as opposite to the dangerous animals we now observe (Coppleson, 1958; Cortney, 1962; Whitley, 1940). It was probably the movie ‘Jaws’ (1975), commonly referenced as a turning point in the western perception of sharks, that massively influenced the public’s perception about sharks with a worldwide ripple effect. Shark fear spread around the world and this apparent phobia conditioned bathers and beach goers’ behaviors, afraid to get in the water because of the potential danger underwater. The media was quick to take advantage of the public’s reaction and continued to exacerbate this fear of sharks because of the popularity and enthusiastic response to stories about supposed "shark attacks".

Media as a key actor in the shark’s public image

Even though public perceptions are not shaped exclusively by the media, it is commonly accepted that the media does play an important role in the public’s attitude towards a specific topic. The media often shapes public debate in terms of setting agendas and focusing the public’s interest, limiting the information with which audiences understand particular subjects and removing

alternative thoughts from public debate. This was confirmed by McCagh et al. (2015) by studying the influence of the media on the development of the management of the presence of sharks on the coast of Australia. Results showed that, although media-directed public pressure apparently influenced the decision to implement mitigation measures (safety nets), culling of shark populations in an effort to protect people did not have the public's support. The authors also identified several dissonances in media coverage (use of emotive language about man-shark incidents; use of two opposing framings: anthropocentric and conservation) that contributed to the public's perception of ineffective management, stressing the importance of rethinking the communication, and involving the population, researchers and stakeholders in the strategic design. Sabatier and Huveneers (2018) study also reinforced this idea of media 'attempting' to shape public opinion, by looking at the way media reported events of contact between sharks and humans between 2011 and 2013 in Australia. By analyzing over 350 articles published in popular newspapers before and after a series of 6 fatal attacks, the media framework tended to exaggerate public anxiety about the presence of sharks. The results obtained reinforced the idea of the need for government agencies, the scientific community and the media to work closer together on communication, in order to provide concrete and effective advice and information about the biology and behavior of sharks. Hardiman and colleagues (2020) found similar results when surveying the content of four major newspapers in Australia, during a period of record human-shark interactions in 2015, resulting in just 2 fatalities within the study period. As the authors highlight, the news content was strongly focused on the negative aspects of these interactions. Among the 309 articles analyzed, most were markedly anthropocentric, emphasizing the risk to humans from sharks and with negligible mention to shark conservation. Also worth mentioning, accompanying photographs pictured human 'victims' or 'dangerous taxa'. Of 70% of all studied articles with at least one photograph, almost half featured sharks and within these, a marked predominance of images of the Great White was noted. As information now comes to people through social media, as well as more traditional methods, scientists are beginning to take the stage and make use of social media channels, like Twitter and Facebook, to reach out to an increasingly broader public (Parsons et al., 2014; Côté & Darling, 2018; Kidd et al., 2018). With sound and realistic information about threatened species, many scientists are now betting on this parallel source of information to reach out and nudge those who may later take a stand to counteract misinformed narratives. Le Busque et al. (2019) analyzed the content and themes of 2,643 Facebook posts by 100 Australian media outlets in 2016. Around 76% (2,018) of all posts and 35,553 users' comments, were shark-related and included in the study analysis. Only 49 (out of 366) days did not include news in any way associated with sharks, which denotes the abundance of the theme in Australia's news scene. At the global scale, a total of just 95 reported human-shark interactions happened that year (26 in Australia and 69 elsewhere), but they accounted for 76% of

the social media posts and 87% of the year's media posts. Of the 19 shark-related identified themes, human-shark interactions were the most common theme in the Facebook posts, comprising close to half (45.6%) of the overall posts. Interestingly, the information collected from the users' comments, as a way to understand the general public's reaction to the specific media theme, showed a general fear towards the ocean, even though most users expressed that they were not in favor of aggressive mitigation techniques, such as drum-lines or culling. Following this last study, Le Busque et al. (2021a) strived to understand what impact media messaging has on people's risk perception, acceptance of sharks, blame towards sharks, and preferred methods for reducing shark interactions. Four different types of media headlines (non-shark attack: e.g. 'Extremely rare megamouth shark caught in Japan'; non-intent: e.g. 'Shark attack: Shark Mistakes surfer for seal'; statistics: e.g. 'Taking a selfie on a cliff is more risky than a shark attack, says academic. Zoo tries to save shark's reputation'; and sensationalism: e.g. 'Stay out of the water. Shark attacks have hit a record high around the world and experts say the number is set to rise') about sharks were tested for their influence. Although the authors found no significant differences in any of the measured items (risk perception, acceptance of sharks, blame towards sharks, and mitigation preferences) between pre and post exposure to the headlines, the participants' associated thoughts of the media approach and sharks in general confirmed their belief that the media usually portrays sharks negatively, using terms such as 'monsters', 'savages' and 'mindless killers', intentionally evoking fear emotions and exaggerating stories for sensationalism. Ostrovski and colleagues (2021), through the application of an online questionnaire, asked 354 Brazilian citizens about their perceptions of sharks, including media influence. Results confirmed what was previously found in other studies, i.e., respondents pointed to media, such as films, news or documentaries, as a source of fear and negative influence on their perception.

Stereotypes, attitudes and knowledge

The last two decades showed a growing number of research efforts focused on acknowledging the people's current perceptions toward sharks, hoping to better understand the social cognitions behind the shark's reputation. Knowledge of the public's attitudes towards animals not only influences coexistence between the two but is also an essential factor in the implementation of applicable and effective conservation and mitigation measures (Batt, 2009). Like Kretser et al. (2009) points out, in the context of the conflict between wildlife and man, acknowledging attitudes is crucial. As such, an honest and complete understanding of what psychological drivers affect the public's behavior toward sharks will allow conservation actors to create effective campaigns and efforts. Although the shark is considered one of the 20 most charismatic animals according to Albert et al. (2018), current narratives continue to associate

negative connotations that affirm the idea of the ruthless and voracious predator (Muter et al., 2013; Neff & Hueter, 2013).

A gendered, mixed stereotype

Overall, plenty of knowledge on the peoples' attitudes toward sharks has emerged over the last two decades. To date, various quantitative and qualitative methods have been used to study attitudes towards sharks or shark conservation including the general knowledge about sharks (Friedrich et al., 2014), attitudes toward sharks (Thompson & Mintzes, 2002; Acuña-Marrero et al., 2018), conceptual maps (Thompson & Mintzes, 2002), content analysis of websites (e.g., Discussion board, see Shiffman et al., 2017), newspapers (Boissonneault, 2011; Boissonneault et al., 2005) and movies (Rugen, 2013), people's fear of sharks (Le Busque et al., 2021b) and finally analysis of children's drawings and interviews (Neves & Monteiro, 2014).

To our knowledge, not much research has been done on detailing the stereotype of the shark, except from two recent studies by Neves et al. (2021a,b). In one study, the authors found the shark to be associated with a stereotypical gendered perception, i.e., mostly perceived as a masculine social object (Neves et al., 2021a). The authors highlight the possible connection to the social approach which posits that men and women are socialized to endorse and valorize stereotypical gender roles. Males are usually depicted as more competent (e.g., active, independent, egotistic and action-oriented) and female as more social (e.g., passive, dependent, generous and family care-oriented). Thus, sharks being seen as highly agentic and less communal animals may carry with them those same expected stereotypical social roles associated with males. In one other study (Neves et al., 2021b), the shark was found to fit in the threatening-awe/predator stereotype (high competence and low warmth), a mixed-stereotype associated with admiration, fear and avoidance or harmful behaviors, as previously found by Sevillano and Fiske (2016) for other animals such as lions or bears. Animals associated with such mixed stereotypes usually evoke respect and fear because of their perceived high competence (e.g. aggressiveness, dominance), but also hold our attention and admiration due to other traits such as beauty, intelligence, determination, etc (Sevillano & Fiske, 2016a). This newly published work highlighting the similarities between our stereotypes of sharks and our stereotypes of male gender (powerful, self-centered, antisocial) may be a critical point in understanding our perceptions and also in controlling them. Is there a possibility that conservationists and educators using female mascot sharks as teaching tools could help to reassign our perceptions of sharks from male stereotypes (dominant, aggressive, loners) to female stereotypes (warm, maternal, social) from the very early stages of education?

Education and gender-related attitudes

Thomson and Mintzes (2002) were the first to adapt Kellert's Attitudinal Inventory for sharks with regard to education and gender and the identified parallels have been confirmed in subsequent studies (Garla et al. 2015, Tsoi et al. 2016). Higher knowledge was consistent with greater scientific and naturalistic attitudes and lower utilitarian and negative attitudes. Females were significantly more moralistic and significantly less naturalistic and utilitarian than males. Also, personal experience with sharks, pro-environmental attitudes and exposure to specific media coverage, with a relatively high profile of conservation messaging, proved to be relevant factors for a positive image of sharks.

More recently, Lucrezi et al. (2019) searched for the attitudes and perceptions toward sharks of beachgoers in South Africa. They found that basic knowledge of sharks positively influences attitudes and reduces the perceived risk they pose. Half of the participants who learned about sharks when children, criticized current shark media framing and folk culture.

For these authors, educating the general public on basic knowledge about sharks should be a first step to influence their attitudes and behaviors. Three main challenges related to this step were drawn from this study: reducing the 'distance' between people and sharks, including more information about sharks through school education and addressing misinformation and misbelief toward sharks.

Biased policy management

Human-shark interactions are considered low probability / high consequence events so any incidents will attract substantial media attention for short periods of time, greatly affecting the general perception of these animals. This, just as mentioned before, influences government policy responses which tend to magnify fear messages, influenced by feelings about the idea of a given outcome rather than the reality of its occurrence. This apparent knee-jerk policymaking in reaction to anecdotal situations of human-shark interactions is now being questioned in its effectiveness by that same public opinion which policymakers want to influence.

By incorrectly citing facts, presenting them out of context or from unknown sources, and even the existence of coverage bias on specific topics, simplified or inaccurate information about sharks in the media is affecting people's understanding of the real problem sharks face today. In fact, people ill-informed about threats and solutions can condition successful conservation projects that already exist through the active acceptance of wrong policies (without confirmation from science-based information) or by voting for policies that support the wrong strategies. This general misunderstanding was confirmed by Shiffman et al. (2020) through the study of the mainstream

media aimed at understanding if the layperson could actually learn about sound and factual shark conservation through mainstream media.

Policyholders also seem to be negatively influenced by the media. This was confirmed by Neff (2015) who studied the way in which several Australian political actors used movie narratives to influence risk management measures after shark accidents. Through an analysis of political decisions for risk management after shark accidents between 2000 and 2014, the author concluded that many of the political speeches, and inherent legal consequences, were aligned with cinematic narratives rather than based on scientific evidence.

Mitigation measures and public acceptance

Even after the occurrence of human-shark interactions, the implementation of risk management strategies may well be an overestimated narrative by policyholders as a safeguard to beachgoers.

Neff and Yang (2013) studied the attitudes, before and after shark accidents, among residents of two coastal cities in South Africa, cities with a history of continuous presence of Great White Sharks on the coast. The results obtained demonstrated that both levels of pride in the local wildlife, as well as confidence in the safety measures in force did not change after shark attacks. This was the first study that dissociated attitudes towards the occurrence of shark accidents, questioning the narratives commonly used by the media and governments to manage risk situations at the expense of shark lives. It also demonstrated that it is possible to assume that shark attacks do not always produce negative emotional responses, confirming that a strategy of general information on behaviors and preventive measures can be more effective than directly negative measures for shark populations.

Gibbs and Warren (2015) studied the attitudes of ocean users in Australia when they encountered sharks and about the mitigation measures imposed, namely the directed killing of sharks. Results showed that these ocean users showed a positive attitude towards sharks, being aware of the need for personal experience adjusted to the associated risk. Most were opposed to the mitigation measures based on direct killing, supporting instead more research and education focused on shark behavior in order to understand and accept the risks associated with using the ocean. In accordance with these findings, Pepin-Neff and Wynter (2018) studied the public attitudes and risk management preferences after shark accidents, in 2015 and 2016, in two Australian cities. Even after serious accidents resulting in deaths, study participants showed they preferred non-lethal shark risk management policies, stressing that the attacks would have been accidental rather than intentional. According to the authors, the Australian public seems to have a more equitable

perception of sharks with fish than sea monsters, considering the sensationalist language of "shark attacks", often adopted by political leaders.

Despite the growing scientific evidence showing that a major issue in shark conservation is in the way we look at and act towards the shark and not in the negative impact the shark objectively has on humans (human-shark interaction), the misunderstanding about which management and conservation policies should be implemented, and which may work best in certain situations, remains.

Slow but growing awareness

Even though negative attitudes toward sharks are still dominant, there is growing evidence that things may be slowly changing (Mazzoldi et al., 2019) and a gradual but clear shift toward appreciation for sharks can be seen through analysis of popular media.

In a Whatmough et al. (2011) study where the authors analyzed the content of 94 water sport-related magazines dated between 1953 and 2006, significant changes in diver and recreational fishermen's attitudes towards sharks were noted over time. A shift was noted in the value they placed in the shark, increasing over time the perceived value in their existence in the wild and a lowering value of catching sharks.

Over the last 20 years we have seen a change in the narrative of nature documentaries, markedly defined by scientific facts about sharks (Mazzoldi et al., 2019). Discovery Channel's Shark Week, a program that has been running every year since 1988, is an essential television event in western society, annually bringing together tens of millions of viewers in more than 70 countries (Hibberd, 2014; Hamedi, 2014). Evans (2015) carried out a content analysis study on Shark Week's programming between 2001 and 2012, where he confirmed an increase in the presence of scientific and conservation content from 2010, although numerous narrative elements that continued to be used to present sharks as deadly predators, reinforcing the negative and prejudiced idea of these fish.

The future in the making

Despite an overall media focus on misinformed facts, interventions promoting integrated nature and digital-based activities are now being drawn that hope to appeal to an ever-growing digital-media-oriented youth (Larson et al., 2019; Edwards & Larson, 2020). These interventions make use of engaging communication strategies and using technology-enhanced learning approaches, among others.

Another effective tool in changing the perceptions of many species with associated prejudices is the long-term exposure to documentaries and other forms of mass streaming tools.

Although today it may seem otherwise, cetaceans, like whales and dolphins, were once vilified. There are countless historical records where whales were perceived as synonyms for danger in the sea (Bearzi et al., 2010). According to Mazzoldi et al. (2019), 1851 Herman Melville's Moby Dick novel initiated an attitudinal change in relation to this group of charismatic marine animals. Later, with the use of other communication and awareness tools, such as television and subsequent documentaries, there was a change in public perception of these animals. Since then, the perception of these marine animals has moved to a universe of scientific interest and the need for protection. A similar change in perception has also occurred with dolphins. Although historical records are not as negative as with whales, dolphins did not enjoy the positive status they have today. Although they were not perceived as a danger to man, they were often considered pests for fishing. They were, therefore, targeted for capture or extermination, due to their role as predators of other fish (Bearzi et al., 2004).

We may also hope to find allies where they are least expected. Balmford et al. (2002) tested children's knowledge of natural and unnatural history. These authors found that children between the ages of 4 to 11 recognized and described man-made characters (Pokémon 'species') with more detail and ease than those drawn from the local and national wildlife. These findings give conservationists some very interesting food-for-thought. The use of likeable animated but man-made species as tools for connecting students with animals may be more effective than the use of biologically accurate images of species found in nature. Even though, to our knowledge, no specific study was done with sharks, there is a path yet to be explored.

Other stakeholders involved

As mentioned before, evidence shows that increasing knowledge directly relates to more positive attitudes toward sharks. Although the 'shark' concept has not been integrated in formal school education, for the last decades, different social players (aquariums, ENGO's, etc.) have been working, individually or collaboratively, to change the laymen's perception of sharks aiming to protect them. Aquariums worldwide have a tremendous potential to educate and engage in conservation, as well as helping to invert some erroneous concepts. With more than 700 million visitors every year (WAZA, 2005), the majority of these institutions strongly embrace conservation education while offering visitors unique and different educational experiences when compared to the traditional and more formal learning experiences (Belle, 1982; Colardyn & Bjornavold, 2004). This strategy also allows visitors a close visual or physical contact with many species, among them sharks, properly planned and available for interpretation or complementing formal education methods, thus contributing to an increase of species-driven conservation awareness (Ogden & Heimlich, 2009; Packer & Ballantyne, 2010). Even though individual zoos and aquariums may

deploy their daily activities independently, there are several concerted international efforts focusing on sharks. These efforts, many times in the form of international campaigns, involve governments, ENGOs and schools in strategic and cross-sector synergies. And though communication strategies are changing, such as adopting the IUCN's 'Love, not loss' approach, these institutions are still struggling to find ways to, effectively and consistently, reframe laymen's shark-view with the true nature of sharks.

One recent study conducted by Pepin-Neff and Wynter (2018a) showed that this is, in fact, possible. By priming aquarium goers with different messages to test a possible reduction of perceived fear of sharks, they found very promising results. Priming visitors before entering a 'shark-tunnel' with science-based education messages, common to many facilities worldwide, did not reduce the visitors' perception of sharks as sources of threat and fear. Conversely, by priming visitors with messages highlighting qualities having nothing to do with a shark's hunting abilities and adaptations, as well as their lack of intention to prey on humans, fear significantly decreased thus exposing a subtle communication strategy to change attitudes toward sharks. In sum, research has shown that the more knowledge people have about sharks and their perceived importance to the marine ecosystem, the more favorable attitudes and pro-conservation intentions they possess (e.g., O'Bryhim & Parsons, 2015) and contributions may come from other indirect stakeholders.

Conclusion and agenda for future research

Current research on beliefs, knowledge and attitudes toward sharks lead us to believe that there is an ongoing trend toward the conservation of shark populations. Today, there seems to be a dichotomy between perspectives in the western world. While some countries are showing signs of a social transformation from protection 'from' to 'for' sharks (e.g. Friedrich et al. 2014, Pepin-Neff & Wynter, 2018a), others are yet far from these shift and still perceive sharks as sources of fear and danger (e.g. Tsoi et al., 2016, López et al., 2018). This transition from bad to good/needed is due to our increasing comprehension of the many psychological factors involved in decision making, risk management, public awareness and science-based knowledge. As Neff (2015) remarks, we live in a world evermore connected, where the emotional perception of multiple, frequent and clustered events is unlimited. The overwhelming amount of news, social networks and other communication tools enhance the way people perceive the frequency and intentionality of interconnected events, increasing the public's anxiety and driving national and local policy makers to immediate and, yet to be determined, effective actions to the associated risk. In the end, shark populations are those that really suffer in the long run.

As sharks are culturally constructed objects, we believe that there is a clear need to deepen the knowledge of their social representations, a very little explored area, allowing access to

information about our collective and shared perception. Expanding and detailing these social representations will allow explaining and substantiating opinions and behaviors, useful to improve the effectiveness of many conservation approaches. Moving from theory to practice, we propose that by selecting specific representations (positive and congruent to the aimed message), it is possible to avoid dissonant messages from the current social dialog. As social representations are not fixed in time, these selected messages, to be included in communication campaigns and education strategies, may lead to a change in the perception of sharks in the long run. In addition, and as these animals trigger strong emotional reactions, studying the psychological underpins of the shark's negative stereotype, which often lead to unwanted attitudes and behaviors, is also of fundamental importance. On a practical perspective, by acknowledging the mixed stereotype of sharks (Neves et al., 2021b), the use of strategies to enhance the warm perception of sharks may lead to more empathetic emotions and thus more positive emotional reactions. This could be done through the use of a careful anthropomorphic approach when communicating about sharks. As mentioned by Chan (2012), through the use of anthropomorphic features such as attributing human names to the characters, emphasizing unique personalities, social nature, and rich mental and emotional life, it is possible to create greater public interest in their conservation. The authors also argue that the existence of a gendered stereotype (Neves et al., 2021a) is of foremost importance to any communication approach. As social role theory posits, sharks being perceived as male social elements carry with them a set of stereotypical perceptions contrary to the aimed conservation messaging. If opting for communicating through storytelling, the use of key female characters instead of the already marked male perception, could help nudge the emotional component of attitudes and the willingness to participate in conservation actions. As sharks are usually portrayed as solitary animals detached from human presence, we also argue that it would be beneficial to add humans and sharks in the same frame in future communication strategies and education approaches. This would work in addition to other measures to encourage a slow but consistent stereotype change.

It is also important to continue to acknowledge the weight that knowledge has on attitude formation and, consequently, its implication on future conservation strategies. Education of new generations, outlining strategies tailored to different age-groups, and using regional social norms to facilitate the integration of new conservation messages, should be considered.

Lastly, but not of least importance, aquariums and other ENGO's focused on non-formal and informal education approaches should also have in mind that most current awareness strategies may well be stereotype maintainers. Contextualizing the shark through its biology and ecology may not add much for changing its resilient stereotype and inherent prejudice, as noted by Pepin-Neff & Winter (2018a). Oftentimes, by embracing the shark's unique and extraordinary biological

characteristics, it may only be reinforcing its competence and adaptability, giving rise to some cognitive dissonance when appealing to its conservation. We argue that leveraging the social aspects of sharks, instead of the biology and ecology facts, should bring benefits to the overall perception of these animals. There is, however, a thin line to be taken into account. A common message of many aquariums is to highlight the non-dangerous nature of sharks (which, although scientifically sound, is nevertheless a counter-normative message) and this may well be inducing the same cognitive dissonance to the target audience and, thus, be ineffective in the long run.

In sum, history has shown that it is possible to reverse the current social perspective of some animals. Cetaceans (Mazzoldi et al., 2019) and manatees (Goedeke, 2004) are good examples of such shifts in public opinion and conservation efforts. As for sharks, increased education, different communication strategies and a growing awareness in some media outlets and policyholders are, no doubt, working toward their sustainability and conservation, despite the long way still to go.

4. ESTUDOS EMPÍRICOS

Estudo 1

Social Representations of Sharks, Perceived Communality, and Attitudinal and Behavioral Tendencies Towards Their Conservation: An Exploratory Sequential Mixed Approach.[2]

Abstract

Sharks are crucial to the marine ecosystem, but they are critically declining. Their bad public image explains, to some extent, the lesser concern for their conservation compared to other marine species. Extending previous research which has mainly focused on the study of attitudes towards sharks, we propose a two studies sequence, first by exploring the shark's social representation, followed by an exploration of some stereotypical traits that may affect attitudes toward shark conservation. Study 1 specifically explored the social representation of sharks in a sample of zoo goers (N = 979). Main results showed that the representation was ambivalent and participants considered sharks as human predators. Surprisingly, findings showed that sharks were also seen as highly agentic and little communal animals. Consequently, Study 2 (N = 60) was designed to more thoroughly explore this gendered view as well as its implications in the attitudes and behavioral intention towards shark conservation. Results showed that, although sharks were again perceived as highly agentic, it was the perception of the sharks' communality that was associated with more positive attitudes towards their conservation and a higher tendency to choose a shark conservation trust as first choice. Implications of studies 1 and 2 results for sharks' conservation communication strategies and policies are discussed.

[2] Baseado em: Neves, J., Giger, J. C., Piçarra, N., Alves, V., & Almeida, J. (2021). Social representations of sharks, perceived communality, and attitudinal and behavioral tendencies towards their conservation: An exploratory sequential mixed approach. Marine Policy, 132, 104660. https://doi.org/10.1016/j.marpol.2021.104660

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Introduction

The worldwide population of sharks is critically declining. However, sharks generate less conservation concerns in the general population than other iconic sea animals like dolphins. Scholars attribute the lesser interest of the public to shark conservation to their bad image and reputation. The present paper is aimed at studying sharks' image to understand how it can interfere with public attitudes and behavioral intentions towards their conservation. More precisely, Study 1 explores, qualitatively, the social representation of sharks, and Study 2 extends Study 1's results by exploring, quantitatively, the association between shark's stereotypical features (i.e., agency *vs.* communality) and attitudes and behavioral intentions towards their conservation.

Sharks public image and its impact on conservation

From all marine species, sharks are probably the most vilified species by the general public (Dobson, 2008; Hoyt, 2013). Indeed, sharks are consistently ranked in the top 10 of the scariest and least liked animals (Kellert, 1985a,b). They are seen as bloodthirsty man-eating machines (Boissonneault, 2011; Boissonneault et al., 2005) (see also Neff and Hueter (2013) for a review of the origin of sharks as man-eating monsters). Popular entertainment has greatly contributed to such a bad reputation, and has particularly been detrimental to sharks. Peter Benchley's 1974 best-selling book, *Jaws,* followed by Steven Spielberg's 1975 Hollywood blockbuster accompanied by John Williams' ominous theme song, have profoundly marked the mind of worldwide audiences, triggered individual fears, influenced behaviors, and generated long lasting secondary effects with the media-driven shark panic (Neff & Hueter, 2013). Since then, advertisement, entertainment (e.g., *Deep Blue Sea*, *The Reef*, *Sharknado* series, *Finding Nemo*), TV news (e.g., sensationalist headlines and coverage when shark bite incidents happened (Phillpott, 2002; Nel & Peschak, 2006)) or so-called documentaries (e.g., Discovery Channel Shark Week) keep on exploiting and reinforcing the sensational bloodthirsty "ferocious" imagery of sharks. Moreover, the colloquial use of "shark" in daily life language refers to a manipulative, aggressive, unscrupulous, ruthless, cruel, efficient, intelligent, without moral and merciless person (e.g., see dictionaries like https://www.yourdictionary.com for English speaking or https://www.larousse.fr/ for French speaking contexts) . The TV program "Shark Tank" personifies implacable and avid businessmen/women as sharks. In business, the image of sharks is also recycled. For example, Lynch and Kordis (1988) used a marine metaphor to describe three kind of negotiators: sharks (there is one winner -them- and they rely on aggressive and conflictive taking over or trade-off style), carps (they dislike confrontation and are most of the time eaten alive) and dolphins (the ideal negotiators because of their intelligence, their ability to learn, their cooperative nature and respond appropriately to shark like behaviors).

Globally, the entertainment and business industry has, so far, transmitted an extremely simplified and caricatural image of sharks despite their impressive biological and ecological diversity, and has contributed to propagate erroneous or partial knowledge about and negative attitudes towards them. As a consequence, the Great White Shark (*Carcharodon carcharias*) turned out to be the mental prototype of sharks' category despite their wide diversity of body shapes and ecological adaptations (Lucifora et al., 2011). Indeed, the term "shark" covers between 409 and 512 species of sharks (Hamlett, 1999), from small ones like the Dwarf Lanternshark (*Etmopterus perryi*) measuring only 17 centimeters, to larger ones like the biggest fish in the world, the Whale Shark (*Rhincodon typus)* which reaches 18 meters in length (McClain et al., 2015). In fact, and contrary to the general perception, 82% of sharks are less than two meters long (Ebert, 2003). Similarly, although it is true that the common perception of sharks fit the profile of apex predators (i.e., organisms at the top of their underwater food chain), such as the Tiger Shark, the Great White Shark, the Mako Shark (*Isurus* spp.) or the Hammerhead Shark (*Sphyrna* spp.), there are others which feed on organisms that make up the bottom of the ocean food chain. Even though in a small proportion to the overall group, species such as the Basking Shark (*Cetorhinus maximus*), the Whale Shark and the elusive Megamouth Shark (*Megachasma pelagios*) feed directly on small fish and plankton. In sum, not all sharks are big, nor are all top predators. Finally, although some species may be more dangerous and do require caution, most of them are either afraid of or have little to no interest in human presence (Jackson, 2000; Rose & Laking, 2008) and have never been reported to attack humans (Ebert, 2003).

The negative public image of sharks has been linked with overestimated shark-attack risks (Sabatier & Huveneers, 2018), public fear (Pepin-Neff, 2019), limited support for and success of global shark conservation efforts [Thompson & Mintzes, 2002; Muter et al., 2013; Gibbs & Warren, 2015; Shiffman, 2014; Simpfendorfer et al., 2011; López de la Lama et al., 2018; Lucrezi et al., 2019) and has indirectly favored governments' decisions to implement lethal programs (Lucrezi et al., 2019).

Another factor explaining the public's limited interest in helping shark conservation is that there are two other iconic sea animals which catch most of the public preference for conservation: whales and dolphins. Dolphins are especially relevant because they are depicted as the positive antagonists of sharks. Indeed, dolphins are perceived as courageous, noble spirits, spiritual, sociable and altruistic animals that protect both other dolphins and humans from sharks [26]. In the movie "The Cove" (Amante-Helweg, 1996), Dave Rastovich (24'55''to 25'32'') told the audience how, when surfing, a Tiger Shark was following him and how a dolphin saved him from potential attack by pushing the shark away. For ages, stories of benevolent dolphins saving humans from drowning and taking them safe to shore are told (see Sciama (1967)). Dolphins are also seen as more

intelligent than sharks. For example, Nakajima and colleagues (Nakajima et al., 2002) asked university students in Japan and the United States to estimate the intelligence of several animals and showed that dolphins reached the third place (after respectively chimpanzee and orangutan) while sharks came at the 24th position.

To sum up, compared to other endangered marine species, shark conservation efforts are slowed by a set of deep-rooted negative emotions, attitudes, and myths, that equate the absence of sharks with human wellbeing in the general public (Thompson & Mintzes, 2002).

Sharks decline and its consequences

The worldwide populations of sharks are critically declining (Jacques, 2010; Ward & Myers, 2005). As of 2009, around 24% of shark species were considered to be endangered by the International Union for the Conservation of nature (IUCN) Red List (Dulvy et al., 2014). According to this report, about a quarter of the species of elasmobranchs (sharks and rays) were threatened with extinction, that is, assessed or estimated as vulnerable, endangered or critically threatened with extinction and overexploitation occupied the top spot as the main threat to decreasing populations. More recently, a study by Pacoureau and colleagues (Pacoureau et al., 2021) updated this reality to a 71% decrease in the world population of sharks and ocean rays since 1970, due to an 18-fold increase in fishing pressure. This grim scenario now places 75% of all sharks and rays at risk of extinction. Such a decline can be attributed to commercial overfishing (Bonfil, 1994), recreational fisheries, the rising demand for shark fins (Jacques, 2010; Clarke et al., 2006), by-catch in fisheries targeting tunas and swordfish (Megalofonou, 2005; Aroucha et al., 2002; Peterson et al., 2009), illegal trade (Jacques, 2010), physical injury to sharks, pollution (Gelsleichter et al., 2005), habitat loss and degradation (Jennings et al., 2008), and climate change (Chin et al., 2010). Moreover, the long gestation, slow growth, late maturity, and low fecundity rate that characterize sharks prevent the quick regeneration of populations and make them particularly vulnerable to overexploitation (Cailliet et al., 2005; Stevens et al., 2000).

The decline of sharks has a significant impact on the marine ecosystem. Sharks play an important role in the regulation of the marine environment, and their decline will have undesired and unanticipated negative effects for both marine life and humans (Myers et al., 2007). Indeed, as apex predators, they are a key factor in the regulation of species abundance and distribution (Ward & Miers, 2005; Myers et al., 2007). For example, the depletion of sharks in North Carolina has provoked the increase of a species that they prey upon: the Cownose Ray (*Rinoptera bonasus*). This same species, without a predator to keep it in check, wiped out North Carolina's bay scallop oyster and clam populations, prevented their regeneration, and finally drastically affected the scallop fishery (Myers et al., 2007). In Hawaii, the reduction of Tiger Sharks (*Galeocerdo cuvier*)

populations caused the proliferation of juvenile seabirds that they prey upon, leading seabirds to decimate tuna fish populations (Polovina, 1984). In brief, protecting sharks is also protecting the overall ecosystem.

Contributions of social representations to understand public image of sharks

To date, the existing quantitative and qualitative studies have explored knowledge about sharks (Friedrich et al., 2014), attitudes (Thompson & Mintzes, 2002; Acuña-Marrero et al., 2018), or the content of conceptual maps (i.e., the relations between concepts or ideas) (Thompson & Mintzes, 2002), websites discussion boards (Shiffman et al., 2017), newspapers (Boissonneault, 2011; Boissonneault et al., 2005), movies (Rugen, 2013), and children drawings (Neves & Monteiro, 2014) about sharks. Globally, these studies have focused on individual knowledge and attitudes toward sharks, and, so far, little is known about the social representation of sharks. Social representation theory deals with how people turn an unfamiliar concept or object into a familiar one, and describes a) the processes of anchoring and objectification, by which people appropriate themselves a new concept or object, and b) the product of these two processes, that is, the collectively built and shared, common-sense and everyday knowledge about the concept or object.

Objectivation refers to the process by which a new concept or object is removed from its original context, and is converted into or represented by images, symbols or metaphors, which will constitute the figurative nucleus of the social representation. Anchoring is the process by which the new concept or object is assimilated, integrated into the mental categories associated with already pre-existing familiar concepts or objects. In short, while objectification produces the figurative aspect, anchoring provides the meaning. For example, in the 1990s, the new emerging concept of genetic engineering was objectified in the figure of 'Dolly the sheep' and was anchored in the idea of "cloning" (Curelaru et al., 2012). Social representations, as products of these two processes, are consequently always a simplification of a concept or an object, and may not reflect its complex scientific nature. Globally, social representations refer to a "system of values, ideas and practices with a twofold function; first, to establish an order which will enable individuals to orient themselves in their material and social world and to master it; and secondly to enable communication to take place among the members of a community by providing them with a code for social exchange and a code for naming and classifying unambiguously the various aspects of their world and their individual and group history" (Moscovici, 1973). To sum up, social representations function as a cognitive filter and influence the behavior (Abric, 1996). According to the structural approach (Abric, 1993), the social representation is constituted of a central and a peripheral system. The central system, also called the core or central nucleus, is

constituted of the more stable and consensual elements. These elements are the fundamental and necessary aspects of the representation. They represent the group consensus, and their function is to preserve the stability of the representation over time. Elements belonging to the first periphery keep a close connection with the central nucleus and give additional meaning. They help to maintain the nucleus stable. Indeed, they correspond to interindividual variability, and serve as a base for perceiving, understanding, and accommodating new unfamiliar objects to the central nucleus. The second periphery and the contrast zone act as buffers to contradiction or external threat. The contrast zone may also reveal matching ideas or representational elements held by a minority group. For example, Curelaru et al. (2012) investigated the social representation of cloning. They found that the central core was composed of the idea of *Duplication*, of negative emotions (e.g., *Fear*) and of a specific example: *Dolly*. The first periphery was mainly composed of medical procedures (e.g., *Experiment*, *DNA*) and some related concerns (e.g., *Identity*, *Unreligious*). The second periphery reinforced the first one by detailing various human and spiritual issues associated with cloning (e.g., *Sin*, *Personality*, *Artificial* or *Hope*). Finally, the contrast zone contained only two items: *Inhuman* and *Tube*."

The concept of social representation has been useful to understand perceptions and practices in various domains of human activity like for example business (e.g. De Rosa et al., 2019), healthcare (e.g. Robieux et al., 2018), social obedience (e.g. Pozzi et al., 2014), education (e.g. Danermark et al., 2014), technology acceptance (e.g. Piçarra et al., 2016), or economics (e.g. Gangl et al., 2012). Because social representations are a collective system of interpretation based on culturally shared values, ideas and practices, that go beyond the mere individual knowledge and attitudinal evaluation, we argue that studying the social representation of sharks can improve our understanding of their public image and the lesser public interest for their conservation.

Objectives of the research

Sharks are at risk of extinction and the population do not feel concern for sharks' conservation although they are a key element for the balance of the marine ecosystem. Public image of sharks was identified as one of the main inhibiting factors in their conservation. Understanding the content of such an image is then crucial. This research is composed of two sequential studies. Study 1 explores and details, for the first time, the social representation of sharks. Based on the results of Study 1, Study 2 was designed to explore shark's stereotypical traits that can have implications in the attitudes and behaviors towards their conservation.

Study 1 - Social representation of sharks

Study 1 is aimed at determining the social representation of sharks.

Method

Procedure

Data was collected at the entrance of an oceanographic park in Southern Portugal, between July and August of 2016. Randomization was guaranteed by selecting each participant from the entrance cue based on multiples of three in line. Participants were asked to write down the first words (up to ten words) that come to mind, when presented with the stimulus word. Only one stimulus word was presented at a time to each participant. The stimulus words were "Shark", "Dolphin", "Turtle", and "Crocodile". Order of word stimuli was randomized. This free association technique is commonly used to collect the constituent elements of social representations (e.g., Curelaru, 2012; Piçarra et al., 2016) in an informal and spontaneous way, without social judgement constraints. Each participant had the time s/he needed to complete the task, with no forced timing. Although Study 1 focuses on sharks, the social representation of dolphins was also collected because they are considered as the positive antagonists of sharks and can serve a point of comparison. "Turtle" and "Crocodile" were added to avoid the focalization of "Shark" *vs.* "Dolphin" comparison. Participation was voluntary and no identification was asked. All participants were previously informed that they could stop the task at any time, without incurring any prejudice and that all data would be treated holistically, respecting the ethical principles of confidentiality and anonymity. All procedures performed in this study were in accordance with the American Psychological Association (APA) ethical principles and the Portuguese regulation about data protection.

Lexicographical analysis

Lexicographical analysis is aimed to identify the elements that constitute the central nucleus and the peripheral system of the social representation. All data was transcribed to a spreadsheet and then analyzed using the software EVOC 2000 (Vergès, 2001), following Abric's theory of the central nucleus (Vergès, 2001) and Vergès and colleagues (2002) recommendations. The software EVOC 2000 provides a double entrance table indicating the central and the peripheral system (see Table 1) by crossing the frequency of evocation of the elements and their elicitation order (i.e. their rank of apparition in the evocation). The core is constituted by elements with a high frequency (i.e., evoked by a large part of the participants) and a low rank (i.e., elements appear first). The first periphery is composed of the highly frequent but late-recalled elements. The second periphery is constituted by the less often and late evocated elements. Finally the contrast zone is composed of elements with a low frequency and a low rank (i.e. evoked by a restricted number of people).

Some stimulus words produced a great amount of evoked elements (i.e., high heterogeneousness) while others produced less elements (higher homogeneousness). The minimum frequency is the point where elements' frequency changes from many words and very low evocation rank to few words and a higher evocation rank. Classical literature on social representations (Vergès et al., 2002) suggests the use of 2.5 as a cut-off point. In the present study, the mean order was 2.6 for all stimulus words because it provided a minimum common denominator for the inclusion of, at least, one candidate to the central nucleus in the "dolphin" stimulus word.

Similitude analysis

Lexicographical analysis determines the elements that belong to the central nucleus and the peripheral system of the social representation, but it does not provide any information about how the elements are interconnected. To explore how the elements relate to one another, a similitude analysis (Rouquette & Rateau, 1998) was conducted using the software SIMI 2000 (Junique et al., 2002). To reduce the number of evocations to a maximum of 30, all evocations with an average regency above 5 were excluded. This criterion, applied to all outputs, allowed to overcome the problem of excess categories of the first periphery. Maximum spanning trees were then graphically drawn for evocations of each stimulus word. Each word is connected to the one(s) more related to it. The thicker the line, the stronger the relation between ideas (Vergès, 2001).

Results

Participants

Zoo goers (N = 979; M_{age} = 36.9; *SD* = 10.9) have voluntarily participated in a free association recall task. This random sample was composed of 452 male participants (46%), 507 female participants (52%) and 20 participants did not report their gender. Half of the participants were Portuguese, and the other half were from different nationalities. Among participants, 7.25% (n = 71) have attended school up to 9th grade, 25.84% (n = 253) have a high school education, 56.89% (n = 557) went to university, and 10.10% (n = 98) decided to not report their education. Regarding occupation, 19.91% (n = 195) had a higher managerial and professional occupation, 42.59% (n = 417) had a lower managerial and intermediate occupation, 21.85% (n = 214) had a routine and manual occupation, 9.90% (n = 97) were unemployed, and 5.72% did not indicate their occupation.

Lexicographical analysis

Stimulus word "shark". A total of 2880 words composed the lexicon for the word "shark", of which 1984 words were mentioned only one time, corresponding to 69% of the total lexicon.

Participants evoked, on average, 6.73 (*SD* = 2.16) words. The minimum frequency considered was 4 and mean frequency considered was 8. Table 3 shows the candidates to the central nucleus and periphery. *Majestic* (highest frequency of 20 and lower rank order of 2.5) is the only item that constitutes the central nucleus. Elements of the first periphery display a more concrete vision of what sharks are for participants. Sharks are depicted as *Ancient* creatures source of danger whether in their aspect (*Teeth*, *Big mouth*, *Ugly, Great White*), behavior and consequences (*Predator*, *Deadly*, *Eats*, *Bite*, *Attack, Fast, Blood*), traits (*Evil*, *Fierce*, *Aggressive, Hungry*), emotions they generate (*Fear*, *Danger*) and the potential context of attacks (*Surf*, *Beach*). Elements like *Strength, Power*, *King of the ocean*, *Respect*, *Beautiful*, and *Gracious* reinforce the central nucleus element (i.e., *Majestic)*. Information about their environment *(Sea, Wild, Depth),* their taxonomy (*Fish*) and associated characteristics (*Fin*, *Color*, *Swim*, *Hydrodynamic*, *Tail*, *Eyes*, *Senses*) are found. There are some neutral (*Solitary, Misunderstood)* and positive traits (*Intelligent*). Sharks are described as *Threatened* and some causes of threat are mentioned (*Distribution*, *Food)*. Finally, the reference to *Movies* appears.

Elements of the 2nd periphery and the contrast zone generally present contents that are characterized by lower frequencies and ranks and that complete the first periphery. Basically, their analysis reveals that items fell into the categories identified in the first periphery. Noteworthy, dolphins are mentioned in the second periphery.

Table 3 - Candidates for the central nucleus and peripheries for the stimulus word "Shark"

Frequency >= 8 Mean Order < 2.6	Frequency	Order	Frequency >= 8 Mean Order >= 2.6	Frequency	Order
Central Nucleus			**1st Periphery**		
Majestic	20	2.5	Teeth	258	3.5
			Sea	222	4.0
			Fear	178	3.2
			Danger	168	2.7
			Predator	146	3.8
			Big mouth	133	4.1
			Fin	110	4.9
			Fast	101	4.6
			Movies	97	4.6
			Diversity	70	6.0
			Deadly	58	3.6
			Blood	57	4.6
			Fish	56	5.2
			Great White	49	4.5
			Strength	47	3.9
			Bite	45	4.4
			Beautiful	45	3.7
			Aggressive	45	3.1

			Color	41	6.0
			Fierce	38	3.2
			Attack	27	4.4
			Gracious	26	4.2
			Swim	25	5.1
			Threatened	25	3.7
			Wild	24	3.6
			Surf	19	5.5
			Evil	19	4.5
			Power	19	3.7
			King of the ocean	19	3.1
			Misunderstood	19	2.9
			Intelligent	18	4.2
			Depth	18	4.0
			Distribution	17	6.2
			Hydrodynamic	17	5.4
			Solitary	15	5.7
			Eats	14	5.3
			Respect	12	3.2
			Food	11	6.4
			Ugly	11	5.7
			Beach	11	5.4
			Hungry	11	5.2
			Eyes	10	6.0
			Tail	10	6.0
			Senses	10	5.5
			Ancient	9	5.4
			Big mouth	8	4.9
Frequency < 8 Mean Order < 2.6	Frequency	Order	Frequency < 8 Mean Order >= 2.6	Frequency	Order
Contrast zone			**2nd Periphery**		
Slim	7	2.6	Dominant	7	5.3
Animal	5	2.3	Cold	7	5.3
Fascinating	5	1.9	Diving	7	4.9
			Mammal	7	4.4
			Dolphin	6	6.0
			Boat	6	5.2
			Voracity	6	4.3
			Curious	6	3.3
			Interest	6	3.2
			Aquarium	5	6.0
			Aquatic	5	6.0
			Heavy	5	6.0
			Soft	5	6.0
			Bright	5	5.6
			Cage	5	5.2
			Revenge	5	5.0
			Swordfish	5	5.0
			Cunning	5	4.6
			Mystery	5	4.4
			Fantastic	5	4.4

			Unknown	5	3.0
			Hunted	4	6.7
			Skin	4	6.2
			Threat	4	5.7
			Calm	4	5.2
			Territorial	4	5.2
			Clever	4	4.7
			Friendship	4	4.5
			Cool	4	4.5
			Serenity	4	4.0

Stimulus word "dolphin". The lexicon for "dolphin" was composed of 1181 words, counting with 452 unique words (38% of the total lexicon). Evocation was, on average, of 6.53 (*SD* =2.06) words. Minimum frequency considered was 4 and mean frequency considered was 7. Table 4 shows the candidates to the central nucleus and first periphery. *Intelligent* is the element with the highest frequency and lowest rank order, thus being considered the best candidate for the central nucleus.

Table 4 - Candidates for the central nucleus and peripheries for the stimulus word "Dolphin"

Frequency >= 7 Mean Order < 2.6	Frequency	Order	Frequency >= 7 Mean Order >= 2.6	Frequency	Order
Central Nucleus			**1st Periphery**		
Intelligent	56	2.5	Sea	89	4.2
			Fun	76	4.6
			Friend	76	3.5
			Cute	68	3.8
			Kind	55	2.9
			Joy	49	3.3
			Love	31	2.7
			Swim	27	4.4
			Caring	26	3.2
			Fish	25	4.1
			Soft	23	5.2
			Family	23	4.7
			Mammal	21	3.6
			Freedom	21	3.2
			Aquarium	19	5.8
			Serenity	19	3.4
			Nice	19	3.3
			Fast	18	5.1
			Ability	18	5.1
			Gracious	16	5.1
			Smart	16	3.1
			Jump	14	5.0
			Smile	13	6.2
			Communication	13	4.2
			Blue	12	5.1
			Slippery	11	5.3

			Fin	11	4.9
			Sound	10	4.9
			Color	10	4.3
			Infancy	8	5.2
			Big	8	4.4
			Protection	7	4.0
			Emotion	7	3.4
Frequency < 7 Mean Order < 2.6	Frequency	Order	Frequency < 7 Mean Order >= 2.6	Frequency	Order
Contrast zone			**2nd Periphery**		
			Complicity	6	5.3
			Fantasy	6	5.0
			Vacation	6	4.0
			Social	6	2.8
			Show	5	5.4
			World Region	5	5.4
			Strong	5	3.4
			Sense	4	7.0
			Carnivore	4	5.7
			Bottlenose	4	5.5
			Delicacy	4	5.2
			Funny	4	4.0
			Special	4	2.7

The first periphery contains information about their "personality" (*Fun*, *Kind*, *Friend*(ly), *Caring, Smart, Nice*), the emotions they generate (*Joy*, *Love* , *Fun*, *Emotion Serenity)*, their social capacities (*Smile*, *Communication, Sound*), their physical aspect (*Soft, Gracious, Blue, Slippery, Fin, Color, Big*), their behavior (*Swim, Fast, Ability, Jump*), their environment (Sea, Aquarium) and typology (*Fish*, *Mammal*), and various ideas like *Family, Freedom, Infancy*, and *Protection*.

Items belonging to the second periphery reinforce the categories found in the first periphery. No item was found in the contrast zone.

Similitude analysis

Stimulus word "shark". Figure 3 shows the interconnectedness of the elements that compose the representation of the shark. *Teeth* was the main organizing element as most of the other ideas and meanings stemming from it. Related elements were associated to insecurity and threat (i.e., *Fear, Predator, Blood, Deadly, Bite, Danger, Evil*), characteristics (i.e., *Big, Fast, Fin, Strength*), environment (i.e., *Sea, Wild, Habitat*), one exemplar *Great White* and *Movie*. The second node *Big* is related to *Strength* and *Evil* and reinforces the notion of threat. Worthy to note that among all the elements, *Fear*, *Danger*, *Fin* and *Sea* are the stronger associates with the main node *Teeth*.

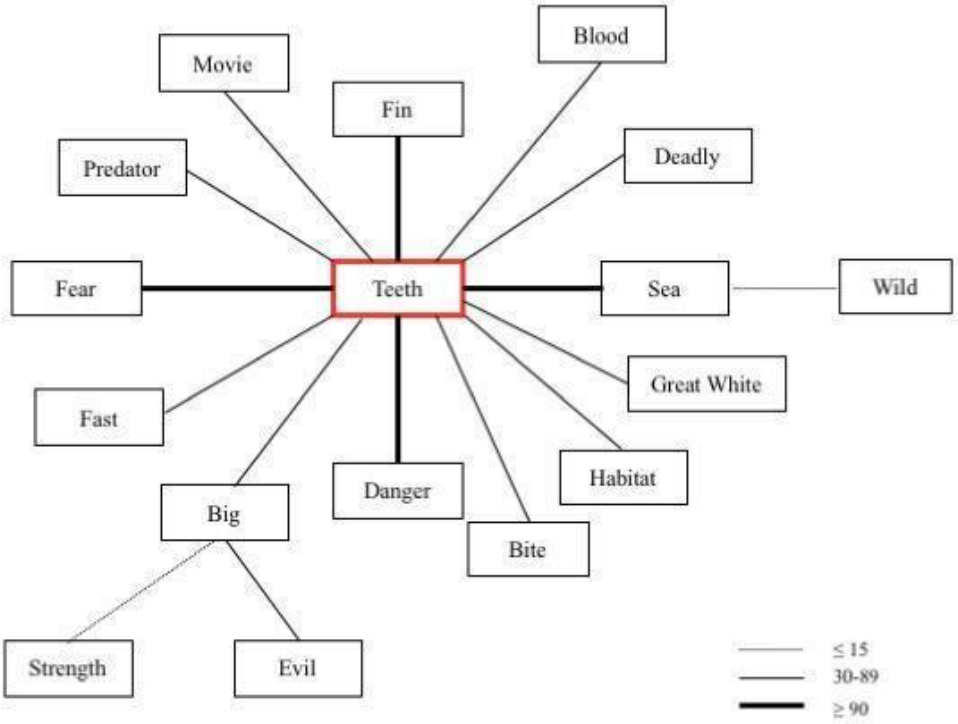

Figure 3 - Tree with the elements of the social representation of sharks (for male and female participants).

Previous studies have shown that gender of participants can affect perceptions and attitudes towards sharks (Thompson & Mintzes, 2002; Almeida et al., 2014). Consequently, the social representation of sharks was analyzed according to participants' gender (see Figures 4 and 5).

The social representation of female participants is mainly based on emotional elements (see Figure 4). The organizing node is *Teeth*, which relates to three peripheral nodes: *Big*, *Fin* and *Sea*. Among the 11 elements directly associated with *Teeth*, six relate with threat (i.e., *Scary, Danger, Killer, Fear, Predator, Movies*). Although the other five remaining items deal with sharks' appearance and environment, they also convey ideas of threat (e.g., *Blood, Aggressive, Bite, Fierce*). Interestingly, *Jaws* (the movie) appears and is related to *Great White*. The notion of *Diversity* is also evoked.

Inversely, the social representation of male participants is mainly based on cognitive elements (see Figure 5). It is organized around two distinct nodes that are not directly related to each other: *Fish* and *Fin*. Among the 16 items, 10 relate to the shark's characteristics, environment or species (e.g., Fast, *Fin, Carnivore, Big, Color, Fish, Swim, Sea, Water, Great White*), two relate with *Diversity* and *Threatened*, 2 relate with Jaws and Movie and finally 2 relate with danger (*Blood, Bite*). No references to *Teeth* or (negative) emotions were found. In short, the social representation of male participants is based on naturalistic and utilitarian elements.

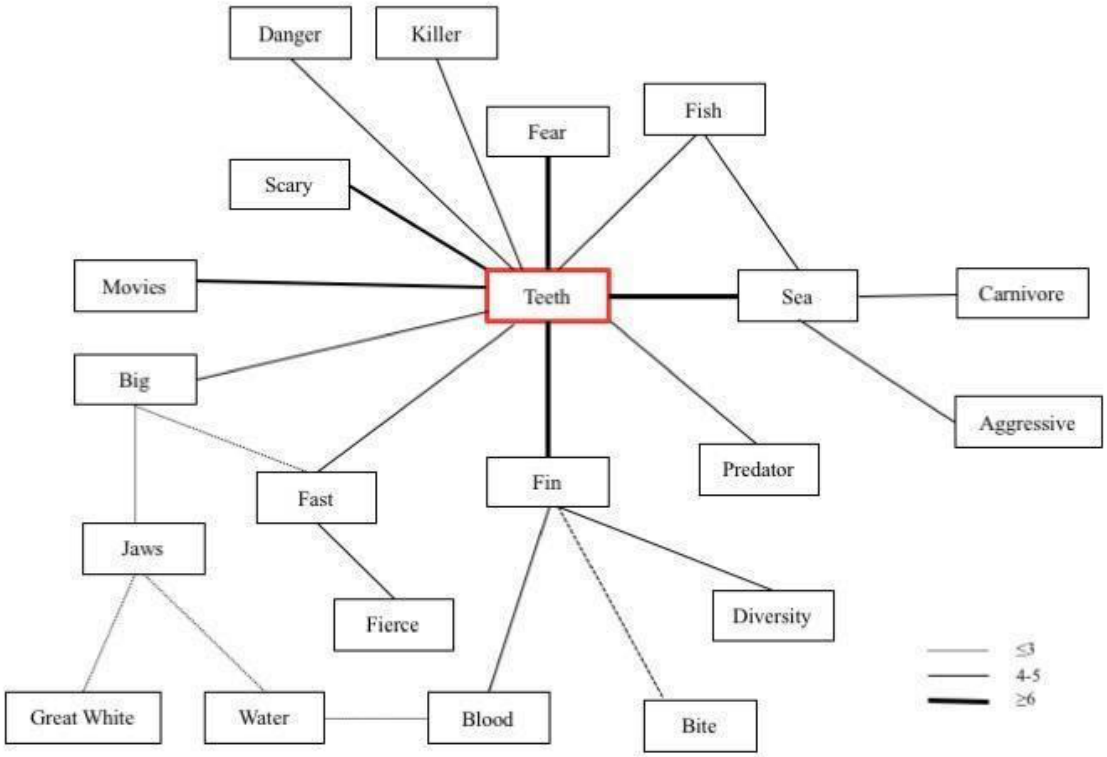

Figure 4 - Elements of the social representation of sharks by female participants.

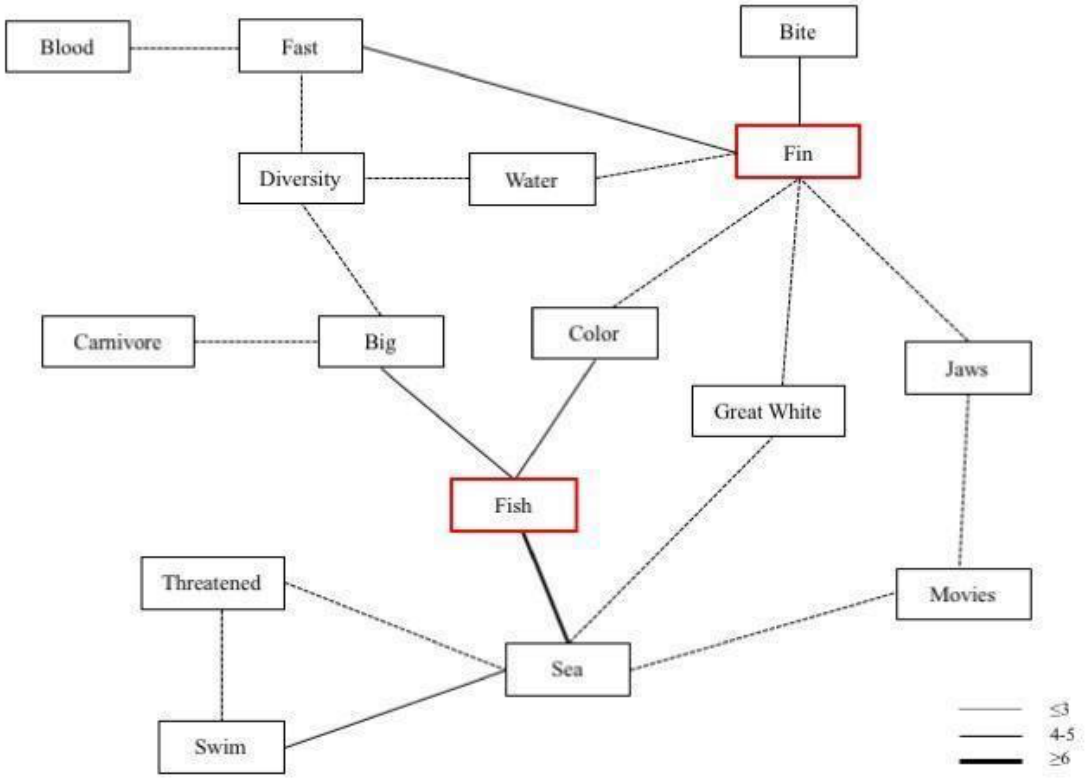

Figure 5 - Elements of the social representation of sharks by male participants.

Interestingly the reference to the Hollywood movie *Jaws* appears in both social representations but with different connections. Male participants connect *Jaws* with the ideas of *Fin* and *Movies*, a stereotypical image resulting from the blockbuster film. Female participants relate *Jaws* with *Big*, and *Great White*, that is, a set of ideas providing a more concrete idea of the danger. In short, the social representation of male is merely naturalistic and descriptive while the female's one is focused on possible dangers the animal might impose.

Stimulus word "dolphin". The social representation of dolphins (see Figure 6) is structured around two directly interconnected main nodes: *Friend* and *Fun*. *Friend* relates to information about the environment (e.g., *Sea*), traits (e.g., *Intelligent*) and sociability (e.g., *Caring*, *Family* and *Communication*). *Fun* is associated with beauty, emotions (e.g., *Love, Joy*) and values (e.g., *Freedom*). In short, its social representation is organized around the ideas of relationships and positive emotions. All elements are either neutral (e.g., *Swim*), positive (*Intelligent*) or highly positive (*Love, Freedom*) which strongly contrast with the elements of the shark's social representation.

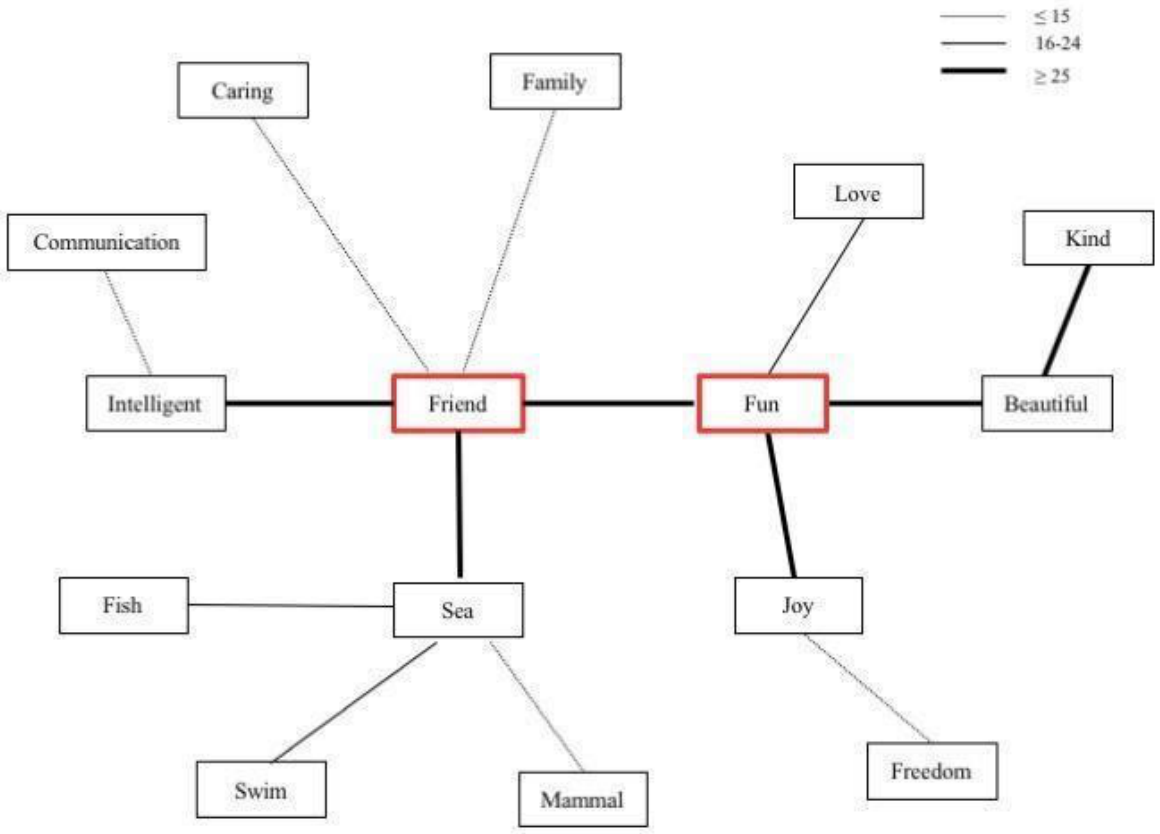

Figure 6 - Tree with the elements of the social representation of dolphins (for male and female participants).

Discussion

Although elements like *Food* and *Distribution* seem to indicate that participants were at least aware of the use of sharks in the food industry, no specific element concerning preoccupations about their conservation were found. The other elements of the shark's social representation could explain such an absence.

Sharks as a source of danger for humans.

*S*harks were firstly perceived as a source of danger. This representation is congruent with previous studies (e.g. Acuña-Marrero et al., 2018; Neves & Monteiro, 2014; Sabatier & Huveneers, 2018). *Teeth* was the general organizing node and was associated with ideas of insecurity (e.g., *Fear, Danger)* and attacks (e.g., *Bite*, *Blood*, *Deadly*, *Predator*), and with one very specific over-mediatized species of shark, i.e., the *Great White*. In brief, people perceive sharks as preying upon humans.

Such a belief is quite intriguing because sharks feed on animals below them in the food chain, and although some species of sharks can be dangerous for humans, most of them are inoffensive and shark attacks are very rare. The likelihood to die from a shark attack is lower than to die from a car accident or even from a lightning strike (ISAF, 2020). Moreover, shark lethality is much inferior when compared to mosquitoes. Worldwide, mosquitoes kill more people in one day than sharks do in a century (WHO, 2020; GSAF, 2020). Finally, only a small minority of people are likely to encounter a shark in the wild. The fear of being attacked by a shark is then more an emotional response to an imagined danger, that is collectively elaborated, than a real one for most of us.

Why is the social representation of sharks rooted in such a threatening image? Some kind of *Jaws effect* (i.e., negative exploitation of sharks by the media for sensationalism) could be at work and explain such a bad image (for a review, see Pepin-Neff (2019)). Benchley's 1974 best-selling book and Spielberg's 1975 movie *Jaws* have incontestably marked people's minds and shaped the profile of sharks as ferocious man-eating "serial killers". Since then, advertisement, entertainment, TV news or documentaries keep on exploiting, and reinforcing, the sensational killing machine imagery of sharks. Not surprisingly, the word *Movie* is found in the lexicographical analysis, and similitude analysis showed that *Movie* is linked with the organizing node *Teeth*. Sharks (and mainly the Great White) are now more than just animals: they became a culturally over-determined social object. As Westbrook and colleagues (Westbrook et al., 2018, p.13) suggested, "negative representations of sharks in our culture are so plentiful, often intrinsic to our enjoyment of our favorite books, games, movies, and art, that it is a real challenge to see sharks in a positive light." In brief, the analysis of the social representation of sharks revealed that roughly 45 years after the

release of the film, and against the accumulated scientific knowledge about them, sharks are still perceived as stalking malevolent human killing machines. The belief that sharks prey upon humans clearly works against public attitudes and behaviors towards their conservation. To which extent is a person willing to protect an animal that preys on humans?

Great White as the mental prototype of sharks

Results of both lexical and similitude analyses also revealed that *Great White* was the only species present in the social representation of sharks suggesting that it is the most accessible prototype of sharks in peoples' minds (or maybe the only one known). This stems from an underexposure to different types of sharks (see also Seraphin, 2010). Again, the Jaws effect could be at work. Spielberg's movie displayed a Great White and, ever since then, media and entertaining industries have been using and overusing the Great White, and its teeth, for sensationalism. For example, when analyzing 300 articles across 20 publications, Muter and colleagues (Muter et al., 2013) found that the Great White is the most frequently cited species in the coverage (followed by Bull Sharks and Tiger Sharks; three species implicated in attacks on humans) and it overshadowed other species like the Daggernose Shark (*Isogomphodon oxyrhynchus*), Sawback Angelshark (*Squatina aculeata*) or the Ganges Shark (*Glyphis gangeticus*), which are much more threatened by extinction and do not receive as much coverage in the media. In brief, the Great White became a pervasive and influential prototype in the public's mind. Thus, one should be asking who would want to protect sharks when such a terrifying prototype seems to be representing all sharks?

Teeth

Results of both lexical and similitude analyses showed that *Teeth* is the central node and is associated with *Great White.* However, many other species of sharks have different teeth. For example, three of the largest shark species are planktivorous and have no teeth in the sense we are used to mentally visualizing these anatomical structures. However, the over-exposition to this prototypical image of a perfect, teeth-filled killing machine may leave people unaware of the immense diversity of sharks in terms of shapes, colors and ecological functions. This *Great White* and *Teeth* combination in the layperson mental image generates fear emotions that may be working against conservation attitudes.

Wild vs. Civilized animals

Interestingly, the comparison of the social representation of shark and dolphin revealed that both are pictured, in a very anthropocentric way, as belonging to two different groups. Sharks are perceived as belonging to the Wild and as outgroup members, while dolphins belong to Civilization

and are in-group members. Indeed, the social representation of sharks displayed them as *Ancient* bloodthirsty *Predators* coming from the *Wild,* while dolphins are *Friend*(s) living in *Aquarium*(s) and which entertain us. The social representation organizing node is *Teeth* for sharks and *Friend* and *Fun* for dolphins. Sharks and dolphins can be seen as, respectively, out- *vs.* in-group animals. Social representations were also marked by moralistic attitudinal differences between the two animals: sharks were *Evil*, *Aggressive* and *Deadly*, whereas dolphins were *Friend*, *Caring* and *Kind.* Finally, dolphins are associated with human emotion (*Love*) and values (*Freedom*) while sharks are associated with raw power (*Strength*). Maybe sharks are terrifying to us because they represent the unpredictability of some aspects of wildness, opposite to our civilized predictable daily life. We prefer to have a sense of control of most of the variables of our lives and sharks may represent the figuratively, but also literal, 'wild' card in our perceived safety.

An ambivalent representation of sharks

Unlike other previous studies in which attitudes toward sharks were found to be markedly polarized (i.e., very negative; e.g. López de la Lama et al., 2018; Neves & Monteiro, 2014; Broadhead, 2016), the present study reveals that the social representation of sharks was highly ambivalent: sharks were perceived as *Ugly*, *Deadly* with threatening *Big Mouth* and *Teeth* but at the same time they were considered as *Beautiful* and *Gracious*. They were seen as *Intelligent* but also *Fierce*, *Aggressive* and *Evil*. They were depicted as *Predator* and *Killer* but also as *King of the ocean*. They evoked *Fear* but also *Respect*. Inversely, the social representation of dolphins is not ambivalent but very positive: they were mainly depicted as *Cute*, *Friendly*, *and Kind* creatures.

Female and male participants have a different social representation of sharks

Consistent with previous studies (Kellert, 1980; Kellert, 1996), results showed that participants who reported to be female had significantly more moralistic and significantly less naturalistic and utilitarian social representation than participants who reported to be male. Indeed, female participants' social representation was organized around *Teeth* and contained elements associated with the themes of insecurity and danger. Inversely, male participants' social representation was mainly composed of naturalistic and utilitarian elements representing sharks as a straightforward animal with specific physical characteristics and its place in nature (anchoring nodes were *Fish* and *Fin)*, and without any (negative) emotions. In short, females' social representation of sharks was more emotionally based while the males' social representation was more cognitively based. Interestingly, such results fit the gender stereotypes traditionally attributed to male and female by society.

Two not incompatible main approaches can explain such a difference in representation of sharks between female and male participants. First, according to the evolutionary approach, women are considered to have developed a stronger fear toward threatening animals than men (Prokop & Fančovičová, 2010), either because fear is a strategy to protect children, or because females' lower physical condition increases the probability to be killed by large carnivore predators. Second, the social approach posits that men and women are socialized to endorse and valorize traditional and culturally constructed stereotypical gender roles that depict male as more competent (e.g., active, independent, egotistic and action-oriented) and female as more social (e.g., passive, dependent, generous and family care-oriented) (Eagly, 1987; Eagly & Wood, 1990). Congruently, Almeida and colleagues (2014) observed that, in a sample of pupils between 8 and 10-year-old, boys preferred predators and other animals traditionally associated with a bad image, like bats and sharks, when compared to girls. Moreover, O'Bryhim and Parsons (2015) found that being a man was the strongest predictor of shark knowledge, and that shark documentaries were marketed towards men through the presentation of sharks as highly competent predators.

A gendered representation of sharks and dolphins

Results of lexicographical and similitude analyzes depicted sharks as *Wild*, *Solitary*, *Powerful* and highly competent *Predators* that provoke *Fear,* and whose *Intelligence* is used for the purpose to kill efficiently. Inversely, dolphins are *Cute*, *Friend(*ly), *Kind* and *Caring* creatures that inspired *Love,* and whose *Intelligence* is associated with *Communication*. Putting in another way, sharks were seen as highly agentic and less communal, whereas dolphins were most strongly depicted as communal. Basically, communion refers to the qualities relevant for the establishment, maintenance and functioning of social relationships such as friendliness, warmth or trustworthiness. Inversely, agency encompasses qualities relevant for goal-attainment and task functioning (e.g., competence, ambitiousness) as well as status and power. Research in social cognition has shown that communality and agency are the two dimensions that structured the perception and the evaluation of persons and groups (Abele & Wojciszke, 2007) as well as gender stereotypes (see Sczesny et al. (2019) for a review). Compared to men, women are perceived as more communal and less agentic. In other words, women are stereotypically seen as "naturally" oriented towards others: they nurture, care, protect and assure wellbeing. Consequently, they display traits like altruism, friendliness, helpfulness, trustworthiness, or fairness, and are associated with approaching emotional states (e.g., love, tenderness, friendliness). Inversely, men are stereotypically seen as "naturally" concerned for oneself and one's goals and motivated for self-assertion and self-protectiveness. As a consequence, they are seen as having goal-attainment directed traits (e.g., competitive, aggressive, though, ambitious, selfish) and corresponding emotional states (e.g.,

aggressiveness, perseverance). Interestingly, such a gender stereotypical view maps the description of sharks and dolphins in that sharks were depicted as stereotypically more masculine (i.e., more agentic than communal) and dolphins as more feminine (more communal than agentic). This gendered perception of both animals is also coherent with the fact that sharks were found, in the current study, associated with avoidance emotions (e.g., *Fear*, *Power*) and dolphins with approach emotion (e.g., *Love*).

Gender stereotypes applied to sharks as a new way to understand public sharks conservation attitudes and behaviors

To sum up, results of Study 1 showed that sharks were considered as preying on humans and the Great White, and its teeth, was the mental prototype of all sharks, which is congruent with results of previous studies. Such a perception clearly works against conservation attitudes and behaviors toward sharks. Study 1 also extends previous research, by showing that the social representation of sharks is not polarized (i.e., completely negative or positive), but ambivalent. Finally, unique to our study, results revealed that the social representation of sharks was gendered: sharks were seen as more masculine than dolphins. Could such a gendered perception of sharks influence attitudes towards their conservation? Research on intergroup stereotypes and emotions suggests that it could be the case. Indeed, the BIAS map (Cuddy et al., 2007) posits that perception of warmth (i.e., communality) in the person in need increases prosocial behavioral tendencies over other behavioral tendencies like active harm, passive harm, or passive facilitation (e.g., doing nothing) while perception of competence (i.e., agency) favors passive harm tendencies, such as neglect. Elaborating on the BIAS map (Cuddy et al., 2007), Sevillano and Fiske (2019) found that the perception of warmth in fictitious animal species (created for their study) was associated with more proactive (e.g., support/help) and less harming (e.g. kill/trap) behavioral tendencies.

Study 2 - Sharks perceived communality and agency, and attitudinal and behavioral tendencies towards their conservation.

Considering that Study 1 has shown that sharks were perceived as more agentic than communal, and that research on stereotypes about animals has found that the level of perceived warmth (e.g., communality) in animals could favor tendencies for their conservation, we have opted for conducting a second study aimed at checking quantitatively whether 1) the perception of sharks was gendered and, 2) the perception of communal traits in sharks was associated with attitude towards their conservation and intention to donate for their conservation.

Method

Procedure

Participants were asked to answer questions on communality/agency, perceived masculinity, donation preferences and attitudes towards conservation towards four animals: sharks, dolphins, turtles, and crocodiles. Animals' presentation order was randomized. Like in Study 1, turtles and crocodiles were added to avoid participants to focus on comparing sharks and dolphins. Participants were instructed about data anonymity and the possibility to not answer or to cease their participation in the study without occurring in any prejudice. All procedures performed in this study were in accordance with the American Psychological Association (APA) ethical principles and the Portuguese regulation about data protection.

Data collection instruments

Communality and agency. Communality was assessed with 7 adjectives (*friendly, well intentioned, trustworthy, warm, kind, sincere, tolerant*; Cronbach α = .83 and .84 for, respectively, sharks and dolphins) and agency with 7 adjectives (e.g., *competent, confident, independent, competitive, capable, efficient, skillful*; Cronbach α = .84 and .78 for, respectively, sharks and dolphins). Participants were asked to indicate to which extent each adjective described each four animals on a seven-point scale from (1) *totally disagree* to (7) *completely agree*. Higher scores indicate higher perceptions of communality and agency.

Perceived femininity/masculinity. Participants were asked to indicate how feminine and masculine they perceived each of the four animals by dividing 100 points for each animal into two categories: masculinity and femininity. Higher scores on femininity indicate that the animal is perceived as more feminine (and symmetrically less masculine).

Donation order. Participants were asked to answer the following question: "If you had the opportunity to donate to various conservation organizations, indicate the order from the most important (1) to the least important (4): a) conservation trust for crocodiles; b) conservation trust for turtles; c) conservation trust for sharks; d) conservation trust for dolphins." Mean scores vary from 1 to 4 and lower scores indicate the tendency to choose the conservation trust as first choice.

Attitudes towards conservation. Participants were asked to indicate on a seven-point scale, from (1) *totally disagree* to (7) *completely agree*, their opinion, for each of the four animals, to the three following items: "*More efforts should be made to preserve [animal name]*; *Conservation of [animal name] is a matter for humans*; *[animal name] conservation is the responsibility of humans*") (Cronbach α = .88 and .68 for, respectively, sharks and dolphins). Higher scores indicate more positive attitudes towards the conservation of each animal.

Results

Participants

Sixty undergraduate students (N = 60; M_{age} = 20.41; *SD* = 3.82) in Psychology volunteered to participate in a large paper and pencil study about the perception of animals in which questions of Study 2 were embedded. The sample is composed of 49 females (M_{age} = 20.55; *SD* = 4.18) and 11 males (M_{age} = 19.81; *SD* = 1.32).

Differences between sharks and dolphins

A series of paired samples *t*-test was conducted. Firstly, results showed that, compared to dolphins, sharks were perceived as more agentic and less communal (see Table 5). Secondly, sharks were seen as more masculine than dolphins which confirmed a gendered view of sharks and dolphins. Thirdly, results also showed that participants had more positive attitudes towards dolphins conservation and preferred to donate for dolphins than for sharks. Interestingly, one sample *t*-tests revealed that although the mean for attitudes towards conservation of sharks (*M* = 6.02) is significantly higher than the mean point of the scale (i.e., 3.5), the mean for the intention to donate (M = 2.88) was above the mean point of the scale (i.e., 2; a score of 1 was the highest intention). In short, although participants had a very positive attitudinal tendency for shark conservation, donating for their protection was not their priority.

Table 5 - Means and Standard Deviations for Measures in Study 2

	Communality	Agency	Attitude towards conservation	Donation order	Perceived Femininity
	M(*SD*)	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)
Sharks	2.68(1.02)^{a} *	5.69(1.04)^{b} *	6.02(1.32)^{c} *	2.88(0.99)^{d} *	35.63(19.52)^{e} *
Dolphins	5.70(0.89)^{a} *	5.31(0.91)^{b} *	6.45(0.78)^{c} *	1.81(1.06)^{d}	54.75(14.36)^{e}*

Notes. N = 60. Means that share the same superscripts in the same column differ from each other at $p < .05$; * = the mean differs from the middle point of the scale at $p < .05$ (one sample *t*-test).

Correlational analyses

Results showed that, for sharks, a higher level of communality was significantly associated with more positive attitudes towards conservation, a higher tendency to choose a shark conservation trust as first choice and a higher tendency to perceive sharks as feminine (see Table 6).

Table 6 - Correlations between Variables for Sharks (in bold) and for Dolphins

	Communality	Agency	Attitudes towards conservation	Donation order	Femininity
Communality	-	**.05**	**.39****	**-.26***	**.34****
Agency	.67**	-	**.22**	**-.04**	**-.22**
Attitudes towards conservation	.14	.24	-	**-.21**	**.12**
Donation order	-.24	.04		-	**-.18**
Femininity	.19	.06	.01	-.05	-

Notes. N = 60; Correlation for sharks in the upper part of the diagonal (in bold) and for dolphins in the lower part of the diagonal.

Regression analyses

Attitudes towards conservation and intention to donate for sharks and dolphins were regressed on their levels of communality and agency. Attitudes towards conservation of sharks were successfully predicted by their perceived communality but not by their agency (see Table 7). A higher perception of communality is associated with a more positive attitude for their conservation. The statistical model for predicting order of donation for sharks did not reach significance ($p > .05$) and no further exploration was made.

Table 7 - Regressions analyses

	B	SE	*Beta*	*t*	*p*
Attitudes towards shark conservation					
Intercept	3.21	.94		3.40	.001
Communality	.49	.15	.38	3.20	.002
Agency	.26	15	.20	1.73	.089
$F(2,57) = 6.97$; $p = .002$; $R = .44$; $R^2 = .19$					
Order of donation for dolphins					
Intercept	2.80	.88		3.20	.002
Communality	-.60	.19	-.50	-3.04	.004
Agency	.45	.19	.38	2.13	.024
$F(2,57) = 4.69$; $p = .013$; $R = .37$; $R^2 = .14$					

Notes. N = 60

Concerning dolphins, the statistical model for attitudes towards their conservation did not reach significance ($p > .05$) and no further exploration was made. However, order of donation for dolphins was successfully predicted by communality and by agency (see Table 7). However, if a higher level of communality was associated with more willingness to donate for a dolphin conservation trust, a high level of agency was associated with less willingness to donate.

Discussion

Sharks were perceived as more agentic and more masculine than dolphins which confirmed the gendered representation of sharks and dolphins found in Study 1. Moreover, their conservation was not a priority for the participants, as shown by the low intention to donate for their conservation. However, a higher level of perceived communality (e.g., caring, emotionality) in sharks was associated with stronger willingness to donate for their conservation. Perception of communality in sharks seems to increase the likelihood to help for their conservation.

Implications of studies 1 and 2 results

Recommendations for action

Because sharks are a key factor for maintaining the marine ecosystem healthy, their conservation is a crucial issue. However, they do not receive the same level of attention, sympathy, engagement and support for conservation as other sea animals, like, for example, dolphins. Modifying sharks' public image has been a top priority for most shark conservation non-governmental organizations (NGO). Although in the last decades, people have started to perceive more and more sharks as animals in need of conservation (e.g. see Friedrich et al., 2014; Whatmough et al., 2011), gaining support for shark conservation is still extremely difficult due to the resistant and lasting negative image the general public holds towards sharks (Muter et al., 2013). Congruent with previous studies, results of Study 1 showed that sharks were considered as a danger for humans and were pictured with threatening teeth and as Great Whites.

However, unique to our two studies, Study 1 showed that the social representations of sharks was ambivalent and markedly gendered, and Study 2 confirmed the gendered view of sharks and showed that the perception of communal traits in sharks was associated with more positive attitudes towards their conservation. Such results provide valuable keys to rethink the public-sharks connection, shark's public image for conservation campaigns, as well as NGO, aquariums, marine parks and educational programs.

Firstly, we recommend an analysis and evaluation of the existing conservation campaigns as they may contribute to perpetuating a stereotypical image of sharks (see also Heller, 2015). Secondly, we recommend stopping the use of generic terms of sharks, and instead use the name of the specific species of shark(s) towards which the campaign is directed as well as a non-stereotypical display (e.g., avoiding teeth). Fishbein and Azjen (1975) have showed that the attitude towards a category (e.g., sharks) is not predictive of the behavior (e.g., donating) towards a specific exemplar of the category (e.g., Hammerhead Shark) because there could be a difference in the

representation between the prototype that can represent the category (e.g., the Great White) and the target exemplar of the behavior (e.g., Hammerhead Shark).

Thirdly, we recommend taking advantage of the ambivalence of the social representation of sharks. Attitudes are positive or negative evaluations of an object (e.g., sharks) that are derived from social representation (Bidjari, 2011) and can guide behavior (e.g., donating). An ambivalent social representation could then generate an ambivalent attitude, that is, an attitude composed of both positive and negative cognitions, emotions and/or behaviors about the attitudinal object (van Harreveld et al., 2015). Positive elements of its social representation should be emphasized and used to create stronger and more engaging messages. Indeed, research on persuasion has shown that strong messages (i.e., with strong arguments) have more influence on recipients who have ambivalent attitudes than weak messages (Maio et al., 1996).

Fourthly, Study 2 has shown that participants who attributed more communal traits to sharks also displayed stronger willingness to donate for their conservation. Consequently, we recommend emphasizing real communal characteristics and behaviors of sharks. Consistent with such a claim, Vicchio (1986) found that observation of dolphin's sociability strongly influenced future conservation and protection. Interestingly, recent studies have shown that sharks do display positive social behaviors. For example, Jacoby and colleagues (Jacoby et al., 2012) summarized some research studies on social behaviors in different shark species, e.g. group foraging and social facilitation (Sevengill Shark, *Notorynchus cepedianus*) or social organization (Lemon Shark, *Negaprion brevirostris*), aside from their well-known reproductive aggregations. Guttridge and colleagues (2013) found Lemon Sharks to be able to use socially derived information to learn about novel features in their environment. In a more recent study, Finger and colleagues (2018) found that juvenile Lemon Sharks showed social behaviors, such as following and paralleling partners, with consistent individual differences. More recently, Papastamatiou and colleagues (2020) showed that Grey Reef Sharks (*Carcharhinus amblyrhynchos*) tend to spend time with the same group every day suggesting that, beside social recognition, they show a preference in social gatherings.

Finally, our last recommendation consists in favoring direct experience with sharks to change, or create, favorable and more scientifically based social representations and attitudes towards them. Direct experience was shown to create stronger attitudes that are more predictive of behaviors (Fazio et al., 1978). So far, most of us have only an indirect experience with sharks through TV programs, for example. Direct experience can be achieved by observing and studying sharks in aquariums, marine parks or in natural settings (e.g., shark tourism) , but also *via* virtual immersion with 360º VR devices. Interestingly, attitudes towards objects presented in virtual reality were shown to be as strong as those created in real context (see Giger & Almeida (2019) for a review of the models). Allowing people to virtually meet sharks could be a good opportunity to

discover that these animals are, in fact, more social (i.e., communal) than we think, and promote conservation.

Future research

Study 1 was conducted at a marine zoological facility that raised the question on to what extent the participants had already positive attitudes toward marine life, as well as if these results reflect the perception of only zoo goers. Previous studies have shown that both zoo goers (e.g. Friedrich et al., 2014) and wildlife tourists (e.g. Acuña-Marrero et al., 2018) had positive attitudes towards sharks. Consequently, further studies should also explore the social representation of non-zoo goers or non-wildlife tourists.

Although knowledge and pro-environmental attitudes have been shown to be important elements in attitudinal and behavioral change, they proved to be insufficient to modify conservation attitudes and engagement (Fletcher & Potts, 2007; McKinley & Fletcher, 2010; Kollmuss & Agyeman, 2002) and emotions and attitudes towards sharks (see Seraphin (2010)). Further research on attitudinal ambivalence could help to determine facilitating and inhibiting factors as well as creating more efficient messages. Moreover, the stereotypical gendered perception of sharks and the relationship between perception of sharks' communality, conservation attitudes and behavior should be further explored.

General conclusion

Recent research has emphasized the importance of understanding the psychosocial factors that can promote positive attitudes and behaviors towards sharks in the general public to encourage support for shark conservation policies (Acuña-Marrero et al., 2018). The present work contributed to such effort and extended previous research by highlighting the usefulness of studying the social representation of sharks to reconnect humans and sharks. Results of Studies 1 and 2 have shown that people have a very oversimplified, ambivalent and stereotypical gendered representation of sharks. Indeed, sharks were pictured as highly agentic but little communal. Moreover, Study 2 confirmed that perception of agency and communality was associated with attitudes and behavioral intentions towards sharks' conservation. The perception of communality in sharks was associated with an increase of the intention to help for their conservation. Such results plead for acknowledging and further exploring sharks' communality as a way to positively influence attitudes towards their conservation and the engagement in their conservation.

Estudo 2

Applying the Stereotype Content Model (SCM) and BIAS Map to Understand Attitudinal and Behavioural Tendencies Toward the Conservation of Sharks[3]

Abstract:

Sharks are at increasing risk of extinction. Being a key factor in maintaining the balance of marine life in the ocean, as well as regulating the variety and abundance of the species below them in the food chain, their depletion is threatening the whole marine ecological system. Aside from the fisheries industry regulation, public opinion plays a fundamental role in any conservation effort. However, unlike other iconic sea marine animals like dolphins, sharks received little attention and conservation support from the public. Many scholars attribute such neglect to sharks' public bad image. The present study is aimed at getting a better understanding of sharks' bad image, using the Stereotype Content Model / Behaviours from Intergroup Affect and Stereotypes map (SCM/BIAS map), and its association with attitudinal and behavioural tendencies toward their conservation. Participants (n = 144; Mage = 22.28; SD = 6.24; 66% female) assessed the perceived warmth, competence, approach-avoidance emotions related to sharks (and dolphins) as well as attitudes toward their conservation, and their donation intention. Results showed that, congruent with the SCM/BIAS map, sharks fit the 'threatening-awe stereotype' (high competence and low warmth), whereas dolphins align with the 'protective stereotype' (high competence and high warmth). Results also showed that warmth was associated with more positive perception of sharks and attitude toward their conservation. Warmth as a potential facilitating key factor in sharks' conservation promotion is discussed.

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Introduction

The modern human-shark relationship is paradoxical in various ways. First, they are so far from us and at the same time so close. Although the majority of us live far from their ecosystems, and most of us have almost no chance in our lifetimes to be in direct contact with them, sharks are incredibly present in our daily lives. They can be seen in advertisements (e.g., Kellogg's mascots), clothes for kids, movies (e.g., Jaws, Sharknado franchises), cartoons (e.g., Kenny the shark), TV programs (e.g., Shark Week), music (e.g., Baby Shark), art (e.g., Watson and the Shark by John Singleton), video games (e.g., Hungry Shark), books (e.g., The Devil's Teeth, The Great Shark Escape), toys (e.g., Sharky's Diner), sports team or school mascots (e.g., Orlando Sharks), etc. In fact, sharks have become a familiar, worldwide cultural object. The second paradox is that, despite our pseudo-familiarity with sharks, our knowledge about them is far from being accurate and, for most of us, relies on a fantasized representation acquired through popular culture and media (Panoch & Pearson, 2017).

Sharks are considered a threat among the general public (Panoch & Pearson, 2017). They elicit fear and a sense of danger (Altarriba & Basnight-Brown, 2011). Sharks are seen as powerful, ferocious killing machines stalking humans to prey on them (Morey, 2002; Neves et al., 2021); Thompson & Mintzes, 2002). Even in everyday language, the word “shark” is used to refer to a person who is cruel, ruthless, efficient, intelligent, and lacking in morality. Reinforcing this negative image, sharks are also routinely pictured as the dark antagonist to the iconic dolphin. While people picture dolphins as courageous, sociable, virtuous animals that protect both their peers and humans from sharks (Amante-Helweg, 1996), sharks are seen as vicious and evil man-eating beasts (O’Bryhim & Parsons, 2015). This dichotomy is also found in the tabloid press where dolphins are portrayed as saviours and sharks as predators (Herzog & Galvin, 1992). In other words, sharks are enemies and dolphins are friends. Dolphins are more positively evaluated than sharks, and are preferred over them as a flagship species (Curtin & Papworth, 2018). Finally, dolphins are seen as more intelligent than sharks. When Nakajima et al. (2002) asked Chinese and American students to rank the intelligence of 56 different animals, the dolphin was ranked as the third most intelligent animal on the list (just after chimpanzees and orangutans) while sharks occupied the 24th rank.

Contrasting their popular image as the ultimate predator, sharks are currently facing great threats to their future survival. Although they are valued for their meat, fins and other highly prized body parts (Campana et al., 2016), we know today that they are much more important to the fishing industry alive than dead (Campana et al., 2016). Even though our everyday perception does not lead us to see shark populations as directly affecting worldwide fisheries, the truth is that sharks play a fundamental role in the ocean by maintaining fish and other animals below them in the food chain

in the correct proportion for the ecosystem. They also preserve ecological stability with other competing species, helping to ensure ocean biodiversity, keeping the entire ocean balanced and ensuring the sustainability of fish stocks (Techera & Klein, 2014). By 2009, around 24% of shark species were considered to be endangered by the International Union for Conservation of Nature (IUCN) Red List (Dulvy et al., 2014). With overfishing as the main threat to shark populations, this declining trend continued and still lingers today. A recent study by Pacoureau and colleagues (2021) showed a dramatic 71% decrease in the world's population of sharks and ocean rays since 1970. Due to an 18-fold increase in fishing pressure, these authors currently place 75% of all sharks and rays at risk of extinction. If sharks are to disappear from the ocean, this may result in a sequence of cascading effects in the trophic structure of the entire ocean, leading to a decrease of overall ocean biodiversity (Pacoureau et al., 2021).

Although sharks are not a daily concern of the Portuguese public, largely due to the absence of local conflicts in man-shark interactions, Portugal contributes to the declining state of several shark species through direct or indirect fishing. Since the fishing industry is one of the main conservation challenges that sharks face in Portugal (Alves et al., 2020), shark conservation management is mostly based on the regulation of this industry, overseen by the European Union. Despite major achievements in the sustainable management of fish stocks, including sharks, over the past several years, conservation of sharks is still only beginning. Moreover, though national or community management decisions are, in part, affected by public opinion, the general public shows little interest in shark conservation.

Many scholars have pointed to sharks' bad image as the main impediment to their conservation efforts among the general public (e.g., Ferguson, 2006; Muter et al., 2013; Neff & Hueter, 2012; Philpott, 2002). Understanding the socio-psychological factors, and especially stereotypes, that can structure human perception of sharks is therefore crucial (Panoch & Pearson, 2017). Indeed, people routinely attribute human characteristics (e.g., traits, intentions, and emotions) and stereotypes to animals through anthropomorphism. Such stereotypes have deeply influenced the human-animal relationship. For example, Dashper et al. (2018) have shown that people mobilize gender stereotypes to evaluate horses: stallions are associated with physical presence, strength and power, mares with emotionality (e.g., they were seen as moody, unpredictable, difficult, flighty but protective) and geldings with relaxed and easy-going behaviours and consistency. Budge et al. (1997) found that gender was a major factor in perceived compatibility between owners and pets: showing pictures of large dogs, these were generally attributed to males owners, whereas pictures of smaller dogs and cats were attributed to female owners. Recently, Sevillano and Fiske (2016a,b, 2019) have shown that the Stereotype Content Model (SCM) and Behaviours from Intergroup Affect and Stereotypes (BIAS) map are a useful

theoretical framework to understand stereotypes, emotions and behavioural tendencies associated with animals and their impact on human-animal relationships.

To date, shark conservation has been explored by studying general knowledge about sharks (Friedrich et al., 2014), conceptual maps (Thompson & Mintzes, 2002), attitudes (Acuña-Marrero et al., 2018; Thompson & Mintzes, 2002), the content of website discussion boards (Shiffman et al., 2020), newspapers (Boissonneault et al., 2005; Boissonneault, 2011), movies (Rugen, 2013), children's drawings and interviews (Neves & Monteiro, 2014) and finally social representation (Neves et al., 2021). So far, little is known about the stereotypes associated with sharks as they have not been systematically studied. Determining the public's stereotyped perception of sharks, and the related emotional and behavioural tendencies, could be fruitful for understanding both attitudes and intentions toward shark conservation (Panoch & Pearson, 2017).

From humans to animals: using the Stereotype Content Model (SCM) to understand human-animal relationships.

According to the SCM (Fiske et al., 2002), human intergroup interactions rely on the perception of two fundamental dimensions: warmth and competence. When meeting outgroup members, people try to answer two key questions: 1) Do they have good (vs. bad) intentions toward me and my group? (i.e., the warmth dimension); 2) Can they enact their intentions? (i.e., the competence dimension). Warmth embraces "traits that are related to perceived intent, including friendliness, helpfulness, sincerity, trustworthiness and morality" (Fiske et al., 2007, p.77). Competence encompasses "traits that are related to perceived ability, including intelligence, skill, creativity and efficacy" (Fiske et al., 2007, p.77). While warmth deals with the social acceptance and connection that are needed for survival and determines approach–avoidance tendencies, competence deals with status and the capacities that are needed to attain goals (Fiske et al., 2007). The SCM states that stereotypes vary on these two fundamental dimensions according to their level (i.e., low vs. high).

Extending the SCM, Cuddy, Fiske and Glick (2007) proposed the Behaviours from Intergroup Affect and Stereotypes (BIAS) map, and showed that the combinations of perceived warmth (low vs. high) and competence (low vs. high) were associated with different kinds of stereotypes. These were then associated with different emotions (approach vs. avoidance emotional states), and ultimately, intergroup behaviours that can be categorized along the active vs. passive and facilitative vs. harmful dimensions. For example, groups stereotyped as high in warmth (e.g., caring, honest) and competence (e.g., dominant, intelligent) are typically composed of in-group members or allies. They are seen as non-competitive and high in status. They elicit approach emotions (e.g., admiration, attraction, respect, pride) as well as active facilitation (e.g., helping,

protecting, defending) and passive facilitation (e.g., cooperating with, associating with). Members of groups characterized by a high warmth and a low competence (e.g., women, the elderly) are associated with negative emotions (e.g., pity) and passive facilitation. Members of groups characterized by a low warmth (e.g., selfish, cold, brutal) and a high competence are perceived as competitive and high in status (e.g., men, lawyers, rich people). They are considered as having the potential to cause harm and the competence to do so. They elicit emotions like envy, jealousy or mistrust as well as passive facilitation (e.g., cooperating with, associating with), but also active harm (e.g., fighting, attacking). Finally, members of groups characterized by a low warmth and a low competence (e.g., the homeless) are associated with negative emotions (e.g., contempt) and active harm (e.g., repression). According to the BIAS map, related emotional states take the role of mediators in the relationship between stereotypes and behavioural tendencies, and are stronger predictors of behaviour than stereotypes (Cuddy et al., 2007).

Recently, Sevillano and Fiske (2016a,b, 2019) have suggested that the SCM and the SCM/BIAS map could also be applied to animals to describe and explain human-animal relationships. Sevillano and Fiske (2016a) found that each of the 25 animals under study fitted into one of the four stereotypes: the subordination/prey stereotype (high warmth and low competence; e.g., farm animals) associated with approaching and positive emotions (e.g., peacefulness) and passive harming behaviours (e.g., ignoring); the threatening-awe/predator stereotype (low warmth and high competence; e.g., tigers, bears) associated with admiration, fear and avoidance or harmful behaviours (e.g., shooting); the contemptible/pest stereotype (low warmth and low competence, e.g., invertebrates) associated with avoidance emotions (e.g., disgust) and active harmful behaviours (e.g., killing, poisoning); and finally, the protective/companion stereotype (high warmth and high competence; e.g., dogs, cats, horses, monkeys) associated with approaching emotions (e.g., love) and behaviours (e.g., interacting, caring).

Using the SCM/BIAS map, Sevillano and Fiske (2019b) showed that the specific stereotype associated with each type of animal can trigger different emotional responses and beneficial or harmful behavioural tendencies toward them. In study 1, using an experimental approach, they presented participants with a description of a fictitious animal, the 'wallon', and asked them to evaluate it. The levels of warmth and competence (low vs. high) of the 'wallons' were manipulated through their description. Results showed that warm-competent 'wallons' were associated with fondness/delight; cold-incompetent 'wallons' with contempt/disgust; cold-competent 'wallons' with threat; and warm-incompetent 'wallons' with no specific emotion. A higher perceived warmth was also more associated with active and facilitative behaviour (e.g., support/help) than harmful behaviours (e.g., kill/trap). Finally, Sevillano and Fiske (2019b; study 2) assessed the relationship between the stereotypes of 25 species and the behavioural tendencies toward them. Results showed

that facilitation tendencies (i.e., protection campaigns) were more associated with animals perceived as warm rather than cold.

Warmth, competence and attitudes toward conservation

The general public's attitude toward the conservation of an endangered species is a key factor for the acceptance and legitimization of governmental environmental policies or management actions toward this species (Friedrich et al., 2014). For example, several scholars have suggested that the negative public image of sharks has indirectly favoured the decisions of various governments to implement lethal control programs (Lucrezi et al., 2019; Neff, 2014). The public's conservation attitudes toward a species depends deeply on the human-species relationship, more precisely on individual characteristics (e.g., knowledge about the species), context (e.g., culture, norms, work environment), experiential events (i.e., direct contact with the species), place of living (e.g., near vs. far from the ecosystem of the species), and the influence of the media and advertising (Castillo-Huitrón et al., 2020). It is reasonable to assume that the level of perceived warmth and competence of an animal can affect human attitudes toward its conservation. Results in social cognition support such a claim. For example, levels of perceived warmth and competence predicted the patronizing attitudes toward working mothers (Cuddy et al., 2004), and Bufquin et al. (2017) found that the more participants perceived their co-workers as warm and competent, the more they were satisfied with their jobs.

Warmth, competence and donation

Elaborating on the BIAS map, Zagefka and James (2015) suggested that helping might be more likely when people experience feelings of warmth toward the outgroup in need, i.e., when warm stereotypes prevail. Congruent with such a claim, Lee, Heinze and Lu (2018) found that participants were more willing to donate to corporate social responsibility initiatives organized by sports organizations whose descriptions transmitted a warm and competent image. Zhang, Lin and Yang (2019) showed that participants were more willing to donate time after being exposed to warmth-based advertising and to donate money after competence-based advertising. Finally, in studying human-animal relationships, Sevillano and Fiske (2019, studies 1 and 2) found that the perception of warm traits in an animal, whether a fictitious one or a real one, was associated with more proactive behavioural tendencies (e.g., support/help) and less harming ones.

Overview of the study and hypotheses

To date, only a limited number of studies have been done using the SCM/BIAS map applied to animals. Nevertheless, the SCM/BIAS map has proved to be a useful method to understand

human-animal relationships by determining the stereotypes associated with a large range of animals and their related emotions and behavioural tendencies. The SCM/BIAS map assumes a sequential relationship between the type of stereotype (warmth vs. competence) -> emotions -> behavioural tendencies. Sharks are characterized by a negative image and the general public is less worried about their conservation in contrast to other species (e.g., dolphins). The SCM/BIAS map, which has not yet been applied to sharks, could be fruitful to understand the stereotypes associated with sharks as well as attitudes toward conservation and donation. Warmth and competence have been shown to be related to patronizing attitudes (Cuddy et al., 2004) and donation intentions (Zhang et al., 2019). Donation is a classical indicator of behavioural efforts for conservation (e.g., Clements, 2013; Curtin & Papworth, 2018). Consequently, based on the assumptions of the SMC/BIAS map applied to animals (Sevillano & Fiske, 2006a,b, 2019), we make the following hypotheses about the stereotypes, emotions, and attitudinal and behavioural tendencies toward sharks:

H1: Sharks are characterized by a threatening-awe/predator stereotype, that is, by low warmth and high competence.

H2: Sharks' threatening-awe/predator stereotype is associated with less approach emotions and more avoidance emotions.

H3: Approach emotions are associated with more positive attitudes toward conservation and more intention to donate.

H4: Avoidance emotions are associated with more negative attitudes toward conservation and a lesser intention to donate.

Method

Participants and procedure

One hundred and forty-four university students (n = 144; Mage = 22.28; SD = 6.24) voluntarily participated in a study about animals. Participation took place at the beginning of a class, with previous consent from the teacher. The sample was composed of 49 male participants (Mage = 22.18; SD = 6.14) and 95 female participants (Mage = 22.33; SD = 6.33). Participants were all Portuguese-speaking adults. Data was collected at Zoomarine Algarve, in southern Portugal. Participation followed the ethical standards toward research on humans as required by the host institution. All subjects were informed about their rights for participation and the ability to stop participation at any moment with no harm. An informed consent form was signed by all participants, stating their voluntary and anonymous participation. They were also informed that all data would be treated following the ethical principles of confidentiality and anonymity. All

procedures performed in this study were in accordance with the American Psychological Association's (APA) ethical principles and the Portuguese regulations about data protection.

Material

The questionnaire contained measures of warmth, competence, attitudes toward conservation, intention to donate, and approach-avoidance emotions toward sharks, but also toward dolphins, crocodiles and turtles. Although the study focused on sharks, data for dolphins was also collected. Dolphins, being the positive emotional antagonists of sharks, served as a point of comparison to better understand the perception of sharks, especially for the determination of the type of stereotype. Crocodiles and turtles were added as filler tasks to avoid focalization on the shark and shark vs. dolphin comparison. The order of presentation of each animal was randomized. No photos of the animals were shown in any stage of the study.

For warmth and competence, participants rated each animal on a range of traits using a 7-point scale, ranging from 1 = *nothing* to 7 = *a lot*, assessing perceived warmth (i.e., friendly, well intentioned, trustworthy, warm, kind, sincere, tolerant, attentive, amicable, empathetic) and competence (i.e., competent, confident, independent, capable, efficient, skilful, intelligent, smart). All scales displayed a good internal reliability (i.e., Cronbach $\alpha = 0.82$ and 0.85 for warmth, and 0.83 and 0.82 for competence for sharks and dolphins respectively). Higher scores indicate higher levels of warmth and competence.

For attitudes toward conservation, participants were asked to indicate their opinions on a seven-point scale, from 1 = *totally disagree* to 7 = *completely agree*, for each of the four animals, using the three following items: 'More efforts should be made to protect [animal name]; Conservation of [animal name] is a matter for humans; [animal name] conservation is the responsibility of humans'. Measures displayed a good internal reliability (Cronbach $\alpha = 0.74$ and 0.82 for sharks and dolphins respectively). Higher scores indicate more positive attitudes toward the conservation of each animal.

For approach-avoidance emotions, participants were asked to report, on a 7-point scale from 1 = *nothing* to 7 = *a lot*, how much they would feel a set of approach emotions (i.e., cheerful, accomplished, dazzled, excited, curious, enthusiastic, confident, happy) and avoidance emotions (i.e., afraid, worried, frightened, horrified, disgusted, threatened, uncomfortable, angry) when seeing each animal. Scales displayed good internal reliability (i.e., Cronbach $\alpha = 0.89$ and 0.92 for approach emotions, and 0.82 and 0.74 for avoidance emotions for sharks and dolphins respectively). Higher scores indicate the experience of more approach and avoidance emotions.

Regarding donations, participants were asked to answer the following question: "If you had the opportunity to donate to various conservation organizations, indicate the order from the most

important (1) to the least important (4): a) Conservation trust for crocodiles; b) Conservation trust for turtles; c) Conservation trust for sharks; d) Conservation trust for dolphins." Mean scores varied from 1 to 4, with 1 as the preferred choice and 4 as the last choice for donating to a conservation trust.

For socio-demographic information, participants were asked about their gender and age, and reported their interest in animals on a 7-point scale from 1 = not at all interested to 7 = totally interested.

Results

Preliminary analyses

Table 8 displayed the basic statistical characteristics of the variables under study. Nine participants did not report their preference for donating to conservation trusts. It was decided not to substitute the missing values. Skewness and kurtosis were analysed and all values were below the threshold recommended by Curran, West and Finch (1996; i.e., 2 and 7 respectively). Measures for crocodiles and turtles were not included in the results presentation because they were only filler tasks. Measures for dolphins are displayed to serve as a point of comparison for the sharks' results.

Table 8 - Descriptive Statistics.

		Sharks		Dolphins			
	N	*M*	*SD*	*M*	*SD*	*t*	*p*
Warmth	144	2.89*	0.98	5.58*	0.86	22.842	< 0.001
Competence	144	5.37*	1.13	5.81*	0.79	-4.164	< 0.001
Approach emotions	144	5.57	1.37	5.47*	1.17	-3.610	< 0.001
Avoidance emotions	144	3.59*	1.38	1.47*	0.55	22.079	< 0.001
Conservation attitudes	144	4.03*	1.30	6.36*	0.86	-7.902	< 0.001
Donation preference	135	2.91*	0.96	1.70*	1.01	8.215	< 0.001

Notes. * $p < .05$

Determination of shark stereotype

Results of a series of one sample t-tests (see Table 8) showed that the means of warmth and competence were, respectively, significantly below and above the middle point of the scale (i.e., 3.5), indicating that sharks were characterized by low warmth and high competence. Moreover, compared to dolphins, sharks were perceived as significantly less warm and competent (see Table 8). A paired t-test analysis between warmth and competence showed significant differences to both animals, although sharks (M = 2.49; SD = 1.59; $p < 0.001$) did show a more pronounced difference than dolphins (M = 0.22; SD = 0.61; $p < 0.001$). Following the methods of Sevillano and Fiske (2016a,b), sharks and dolphins were mapped on a scatter plot according to their scores on perceived

warmth and competence to determine their quadrant. Figure 7 displays the space mapping of both animals according to the four quadrants of the SCM. Sharks lay on the low warmth-high competence quadrant whereas dolphins lay on the high warmth-high competence quadrant. In brief, the pattern of results confirms H1: sharks fit the threatening-awe/predator stereotype. Inversely, as a comparison, dolphins fit the protective/companion stereotype.

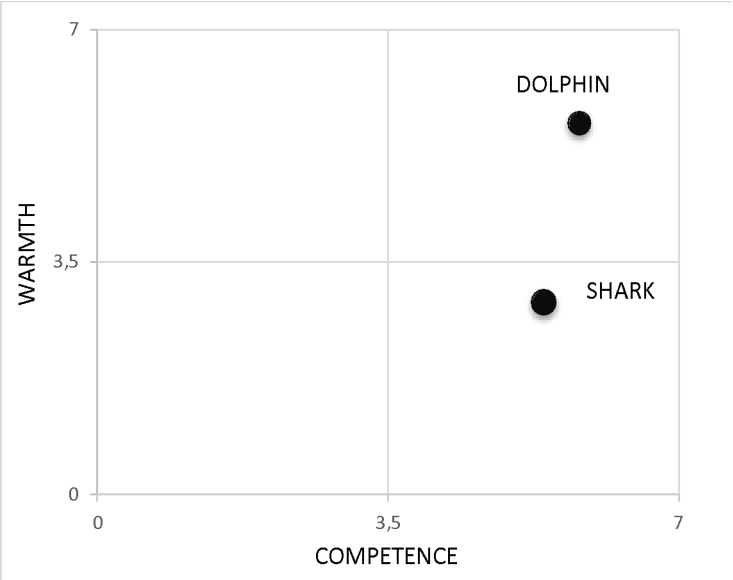

Figure 7 - Warmth by Competence space for sharks and dolphins.

Approach and avoidance emotions

Results of a series of one sample t-tests (see Table 8) showed that the mean of avoidance emotions (but not approach emotions) triggered by sharks was significantly above the middle point of the scale (i.e., 3.5), indicating that sharks were characterized by a higher level of avoidance emotions. Although both mean values were close to the middle point of the scale, a paired t-test analysis between these two emotions found significant changes ($M = 0.43$; $SD = 2.20$; $p = 0.02$). Inversely, dolphins were associated with higher levels of approach emotions and lower levels of avoidance emotions (means are respectively significantly below and above the middle point of the scale; see Table 8). Paired t-test analysis confirmed this marked difference ($M = 4.01$; $SD = 1.43$; $p < 0.001$). Sharks generated significantly more avoidance emotions and less approach emotions than dolphins (see Table 8). The pattern of emotions related to sharks is congruent with the threatening-awe/predator stereotype for sharks, confirming H2. Additionally, for dolphins, the pattern of emotions reported by participants is also congruent with the protective/companion stereotype.

Attitudes toward conservation

Partial correlation analyses (i.e., controlled for gender and interest in animals) showed that participants who had more positive attitudes toward conservation for sharks were also those who reported more approach emotions, supporting H3, and attributed higher levels of warmth and competence to sharks (see Table 9). Avoidance emotions toward sharks were not correlated to their respective attitudes toward conservation, thus not supporting H4.

Table 9 - Correlations between Variables for Sharks (above the diagonal) and for Dolphins (below the diagonal).

	1	2	3	4	5	6
1. Warmth	-	-0.13	0.54**	-0.32**	0.15	-0.13
2. Competence	0.73**	-	0.11	0.13	0.42**	-0.09
3. Approach emotions	0.43**	0.41**	-	-0.35**	0.27**	-0.23**
4. Avoidance emotions	-0.47**	-0.43**	-0.28**	-	0.01	0.14
5. Conservation attitudes	0.21*	0.21*	0.29**	-0.32**	-	-0.17
6. Donation preference	0.18*	0.15	0.16	-0.04	0.06	-

Notes. * $p < .05$; ** $p < .01$. Results for sharks (N = 144) are displayed above the diagonal. Results for dolphins (N = 144) are displayed below the diagonal. All correlations are controlled for gender and interest in animals.

Donation

Participants were asked to rank the order in which they would spend personal money helping one species (1 being their first choice and 4 the last). Partial correlational analyses showed that participants who reported more approach emotions were those who selected shark conservation trusts as their first choice (see Table 9), supporting H3. However, avoidance emotions were not significantly associated with donation, not supporting H4. More positive conservation attitudes toward sharks were also associated with the shark conservation trust as a first choice (see Table 9). Finally, results also showed that sharks were less often a first choice than dolphins (see Table 8).

Test of the relationships between the type of stereotype -> emotions -> attitudes toward conservation/donation

The SCM/BIAS suggest a causal sequence between the stereotype (defined by the different combination of warmth vs. competence), emotions, and behaviours (Sevillano & Fiske, 2016b, 2019). A parallel multiple mediator analysis was conducted using Process (Hayes, 2018; Model 4) with 5.000 bootstrap samples and 95% percentile bootstrap confidence intervals to test the sequential model: warmth x competence -> emotions -> attitudes toward conservation/donation preference order for sharks. Participants' gender and interest in animals were included in the model as control variables. Process (Hayes, 2018) is a regression-based bootstrap approach for mediation analysis that allows researchers to deal with the shortcomings of classical methods like Baron and Kenny's (1986) steps method for mediation and the Sobel test (see Hayes, 2018). Because Process

(Hayes, 2018) contemplates only one predictor at a time, separated models were tested for warmth and competence.

Results for warmth -> emotions -> attitudes toward conservation / donation preference order for sharks

Results of the parallel multiple mediator analysis showed that perceived warmth for sharks was a significant predictor of both approach and avoidance emotions (Figures 8, 9; see Table 10, Model 1, for a complete description). Moreover, approach emotions (but not avoidance emotions) were a significant predictor of both attitudes for both conservation and donation preference order, supporting H3. Finally, although warmth did not have a significant direct effect on attitudes toward conservation or on donation preference order, it had a significant indirect effect on attitudes toward conservation through approach emotions (effect = 0.16; bootSE = 0.07; 95% boot CI = [0.018-0.312]). In other words, participants who perceived sharks as having warm traits reported more approach emotions and less avoidance emotions, and the more they reported approach emotions, the more they had positive attitudes toward shark conservation and chose to donate money to a shark conservation trust as their first choice. Finally, approach emotions mediated the effect of warmth on attitudes toward shark conservation. The pattern of results is congruent with the SCM/Bias map adapted to animals by Sevillano and Fiske (2016b,2019) and their results obtained for other animals.

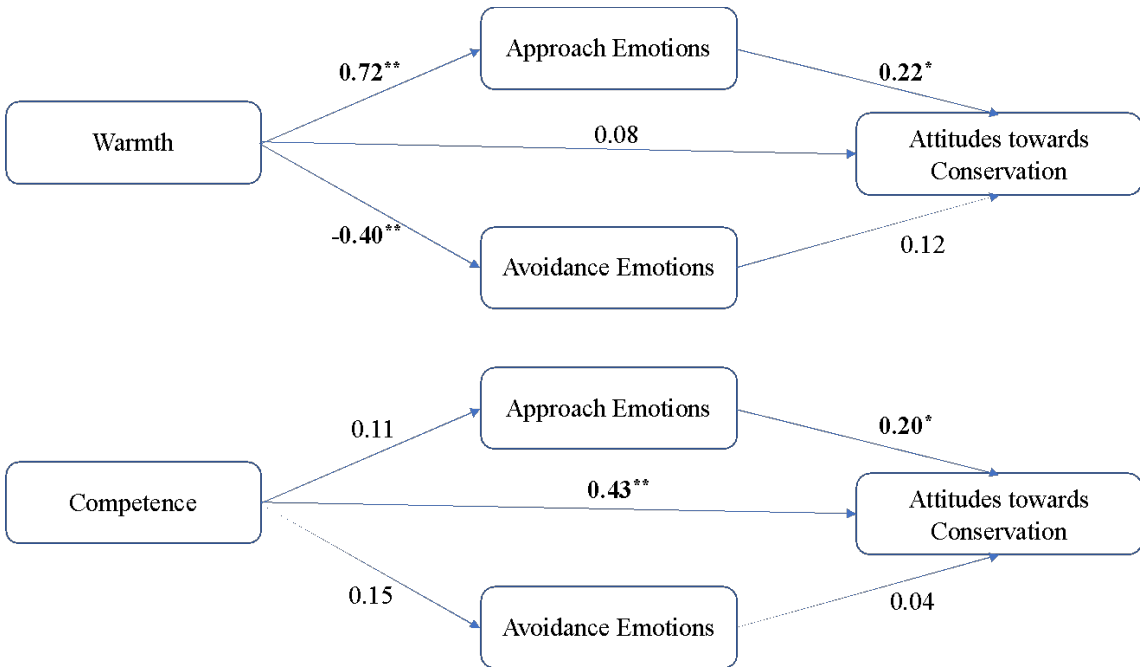

*Figure 8 - Summary information for the parallel multiple mediator model for predicting attitudes toward shark conservation. * p < .05; ** p < .01*

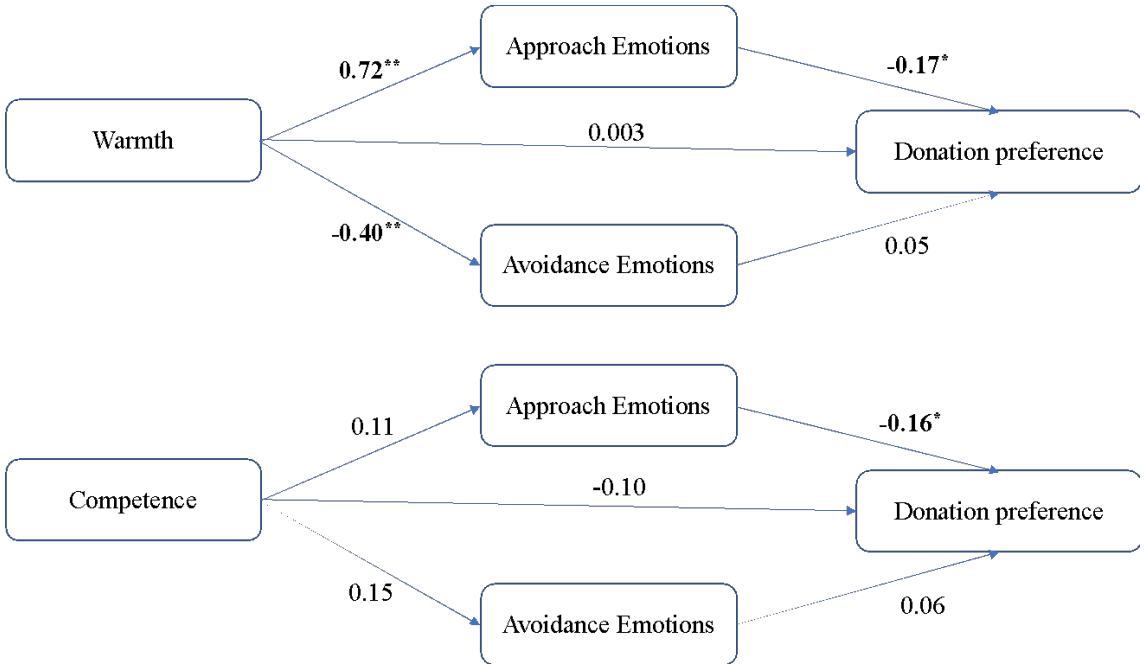

*Figure 9 - Summary information for the parallel multiple mediator model for predicting donation preference for sharks. * p < .05; ** p < .01*

Results for competence -> emotions -> attitudes toward conservation/donation preference order for sharks

Results of the parallel multiple mediator analysis showed that perceived competence for sharks was a significant predictor of avoidance emotions (but not of approach emotion; Figures 8, 9; see Table 10, Model 2, for a complete description), supporting H2. Approach emotions were significant predictors of attitudes toward conservation and donation preference order, supporting H3. Competence was a significant predictor of attitudes toward conservation, but not of donation. No indirect effect of competence on attitudes toward conservation or donation through approach and avoidance emotions was found. In other words, participants who perceived sharks as competent animals reported more avoidance emotions and more favourable attitudes toward shark conservation. Those who experienced more approach emotions for sharks displayed more positive attitudes toward shark conservation and chose to donate more as a first choice to a shark conservation trust.

Additional analyses: Results for dolphins

Although they were not the main target species of the study, results for dolphins were explored as a point comparison. Correlational analyses (see Table 9; below the diagonal) showed that participants who perceived warmth traits for dolphins were also those who reported significantly more approach emotions, less avoidance emotions, more positive attitudes toward

shark conservation and more donation preference. Perception of competence was also associated with more approach emotions, less avoidance emotions, and more favourable attitudes toward conservation. Experiencing more approach emotions was associated with more positive conservation attitudes, while experiencing more avoidance emotions was related to less positive conservation attitude and less donation preference.

A parallel multiple mediator model analysis was conducted using Process (Hayes, 2018) with 5000 bootstraps to test the sequential model warmth/competence -> emotions -> attitudes toward conservation/donation preference order for dolphins.

Concerning the model warmth -> emotions -> attitudes toward conservation/donation preference order for dolphins (see Table 11, Model l), results showed that warmth was a significant predictor of approach and avoidance emotions, while these in turn were significant predictors of attitudes toward conservation. An indirect effect of warmth on attitudes toward conservation through approach emotions (effect = 0.07; bootSE = 0.04; 95% boot CI = [0.0028-0.17]) and avoidance emotions (effect = 0.11; bootSE = 0.05; 95% boot CI = [0.03-0.20]) was found.

In respect to the model competence -> emotions -> attitudes toward conservation/donation preference order for dolphins (see Table 11, Model 2), only avoidance emotions were significant predictors of attitudes toward conservation. An indirect effect of competence on attitudes toward conservation through avoidance emotions (effect = 0.10; bootSE = 0.05; 95% boot CI = [0.03-0.21]) was found.

Discussion

The current study aimed at determining whether sharks were associated with a specific type of stereotype as defined by the SCM/BIAS map applied to animals (Sevillano & Fiske, 2016a,b, 2019), and if this could influence both attitudes and donation intentions toward their conservation.

Type of stereotype associated with sharks and its effects

Results showed that sharks were associated with a specific type of stereotype: sharks were seen as low on warmth and high on competence. In other words, sharks were pictured as pursuing their threatening goals and having the full capacity to attain them. Such a pattern exactly fits the threatening-awe/predator stereotype found by Sevillano and Fiske (2016a) for other predator animals such as lions or bears.

The association between low warmth and high competence forms an ambivalent or mixed stereotype (Sevillano & Fiske, 2016a,b, 2019). Approach-avoidance emotions also confirmed this ambivalent perception. Mixed stereotypes sometimes have ambiguous effects. For example, Sevillano and Fiske (2016a) suggested that animals associated with such mixed stereotypes evoke

respect and fear because of their perceived high competence (e.g., aggressiveness, dominance), but also hold our attention and admiration due to other traits such as beauty, intelligence, determination, etc. Such an effect could explain why, in our study, participants had a positive attitude toward their conservation but giving money for their conservation was not a priority. This also relates to why those who considered sharks as competent animals simultaneously reported more avoidance emotions (but not more approach emotions) and more positive attitudes toward shark conservation. Sharks' perceived warmth and competence were associated with specific emotions and attitudinal and behavioural tendencies, which confirms the utility of the SCM/BIAS map for a better understanding of the human-shark relationship.

Contrasting with sharks, dolphins were seen as highly warm and competent. In other words, they were associated with a non-mixed and protective stereotype. Friendliness and intelligence constitute the protective stereotype (Sevillano & Fiske, 2019a). Interestingly, the SCM posits that the protective stereotype is associated with similarity and closeness, in-group, allied (Fiske et al., 2002) and companion animals (Sevillano & Fiske, 2016a,b, 2019), while mixed stereotypes are associated with out-group and competing members. This difference echoes the antagonism of sharks vs. dolphins. Indeed, the predator vs. protective stereotypes match the characterization of sharks and dolphins found in newspapers by Herzog and Galvin (1992), showing that 30 years later, nothing has changed.

Practical implications: Deconstructing the shark's stereotype to promote its conservation

Sevillano and Fiske (2019) observed that in conservation biology and environmental psychology, research has mainly focused on people's knowledge of and attitudes toward animals to understand conservation efforts toward them. However, although knowledge and pro-environmental attitudes have been shown to be important elements in attitudinal and behavioural change, they were not sufficient to modify conservation attitudes and engagement (Fletcher & Potts, 2007; Kollmuss & Agyeman, 2002; McKinley & Fletcher, 2010) or some affective components like emotions (see Seraphin, 2010). Because stereotypes toward animals are associated with specific emotions, which are related to specific attitudinal and behavioural tendencies (Sevillano & Fiske, 2016a,b, 2019) as the current results showed for sharks, deconstructing stereotypes and emotions associated with sharks could be a complementary approach to intervention strategies and programs. Such an approach would not be to deny the sharks' nature as predators (when they are), but to reduce the negative stereotypical beliefs associated with them (e.g., preying on humans or great whites as prototypical exemplars) and to highlight and stress the qualities that sharks do have. For example, our results showed that warmth was related to approach emotions, which were associated with more positive attitudinal and behavioural tendencies toward sharks. Warmth also had an

indirect effect on attitudes toward conservation through approach emotions. Consequently, one strategy could be to increase the perception of warmth in sharks. Interestingly, recent findings about sharks have shown that, contrary to what most people think, many of them share time and place with other sharks, gather in large schools, establish bonds and connections between themselves (e.g., social), and help with hunting (e.g., collaboration) and protection behaviours (e.g., care) (e.g., Domeier & Nasby-Lucas, 2007; Ebert, 1991; Jacoby et al., 2012; Mourier et al., 2012; Sims et al., 2000). Altogether, these community traits could help to increase their perceived warmth. Promoting warmth in sharks could be done through classical campaigns, e.g. through media outlets and social media and targeting different audiences, or by communicative action using indirect experience with sharks through virtual reality. Interestingly, attitudes formed in virtual reality were shown to be as strong as those created in real contexts (see Giger & Almeida (2019) for a review). Providing people with the opportunity to take a 360-degree virtual reality tour with sharks (displaying social behaviours) through the use of a virtual reality headset may be an effective way to promote their conservation. Such virtual encounters could be proposed as an attraction by aquariums, zoos or other conservation institutions.

Another way to increase shark conservation in the general public could be to use emotion-related behaviours as levers. Sevillano and Fiske (2016a) argued that while animals characterized by the threatening-awe stereotype trigger mixed emotions such as respect and fear due to some traits of high competence (e.g., aggressiveness, dominance), they also trigger admiration due to other traits such as beauty, intelligence, determination, etc. Congruently, Neves et al. (2021) found that the central nucleus of the social representation of sharks was ‘majestic’, which was reinforced by elements of the first periphery like ‘strength’, ‘power’, ‘king of the ocean’, ‘respect’, ‘beautiful’, and ‘gracious’. In short, sharks have the ‘wow’ factor and can trigger awe that results from the combined feelings of fear and admiration they generate (Sevillano & Fiske, 2019a). According to the theory of flagship species action (Jepson & Barua, 2015), species with traits that may elicit fear, such as sharks, will have a limited flagship capacity. Elaborating on communications that trigger approach emotions, awe or the ‘wow’ factor toward sharks could decrease the influence of fear and increase conservation attitudes and efforts in the general public.

Future research

To our best knowledge, the current study was the first attempt to determine the stereotype of sharks (and dolphins) and related emotions and behavioural tendencies using the SMC/BIAS map. Further studies are needed to replicate and extend our results.

In the current study, we use the intention to donate for a conservation trust as a behavioural indicator, that is, an active-facilitative behavioural tendency. The BIAS map classifies behavioural

tendencies according to their degrees of intensity (active-passive), which is determined by the level of effort put into the behaviour itself, and the valence (facilitative-harmful), characterized by the kind of outcome for the target (favourable vs. detrimental). Further studies should investigate the association between perceived warmth/competence in sharks and other types of behavioural tendencies such as killing, conserving, monitoring, helping, ignoring, or letting them die off. Our results suggest that improving the perception of warmth regarding sharks might increase the probability of helping them. However, negative cognitions and emotions associated with sharks can constitute factors of resistance to persuasion. Moreover, sharks have some aspects that will always factor against them, such as their physical aspect (size, teeth for the great white, etc.). Therefore, future research should explore factors that may reduce psychological defence. For example, the use of humour was shown to be useful to change attitudes when resistance is high, because it serves as a distraction for negative affect and at the same time triggers positive affect (e.g., Martin, 2010; Nabi et al., 2007). Sevillano and Fiske (2016c) also showed that emotional involvement with a social target (i.e., sharing others' feelings) decreased the perception of threat and increased the perception of warmth.

The current study also showed that approach emotions (like dazzlement, excitement) associated with sharks were predictors of the attitude toward conservation and donation. Further studies should thus examine how these approach emotions, and specifically awe or the global 'wow' factor, can be enhanced and used to promote conservation and helping behaviours toward sharks.

Our view of sharks may be difficult to change. Indeed, according to Fiske et al. (2002), the content of stereotypes depends on two structural variables: the status and the level of competitiveness. Competitiveness (or lack of cooperation) influences the perceived warmth. Social status (high or low) influences the perceived competence. For Fiske et al. (2002), the kind of relationship (conflictual or not) is the determinant. The image of sharks as the ultimate predator that preys on humans (as transmitted by popular culture) provides them with a high status and a high level of competitiveness. Actually, the entertainment industry displays sharks as blood-driven killing machines that prey upon humans and create the impression that sharks are at war with humans. Moreover, the fact that high-status animals may elicit an ambiguous mixture of admiration and intense dislike because of a sense of threat (Sevillano & Fiske, 2016a) can represent a challenge to modify the sharks' image.

Conclusion

Conservation science and environmental psychology studies have so far focused on attitudes, values, knowledge or representations of sharks. The current study extends the intergroup

perspective focused on stereotypes about animals initiated by Sevillano and Fiske (2016a,b, 2019). Our results highlight how the perception of warmth and competence were associated with emotions, attitudes toward conservation and donation intention. Results confirm that SCM/BIAS map is an heuristic way to study human-animal relationship with sharks and dolphins, two animals that were not yet studied with this method. Different patterns of warmth and competence were associated with sharks and dolphins and predicted specific emotions and behavioural tendencies toward these two animals. Results contribute to a better understanding of the bad image of sharks. Finally, since all national or community management decisions are, in part, affected by public opinion, results suggest that an approach-based warmth-related information strategy could improve conservation attitudes and efforts, and indirectly speed up further policy management toward shark conservation.

Table 10 - Summary information for the parallel multiple mediator model for sharks.

		M_1 (APE)				M_2 (AVE)				Y (Attitudes for conservation)			Y (Order preference)		
Antecedent		Coeff.	SE	*p*		Coeff.	SE	*p*		Coeff.	SE	*p*	Coeff.	SE	*p*
Model 1															
X (Warmth)	a_1	0.72	0.10	0.000	a_2	-0.40	0.11	0.000	*c*'	0.08	0.13	0.53	0.003	0.10	0.98
M1 (AP-E)		-	-	-		-	-	-	b_1	0.22	0.10	0.03	-0.17	0.07	0.02
M2 (AV-E)		-	-	-		-	-	-	b_2	0.12	0.09	0.20	0.05	0.07	0.49
Constant	i_{m1}	-0.20	0.61	0.75	i_{m2}	6.22	0.67	0.000	i_y	3.96	0.89	0.000	3.02	0.69	0.000
Sex		0.01	0.20	0.96		-0.23	0.22	0.30		-0.63	0.23	0.007	-0.21	0.18	0.24
Interest		0.28	0.08	0.001		-0.12	0.09	0.17		0.16	0.09	0.10	0.10	0.07	0.17
		N = 143[a]; R^2 = 0.35				N = 143; R^2 = 0.12				N = 143; R^2 = .15			N =134[a,b]; R^2 = 0.09		
		$F(3,139) = 25.47$, $p < 0.0001$				$F(3,139) = 6.25$, $p = 0.0005$				$F(5,137) = 5.06$, $p = .0003$			$F(5,128) = 2.41$, $p = 0.04$		
Model 2															
X (Competence)	a_1	0.11	0.10	0.30	a_2	0.15	0.10	0.14	*c*'	0.43	0.09	0.000	-0.10	0.07	0.17
M1 (AP-E)		-	-	-		-	-	-	b_1	0.20	0.08	0.02	-0.16	0.07	0.02
M2 (AV-E)		-	-	-		-	-	-	b_2	0.04	0.08	0.60	0.06	0.07	0.36
Constant	i_{m1}	0.63	0.89	0.48	i_{m2}	4.59	0.87	0.000	i_y	2.12	0.90	0.02	3.50	0.73	0.000
Sex		0.15	0.24	0.53		-0.19	0.23	0.41		-0.40	0.22	0.07	-0.26	0.18	0.15
Interest		0.36	0.09	0.001		-0.18	0.09	0.04		0.13	0.09	0.15	0.11	0.07	0.14
		N = 143[a]; R^2 = 0.11				N = 143[a]; R^2 = 0.05				N = 143[a]; R^2 = 0.27			N =134 [a,b]; R^2 = 0.10		
		$F(3,139) = 5.78$, $p = 0.0009$				$F(3,139) = 2.25$, $p = 0.08$				$F(5,137) = 9.88$, $p < 0.0001$			$F(5,128) = 2.83$, $p = 0.019$		

Notes. [a] = one participant did not report his/her attitudes for preservation; [b] = 9 participants did not report their preference order. Model 1: significant indirect effect of warmth on attitudes towards conservation through approach emotions (effect = .16; bootSE = .07; 95% boot CI = [.018-.312]).

Table 11 - Summary information for the parallel multiple mediator model for dolphins.

		M_1 (APE)				M_2 (AVE)				Y (Attitudes for conservation)			Y (Order preference)		
Antecedent		Coeff.	SE	*p*		Coeff.	SE	*p*		Coeff.	SE	*p*	Coeff.	SE	*p*
Model 1															
X (Warmth)	a_1	0.53	0.10	0.000	a_2	-0.29	0.05	0.000	c'	-0.01	0.10	0.96	-0.17	0.12	0.17
M1 (AP-E)		-	-	-		-	-	-	b_1	0.14	0.07	0.039	-0.04	0.08	0.68
M2 (AV-E)		-	-	-		-	-	-	b_2	-0.40	0.14	0.006	0.23	0.18	0.21
Constant	i_{m1}	1.82	0.78	0.02	i_{m2}	3.58	0.36	0.000	i_y	6.50	0.81	0.000	2.01	1.05	0.05
Sex		-0.37	0.18	0.05		0.05	0.09	0.60		-0.24	0.15	0.11	-0.20	0.19	0.30
Interest		0.19	0.07	0.008		-0.09	0.03	0.006		0.01	0.06	0.93	0.02	0.07	0.74
		N = 143[a]; R^2 = 0.25				N = 143; R^2 = 0.26				N = 143; R^2 = 0.16			N =136[c]; R^2 = 0.08		
		$F(3,139) = 15.23$, $p < 0.0001$				$F(3,139) = 16.31$, $p < 0.0001$				$F(5,137) = 5.27$, $p = 0.0002$			$F(5,130) = 2.21$, $p = 0.06$		
Model 2															
X (Competence)	a_1	0.58	0.11	0.000	a_2	0.28	0.05	0.000	c'	0.04	0.10	0.72	-0.11	0.13	.40
M1 (AP-E)		-	-	-		-	-	-	b_1	0.13	0.07	0.06	-0.05	0.08	0.53
5M2 (AV-E)		-	-	-		-	-	-	b_2	-0.37	0.14	0.008	0.29	0.18	0.11
Constant	i_{m1}	1.78	0.78	0.02	i_{m2}	3.45	0.37	.0000	i_y	6.29	0.79	0.000	1.70	1.04	0.10
Sex		-0.52	0.18	0.01		-0.12	0.09	0.16		-0.24	0.15	0.10	0.22	0.19	0.26
Interest		0.17	0.07	0.02		-0.08	0.03	0.02		0.01	0.06	0.91	0.03	0.07	0.66
		N = 143[a]; R^2 = 0.25				N = 143[a]; R^2 = 0.23				N = 143[a]; R^2 = 0.16			N =136 [a,b]; R^2 = 0.07		
		$F(3,139) = 15.49$, $p < .0001$				$F(3,139) = 13.74$, $p < .0001$				$F(5,137) = 5.31$, $p = .0002$			$F(5,130) = 1.97$, $p < 0.09$		

Notes. [a] = one participant did not report his/her attitudes for preservation; [b] = 9 participants did not report their preference order for sharks. Model 1 : significant indirect effect of warmth on attitudes towards conservation through approach emotions (effect = .07; bootSE = .04; 95% boot CI = [.0013-.17]) and avoidance emotions (effect = .11; bootSE = .05; 95% boot CI = [.03-.21]). Model 2: significant indirect effect of competence on attitudes towards conservation through avoidance emotions (effect = .10; bootSE = .05; 95% boot CI = [.02-.20]).

Estudo 3

Humor me (or not): can humor promote positive attitudes and donation intentions toward shark conservation?[4]

Abstract:

Humor has been used as an important emotional leverage in persuasion, by reducing negative cognitions and serving as distraction from counter-argumentation. Following the SCM framework, a three-step research was designed aimed at testing the effect of humor on the perceived stereotype of the shark. Study 1 (*n*=45) validated the use of humorous ads on the attitudes of participants. Study 2 (*n*=150) tested whether humor with or without sharks could improve the shark's warmth dimension. Humor with sharks showed a positive influence on the willingness to donate for their conservation. Study 3 (*n*=303) paired humor with information about the social lives of sharks, in a natural setting experiment (aquarium). Results showed that, although mild, it was possible to affect the warmth dimension of the shark's stereotype but humor did not play the critical role expected in the natural setting experiment. Limitations and future research ideas are explored.

[4] Baseado em: Neves, J., Alves, V., Soares, N. & Giger, J-C. (2021). Humor me (or not): can humor promote positive attitudes and donation intentions toward shark conservation? [Manuscript submitted for publication]

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Introduction

Sharks' decline and its impact on marine ecosystem and human activities

Today, an increasing number of shark species are already listed as endangered according to the International Union for Conservation of Nature (IUCN). By 2009, Dulvy et al. (2014) reported that around 24% of shark species were considered to be endangered by the IUCN Red List. More recently, Pacoureau and colleagues (2021) showed a dramatic 71% decrease in the world population of sharks and ocean rays since 1970. Due to an 18-fold increase in fishing pressure throughout the last decades, 75% of all sharks and rays are at risk of extinction. But it is not only overfishing that is affecting shark populations. Other threats such as by-catch fishing or habitat destruction are also playing a strong role in the future of shark populations (Dulvy et al., 2014; Pacoureau et al. 2021). Removing sharks, either by direct or indirect catch or by the reduction of habitat, is expected to cause cascading effects in the trophic structure of the entire ocean (McCauley et al., 2010; Estes et al., 2011). As shark populations decrease, ocean biodiversity diminishes, leading to fish stocks decreasing. From the global economic standpoint, one has to view the value of sharks in an integrated way, mixing economy and ecology. Even though sharks are fish and their meat, fins and other body parts have high value, they are much more valuable to the worldwide fishing industry alive than dead. When compared to the average fish that are consumed on a daily basis, they play a very important role in the ocean by maintaining fish and other animals below them in the food chain in the correct proportion for the ecosystem. Sharks keep ecological stability with other competing species, helping to ensure ocean biodiversity, keeping the entire ocean balanced and ensuring the sustainability of fish stocks (Techera & Klein, 2014). Since we, as humans, increasingly depend on fish as a protein supply, any decrease in fish availability has a global effect (FAO, 2014).

Sharks' public perception and conservation

Sharks are not solely threatened by direct and utilitarian human activity. Public perception of sharks is also one of the main concerns regarding their conservation. In fact, within the marine environment, sharks are probably the species most vilified by the general public (Dobson, 2008; Hoyt, 2013). Indeed, sharks have been ranked in the top 10 scariest and least liked animals (Kellert, 1985a). Due to their physical appearance and cryptic nature, sharks do not enjoy the same stereotypical traits as other marine species, for example, dolphins (Neves et al., 2021) and thus, there is an absence of empathetic emotions towards them. Popular entertainment has also greatly reinforced avoidance emotions, which has been particularly detrimental to sharks. Ever since the debut of the movie 'Jaws' (1975), the mindset of most western cultures toward sharks began to change, triggering individual fears, influencing behaviors, and resulting in an increasing prejudice

toward the shark image (Bryant et al., 2012). As a result, shark populations became even more endangered due to direct human aversion or phobia. Indeed, sharks are commonly depicted as bloodthirsty man-eating machines (Boissonneault, 2011; Boissonneault et al., 2005; Neves et al. 2021) and are considered a threat by the general public (Panoch & Pearson, 2017). It is common for sharks to be perceived as powerful, ferocious predators which stalk humans to prey on them (Morey, 2002; Thompson & Mintzes, 2002; Neves et al., 2021; Neves et al. 2021a). They elicit emotions of fear and a sense of danger (Altarriba & Basnight-Brown, 2011). This negative public image of sharks has been linked with overestimated shark-attack risks (Sabatier & Huveneers, 2018) and public fear (Pepin-Neff, 2018), thus limiting support for and success of global shark conservation efforts (Thompson & Mintzes, 2002; Muter et al. 2013; Gibbs & Warren, 2015; Shiffman, 2014; Simpfendorfer et al. 2011; Lopez de la Lama et al. 2018; Lucrezi et al., 2019).

Stereotyping sharks

Fiske, Cuddy, Glick and Jun Zu (2002) first proposed the Stereotype Content Model (SCM), which postulates that group stereotypes arise from two major dimensions: warmth and competence. Warmth encompasses 'traits that are related to perceived intent, including friendliness, helpfulness, sincerity, trustworthiness and morality'. Competence encompasses 'traits that are related to perceived ability, including intelligence, skill, creativity and efficacy' (Fiske et al., 2007, p.77). Extending the SCM, Cuddy, Fiske and Glick (2007) then proposed the Behaviors from Intergroup Affect and Stereotypes (BIAS) map. With this approach, combinations of perceived warmth (low *vs.* high) and competence (low *vs.* high) were associated with different types of stereotypes, influencing emotions (approach *vs.* avoidance emotional states) and intergroup behaviors (active *vs.* passive, facilitative *vs.* harmful). As people routinely attribute human characteristics (e.g., traits, intentions, emotions) and stereotypes to animals through anthropomorphism, human-animal relationships are influenced. Recently, Sevillano and Fiske (2016,a, 2019) have suggested that the SCM/BIAS map framework could also be applied to animals to describe and explain these relationships. Sevillano and Fiske (2016) found that, of 25 animals studied, each one could be fitted in one of four stereotypes, mimicking those of human intergroups: 1) subordination/prey stereotype (high warmth and low competence; e.g., farm animals) associated with approach and positive emotions (e.g., peacefulness) and passive facilitative behaviors (e.g., ignoring); 2) threatening-awe/predator stereotype (low warmth and high competence; e.g., tiger, bear) associated with admiration, fear and avoidance or harmful behaviors (e.g., shooting); 3) contemptible/pest stereotype (low-warmth and low competence, e.g., invertebrates) associated with avoidance emotions (e.g., disgust) and active harmful behaviors (e.g., killing, poisoning); and 4)

protective/companion stereotype (high warmth and high competence; e.g., dogs, cats, horses, monkeys) associated with approach emotions (e.g., love) and behaviors (e.g., interacting, caring).

In a more recent study, Neves et al. (2021) found that sharks are indeed stereotyped, following the same social cognition traits as with stereotyping humans. In fact, sharks were depicted as stereotypically more masculine (i.e., more agentic than communal). This gendered perception is also consistent with sharks being associated with avoidance emotions. Neves et al. (2021) also found sharks to be less communal (and highly agentic) animals. Following this stereotypical perception of sharks, the relationship between perception of sharks' communality, conservation attitudes and behavior was then studied by Neves et al. (in press). Results showed a clear dominance of competence over the warmth dimension, where sharks clearly fit within the ambivalent threatening-awe/predator stereotype, as proposed by Sevillano & Fiske (2016). This stereotype involves some prejudice toward subjects, as they are feared due to some traits of high competence (e.g., aggressiveness, dominance), but also hold our attention and admiration due to other traits such as beauty, intelligence or determination. Neves et al. (in press) also found that both perceived warmth and competence were associated with specific emotions and attitudinal and behavioral tendencies which, in turn, could predict positive attitudes and behaviors toward conservation. Approach emotions like dazzlement and excitement predicted positive attitudinal and behavioral tendencies towards sharks. The perception of warmth was also shown to have an indirect positive effect on attitudes towards conservation through the associated approach emotions. The perception of sharks as competent animals also seemed to relate to positive attitudes towards shark conservation.

Increasing the warmth dimension

Following these thoughts, the authors point to the idea that increasing the perception of warmth in sharks may also increase public support for shark conservation. Specifically, drawing attention to some traits commonly dissociated from sharks, such as sociability, collaboration or protection, could enhance their perceived warmth. Similarly, Lee et al. (2018) examined the effects of warmth and competence in sports organization partnerships and how these combined perceptions affected individuals' willingness to donate to corporate social responsibility initiatives. Although they found that articulating partnerships stronger in warmth would benefit the overall perception of the sports organization, in cases of low warmth partners (similar to sharks, for the purpose of this study), the authors highlighted the importance of communication through the use of particular words and phrases, as well as images that highlight positive warm traits. In fact, Li et al. (2020) studied the neural representation of warmth and competence at the brain level and found that, after reading two successive trait-implying behavioral descriptions, participants did not completely

interpret and represent warmth and competence traits as independent dimensions. Warmth was also found to be more influential than competence traits. A possible explanation is that warmth is a more important, broad and dominant dimension in social interaction and cooperation.

Other authors have tested the improvement of the SCM dimension of warmth through direct exposure. Kotzur et al. (2017) studied the influence of positive face-to-face contact on the warmth and competence perceptions for asylum seekers in Germany. Participants who interacted positively with an asylum seeker rated the latter higher on warmth and specific intergroup emotions and were more supportive of solidarity-based collective actions in favour of asylum seekers. They found that positive contact did improve basic stereotype content, emotional reactions, and facilitative behavioral intentions. One other possible strategy to enhance warmth is to opt for a humanizing strategy, i.e., sharing human traits to generate more empathy and other warmth-related emotions. Jarreau et al. (2019) tested whether posts on social media using self-portraits of science professionals would improve the warmth perception of the scientist stereotype. As scientists are generally perceived as competent but not warm (just like sharks), exposing participants to friendly self-portraiture in scientific settings led to an increase in the warmth dimension. This approach also revealed that participants exposed to the scientists' selfies found them equally as competent or more so than when compared to participants on the other conditions (science only or control posts).

All in all, our view of sharks may be difficult to change. The continuous portrayal of sharks as blood-driven killing machines creates a conflicting impression that sharks are a threat to humans, when they should be seen as otherwise. Adding to this, the sharks' physical appearance and ultimate predator-like traits provide them with a high status and a high level of competitiveness. These two traits together actively influence the perceived low warmth and high competence of this animal, challenging any strategy to enhance their 'good side'.

Humor as a strategy to lower defenses

Humor has been used as important emotional leverage in advertising, being used as a tool for consumer persuasion. It is also suggested that humor has the unique quality to overcome resistance to persuasive messaging, raise awareness toward a specific topic being addressed, disseminate information and encourage positive attitudes and behaviors while simultaneously minimizing conflict, anger, and resistance (Nabi et al., 2007).

In a study using humor in advertising, Strick and colleagues (2009) found humor to be both a distractor and a motivator of liking and approach behavior, thus breaking the resistance to persuasion. Since more arousing stimuli are remembered better than less arousing stimuli (Kensinger & Corkin 2004), humor works like other arousing emotional experiences (e.g., fear),

directing cognitive attention toward those stimuli (e.g., predators) at the expense of less arousing stimuli.

Humor research has come a long way since its origins and it is now present in many areas across the social realm. In the field of management, humor was found to have a positive relationship with performance (Avolio et al. 1999) and leadership effectiveness (Priest & Swain, 2002; Mao et al. 2017). It has also been found effective in many other areas, such as teaching (Allen 2014; Billah et al. 2019), well-being (Szabo et al. 2005) and even physical pain management (Dunbar et al. 2012; Rotton & Shats 1996). In the social cognition realm, some studies have found humor (namely derogatory and disparaging humor) to be negative in some contexts (Warren et al. 2018; Abrams & Bippus 2011), especially contexts related to ingroup/outgroup identity. In the present research, we aim to use humor solely as a distractor to promote pleasant situations (Martin & Kuiper, 1999), relieve anxiety and increase positive affection (Meyer 2000) and increase the communicator's credibility and acceptance (Butzer & Kuiper 2008; Maki et al. 2012).

Objective

Overview of the studies

Following the SCM, we designed a three-step research aiming to improve the warmth dimension of the shark. Two studies, preceded by a pre-test for external validation of one research instrument, were conducted to examine the possible effect of humor in changing the stereotype of the shark. Study 1 consisted of a pre-test which asked participants, in a snowball data collection approach, to rate advertisements according to their attitudinal impact. The results validated the use of one research instrument (ads) for Study 2. In Study 2, we examined whether pairing information about the shark with humorous ads (with and without sharks) would improve the warmth dimension of its stereotype. Our methodology asked respondents (undergraduate students) to answer a stereotype-based questionnaire after screening the ads and reading information about the unknown social lives of sharks. The research followed a single-factor condition in three independent samples. In Study 3, with the findings from Study 2 and in a natural setting, we examined whether the pairing of humor (not related to sharks) and the screening of a short video on the social lives of sharks would improve the warmth dimension of these animals. The methodology, based on a natural setting (aquarium), involved a sample of adult zoo goers following a single-factor condition with three independent samples.

Study 1

Study 1 aimed at pretesting the manipulative effect of humorous ads on the respondents' attitudes.

Method

Selection of advertisements

Ads were selected through a YouTube general search. These had to comply with three general characteristics: being preferably in Portuguese (the mother tongue of most of the participants) or without language; belonging to different categories within each condition, so participants didn't lose interest during screening; and having a short duration, no more than 01:00 min. 14 ads that fitted the overall characteristics were first selected. After researcher triangulation, 3 ads per condition (hair product; food supplement; beer), 6 in total, were selected for external validation. Ads were randomly assigned within each condition.

Procedure and measures

Through an online survey, a short questionnaire was given asking about the participants' attitudinal impact (emotional and cognitive components) to a set of three ads (from the same condition). No other information was given to the participants, aside from classifying them for their amusement content. Participants were informed that they could leave the survey any time, without any repercussions. All information collected was anonymous and confidential.
The random deployment of each set of ads was guaranteed by selecting the participants' birth dates (even numbers answered the humor ads' survey (A); odd numbers answered the neutral ads' survey (B)). The survey was sent via email to a small set of known contacts promoting the snowball sampling. 45 surveys were answered (33 responses for form A and 12 responses for form B). Participants' average age was 49 (SD=15), accounting for 33% males and 67% females.

Scores were submitted for one-way ANOVA with Tukey HSD post-hoc tests to compare multiple samples. All data was analyzed using SPSS V23.

After watching each ad, participants were asked to indicate their opinion about the ad. Their attitude towards the ad was measured via a 7-point semantic differential scale composed of three items: "I think the ad is: (1) not funny - (7) funny; (1) not enthusiastic - (7) enthusiastic, (1) not entertaining - (7) entertaining.

Results

A Tukey HSD post-hoc test revealed significant differences ($p<.05$) between 2 neutral and 2 humorous videos, in all three questions (Figure 10).

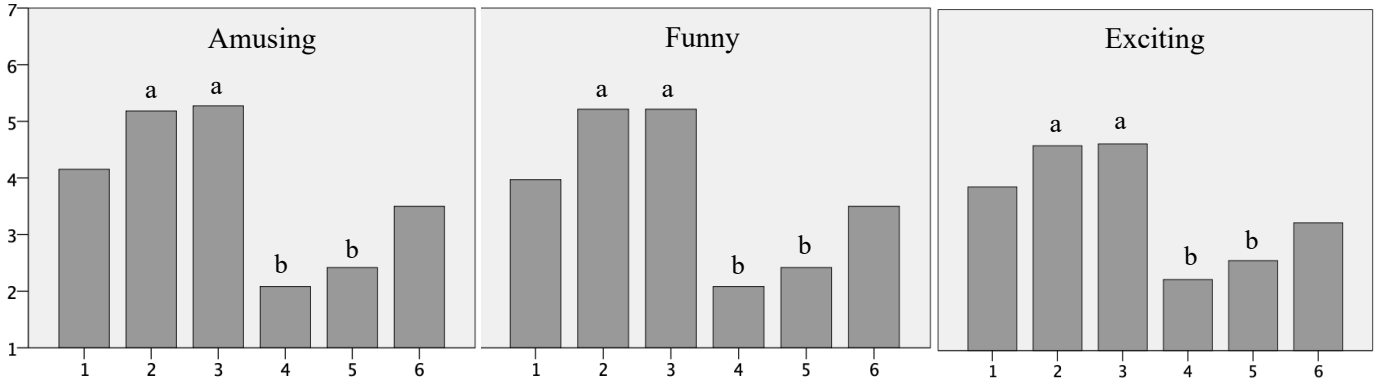

Figure 10 - Score rating for the 6 ads (1, 2, 3 – humour; 4, 5, 6 – neutral) (a,b with significant differences (p<.05)).

Ads 2 (hair product) and 3 (beer) were selected for the humor condition, and ads 4 (hair product) and 5 (beer) were selected for the neutral condition.

Study 2

Study 2 aimed at testing whether information about the social lives of sharks paired with a previous exposure to a humorous context would improve sharks' perceived warmth. We also aimed at testing if exposure to humor with sharks would influence sharks' perceived warmth.

Method

Participants and design

One hundred and fifty undergraduate students (n=150; 24.2% male; 75.8% female; M_{age}=21.3 years old; SD=5.9) voluntarily participated in the study and were assigned one condition of a between-participant experimental design (neutral ads (n=63) *vs.* non-shark-related humor ads (n=55) *vs.* shark-related humor (n=32) ads). Participation followed the ethical standards for research on humans as required by the host institution. All subjects were informed about their rights for participation and the possibility to stop participation at any moment with no repercussions. An informed consent form was signed by all participants, stating their voluntary and anonymous participation. They were also informed that all data would be treated holistically and that the ethical principles of confidentiality and anonymity would be respected. All procedures performed in this

study were in accordance with American Psychological Association (APA) ethical principles and Portuguese regulations about data protection.

Procedure and instruments

Students were asked to participate in two independent studies. In the first study, participants were asked to evaluate a set of two neutral ads, or two humorous, non-shark-related ads, or two humorous shark-related ads, depending on the experimental condition. We opted to include one extra condition (shark-related humor) to the study as, at the time of study 1, no examples were found that paired sharks and humor without reinforcing the already negative perception of the shark. Since this particular content (humor + sharks) in ads is somewhat scarce, we selected two that fitted the purpose without going through the external selection process. The first ad was about swimming apparel and the second was a video game ad.

After seeing the set of ads, participants were asked to rate them as appealing, interesting, pleasing to watch and easy to remember, using a 7-point scale ranging from 1 = nothing to 7 = a lot. Ad exposure was aimed at manipulating the emotional state of participants. Right after the ads' evaluation, participants read the following short text, in a newsbreak format, about the unknown social lives of sharks:

> **Please read the following article, adapted from a marine science outreach website, entitled "The Secret Life of the Sea".**
>
> *The amazing social life of sharks has now been revealed!!! And they are more like us than we ever imagined.*
>
> Sharks are much more social than we think and therefore very different from their reputation as solitary animals. Recent studies suggest that, in addition to society's image of these fish, many sharks enjoy the company of family and friends. Researchers are just beginning to understand that these animals, after all, have complex social lives, worthy of a prime-time soap opera. By aggregating into schools, establishing alliances and other links with each other, they ensure joint benefits in hunting or protection, helping to explain why many of these fish not only tolerate each other, but also often seem to enjoy doing so.
> Among the more than 400 species of sharks, there are some that go out to lunch together in certain estuaries and it is even suspected that the location of preferred feeding areas is socially transmitted between individuals and generations. It's so interesting that sharks seem

to share information about the best feeding places, perhaps in a marine and less technological version of TripAdvisor.

Many sharks are also seen swimming together, often with a preference for a particular companion. Even though our perception tells us that sharks are solitary predators, we now know that many species gather in large numbers in well-known areas of the ocean, to hunt or simply socialize.

Some schools of sharks can reach tens of individuals. There are others, such as hammerhead sharks, which can gather in groups that easily number in the hundreds. Lemon sharks, which live in mangroves, estuaries and reefs, never seem to be alone. They form bonds with other lemon sharks, in addition to being frequently accompanied by remoras, in a close relationship almost as intense as that of a marriage. There are also records of some species in which groups of pregnant females gather in bays and other areas of shallow waters, demonstrating protective behaviors often observed in other species usually more empathetic to us.

After reading the text, participants were then asked to indicate their perception of sharks. Participants rated sharks on a range of traits using a 7-point scale, ranging from 1 = nothing to 7 = a lot, assessing *perceived warmth* (i.e., friendly, well-intentioned, trustworthy, warm, kind, sincere, tolerant, attentive, amicable, empathetic, creative) and *competence* (i.e., competent, confident, independent, competitive, capable, efficient, skillful, intelligent, smart) (see Neves et al., in press). All scales displayed a good internal reliability (Cronbach α=.77 for warmth, and .81 for competence). Higher scores indicate higher levels of warmth and competence.

Perceived femininity/masculinity. Participants were asked to indicate how feminine and masculine they perceived the shark to be by dividing 100 points into two categories: masculinity and femininity (see Neves et al., in press). With this strategy, higher scores on femininity indicate that the animal is perceived as more feminine (and symmetrically less masculine). Previous studies have shown that sharks were perceived as low on communality and high on agency (Neves et al., 2021) and associated with the threatening-awe stereotype (i.e., low on warmth and high on agency) (Neves et al., in press). Those results indicate a gendered view of sharks. The measurement of perceived femininity/masculinity aimed at confirming this gendered view with a more direct and explicit measure.

Attitudes towards conservation. Participants were asked to indicate on a 7-point scale, from (1) totally disagree to (7) completely agree, their opinions about the three following items: “More efforts should be made to protect sharks; Conservation of sharks is a matter for humans; Shark conservation is the responsibility of humans”) (see Neves et al., in press). Measures displayed a

good internal reliability (Cronbach α=.81). Higher scores indicate more positive attitudes towards the conservation of sharks.

Approach-avoidance emotions. Participants were asked to report, on a 7-point scale from 1 = nothing to 7 = a lot, how much of a set of emotions they would feel when seeing sharks. These included approach emotions (i.e., cheerful, accomplished, dazzled, excited, curious, enthusiastic, confident, happy) and avoidance emotions (i.e., afraid, worried, frightened, horrified, disgusted, threatened, uncomfortable, angry) (see Neves et al., in press). Scales displayed good internal reliability (Cronbach α=.92 for approach emotions, and .89 for avoidance emotions). Higher scores indicate the experience of more approach and avoidance emotions.

Donation. Participants were asked to answer the following question: "If you had the opportunity to donate to various conservation organizations, indicate the order from the most important (1) to the least important (4): a) conservation trust for crocodiles; b) conservation trust for turtles; c) conservation trust for sharks; d) conservation trust for dolphins." Mean scores vary from 1 to 4, with 1 being the preferred choice and 4 the last choice for donating to a conservation trust.

Socio-demographic information. Participants were asked about their gender, age, and occupation and reported their interest in animals on a 7-point scale from 1 = not at all interested to 7 = totally interested.

Results

Preliminary analyses and control checking

Skewness and kurtosis values were analyzed and all values were below the threshold recommended by Curran, West and Finch (1996; i.e., 2 and 7 respectively).

Table 12 - Descriptive statistics

	Neutral			Humour			Humour with sharks		
	M	SD	N	M	SD	N	M	SD	N
Competence	5.49*	.63	63	5.25	.81	55	5.49	.82	32
Warmth	3.18*	.96	63	3.5	1.26	55	2.86	.79	32
Avoidance	3.89	1.26	63	3.95	1.38	54	3.77	1.22	32
Approach	3.47	1.34	63	3.37	1.34	54	3.28	1.23	32
Conservation	5.76	1.16	63	5.7	1.13	54	5.74	1.19	32
Donation	2.69	.62	59	2.81	.68	54	3.06	.56	32
Masculinity	61.1*	15.1	63	61.0	16.5	51	63.4	16.8	31

Note. * = Mean differ significantly at $p < .05$ from the middle point of the scale (e.g., 3.5 for all scales except masculinity's middle point = 50)

Sharks' stereotype

A one-sample t-test was conducted to test whether warmth and competence were significantly different from the middle point of the scale in the neutral condition in which humor was not manipulated. Results showed that warmth and competence were respectively lower and higher than the middle point of the scale (3.5; see Table 12). Such a pattern fits the threatening-awe stereotype (i.e., low warmth and high competence) and replicates the results of Neves et al. (in press). Moreover, sharks' perceived masculinity was above the middle point of the scale (see Table 12), indicating that they were seen as markedly masculine, replicating the gendered stereotype perception observed by Neves et al. (2021).

Effects of humor on the sharks' stereotype

A one-way ANOVA was conducted on warmth and competence indexes. Results showed a significant effect of humor on warmth, $F(2,147)=3.867$, $p=.023$. A Tukey HSD test indicated that participants in the generic humor condition perceived sharks as warmer than participants in the humor with sharks condition did ($p=.019$). The perception of the sharks' warmth in the neutral condition did not differ from either of the two other conditions (see Table 12; Figure 11). No effect of humor on competence was observed, $F(2,147)=1.842$, $p=.162$.

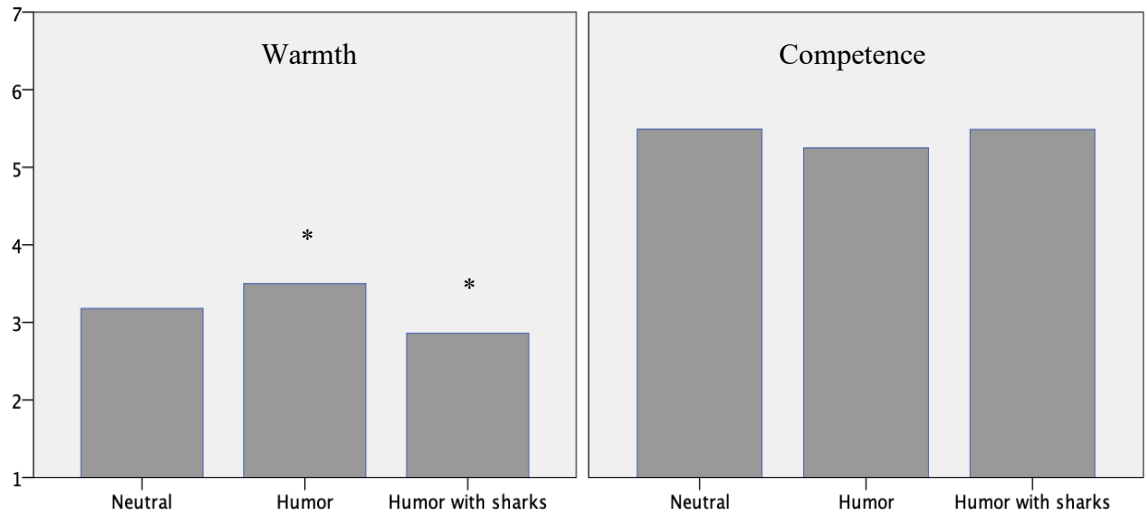

*Figure 11 - Warmth and Competence scores between conditions (Warmth - * with significant differences (Tukey HSD p<.05)).*

A GLM analysis was performed on both warmth and competence for the covariates gender, age and personal animal interest for each condition. Results showed that only animal interest was found to be statistically significant ($p=.030$) with warmth in the humor condition. Animal interest was also statistically significant ($p=.010$) with competence but in the neutral condition.

Effects of humor on other measures

A series of one-way ANOVA revealed that humor showed no effect on attitudes towards conservation, $F(2,146)=.039$, $p=.962$, approach emotions, $F(2,146)=.222$, $p=.801$, or avoidance emotions ($F(2,146)=.214$, $p=.808$). The humor with sharks condition increased the intention to donate when compared to the neutral condition, $F(2,142)=3.525$, $p=.032$.

Correlation analysis

There was a statistically significant increase in the approach emotions/attitudes towards conservation correlation between neutral and the other conditions. A moderate correlation between competence and approach emotions was lost with the humor with sharks condition (Tables 13 to 15).

Table 13 - Correlations found with the neutral condition.

	1	2	3	4	5	6
1.Competence	-	.281*	.108	**.483****	.187	-.201
2.Warmth		-	-.030	.621*	.126	-.474**
3.Avoidance			-	-.162	-0.049	.066
4.Approach				-	**-0.268***	-.411**
5.Conservation					-	-.419**
6.Donation						-

Notes: * $p < .05$; ** $p < .01$

Table 14 - Correlations found with the humour condition

	1	2	3	4	5	6
1.Competence	-	.370**	-.060	.401**	.236	-.053
2.Warmth		-	-.267	.451**	.348*	-.154
3.Avoidance			-	-.440**	-.314*	.426**
4.Approach				-	**.387***	-.281
5.Conservation					-	-.182
6.Donation						-

Notes: * $p < .05$; ** $p < .01$

Table 15 - Correlations found with the humour with sharks condition

	1	2	3	4	5	6
1.Competence	-	.042	-.305	**.068**	.462**	-.122
2.Warmth		-	-.300	.392*	.301	-.264
3.Avoidance			-	-.213	-.094	.262
4.Approach				-	**.522****	-.386*
5.Conservation					-	-.440*
6.Donation						-

Notes: * $p < .05$; ** $p < .01$

Discussion

To improve the stereotype of the shark according to the SCM framework, we aimed at increasing the warmth dimension so it could shift the participants' perception a step closer to a less threatening stereotype (Sevillano & Fiske, 2016a). Our intent was then to positively improve the warmth. On one hand, no change was noted in the shark's competence dimension during testing, independent of the conditions. On the other hand, no positive change in warmth resulted with any of the conditions tested when compared to the control condition. In fact, the use of general humor or humor with sharks showed no improvement in the warmth dimension. We did find differences between the two humor conditions, with a slight, but significant, decrease in the warmth when participants were subject to the humor with shark condition. This finding may be related to some stereotype-incongruent information effect, as these animals were being portrayed as less competent, as opposed to their stereotype (Neves et al., in press). Even though there were no significant differences for the competence dimension, the stereotype-incongruent information of the shark as a playful animal may be strong enough to slightly harm the warmth dimension. It could cumulatively be explained as a form of (self-) disparaging humor and the consequences have been described as forcing or introducing prejudice toward the target of humor (Ford et al., 2015). Interesting, and possibly related, is the fact that only with the humor with shark condition did warmth lose its mild correlative effect with competence. Moreover, humor with sharks showed a positive influence on the intention to donate for shark conservation. Although somewhat surprising, this finding may be partially explained by a contrast effect, in which participants exposed to the disparaging humor feel uncomfortable, as the mental representation of the shark is not coherent with a less competent and funny animal, and thus they express their intent to help.

Also interesting, although less significant to the overall picture, are the correlations between warmth and intention to donate and between avoidance emotions and intention to donate as non-related humor was tested (Tables 13, 14). General humor seemed to negatively influence the participants' willingness to help in conservation.

Summing up, contrary to our initial expectation, the original questions did not find support from our results. There is, nevertheless, interesting information to retain. Even though humor did not change warmth, this dimension moderately correlated with the attitudes towards conservation, which is important if one goal of a stereotype change is to promote an increase in conservation stewardship. This finding is also in line with the SCM and previous findings (Neves et al., in press).

Study 3

We aimed at answering the following questions, in a natural setting experiment:

Can information about the social lives of sharks improve the SCM warmth dimension of these animals? Does pairing humor with information about the social lives of sharks improve their SCM warmth?

Method

Participants and design

Three hundred and three adult zoo visitors (46.3% male, 53.7% female), with an average age of 29.7 (*SD*=9.4), voluntarily participated in this study and were assigned to one single-factor condition (control–100 participants; informational–102 participants; informational with humor–101 participants) in three independent samples. A total of 8 outliers were identified and removed from the final data (control=6; informational=1; informational with humor=1). One-way ANOVA with Tukey HSD post-hoc tests were used for comparing multiple samples. Pearson correlations between each item were also performed. All data was analyzed using SPSS V23. The study was conducted before the Covid-19 outbreak.

Control Condition

Groups of fifty aquarium visitors were welcomed to the entrance hall of the aquarium, where they waited 5 minutes for permission to enter the aquarium circuit. Once at the entrance hall, the group was informed by one educator, using the room's sound system, that this waiting time was only for the previous group of visitors to advance so that all could have the chance to view the aquariums without being too crowded. No additional information was provided to the group about the experience of visiting the aquarium.

Informational Condition

Following the same approach as the control condition, groups of visitors were welcomed to the entrance hall of the aquarium. Then, with the use of a TV, a sound system and a PowerPoint presentation, an educator guided the visitors to some of the species and habitats they would see when roaming the aquarium. The narrative was focused solely on the biological and ecological characteristics of the species. At the end of the educator's interpretation, a video was played (duration 2:25 min) whose content addressed the social characteristics of sharks. In no part of the narrative was there use of any kind of humor associated with the information provided.

Informational with Humor Condition

Following the same design of the control and informational conditions, groups of visitors were led to the entrance hall of the aquarium. Then, an educator, using the same approach as in the informational condition, introduced some of the fish species with the use of humor and active interaction with the waiting visitors. The narrative had a mix of fun facts and biological traits of the species. At the end of the educator's interpretation, the same video about the social life of sharks was projected (duration 2:25 min). As in the informational condition, there was no reference to sharks by the educator (only through the video).

The video

The video was produced using images showing some of the social characteristics of sharks. The narrative (Portuguese voiceover and English subtitles) was created based on Study 2 text to reinforce the shark's social characteristics, as well as using human behavior analogies to increase empathy. The video was created in a newsflash mode to promote credibility and shorten the duration time.

Sampling

Near the exit of the aquarium, a random sample of adult visitors was asked to fill out a survey about their attitudes and stereotypes towards sharks. The survey was based on a previous validated study (Neves et al., in press) and in Study 2. In order to guarantee randomness, every third adult crossing a predetermined invisible line was asked to answer the survey. No specific information about the study was given to the visitors for answering the survey. Also, in order to ensure that two conditions could not overlap, each one was delivered across the entire day. The deployment of each condition was also defined using an online random number generator across the sampling period.

Results

As with Study 2, skewness and kurtosis values were analyzed. All values were below the threshold recommended by Curran, West and Finch (1996; i.e., 2 and 7 respectively).

Sharks' stereotype

Similar to Study 2, a one-sample T-test between the middle point of the scale (3.5) and both warmth and competence for the control condition showed significant differences ($p = .015$; $p < .001$, respectively), confirming the threatening-awe stereotype (low warmth and high competence)

previously found. Participants also found sharks markedly masculine, thus reaffirming the gendered stereotype.

Table 16 - Descriptive statistics

	Control			Informational			Inform. with humour		
	M	SD	N	M	SD	N	M	SD	N
Competence	5.99*	.59	94	5.84	.68	101	5.91	.67	100
Warmth	3.40*	.97	94	3.79	1.17	101	3.64	1.13	100
Avoidance	3.25	1.38	94	3.34	1.32	99	3.38	1.29	95
Approach	4.51	1.30	94	4.70	1.11	99	4.53	1.08	96
Conservation	6.23	.95	94	6.25	.99	99	6.22	.99	95
Donation	2.68	.86	85	2.54	.81	89	2.68	.79	84
Masculinity	56.1*	13.9	92	56.2	15.6	93	59.6	17.7	88

Note. * = Mean differ significantly at $p < .05$ from the middle point of the scale (e.g., 3.5 for all scales except masculinity's middle point = 50)

Effect on sharks' stereotype

We created separate index scores (warmth, competence, attitudes towards conservation, perceived masculinity, intention to donate and approach-avoidance emotions) by averaging the ratings on the several items (when applicable) of each dimension. All questionnaires were subject to reliability analysis, showing highly reliable measures (Cronbach alpha minimum score was 0.71). A one-way ANOVA was conducted on warmth and competence indexes. We found significant differences in warmth between control and informational conditions ($p<.05$) and no differences for the informational with humor condition, $F(2,292) = 3.149$, $p=.044$. No differences across conditions were found for the competence dimension, $F(2,292)=1.158$, $p=.286$ (Figure 12).

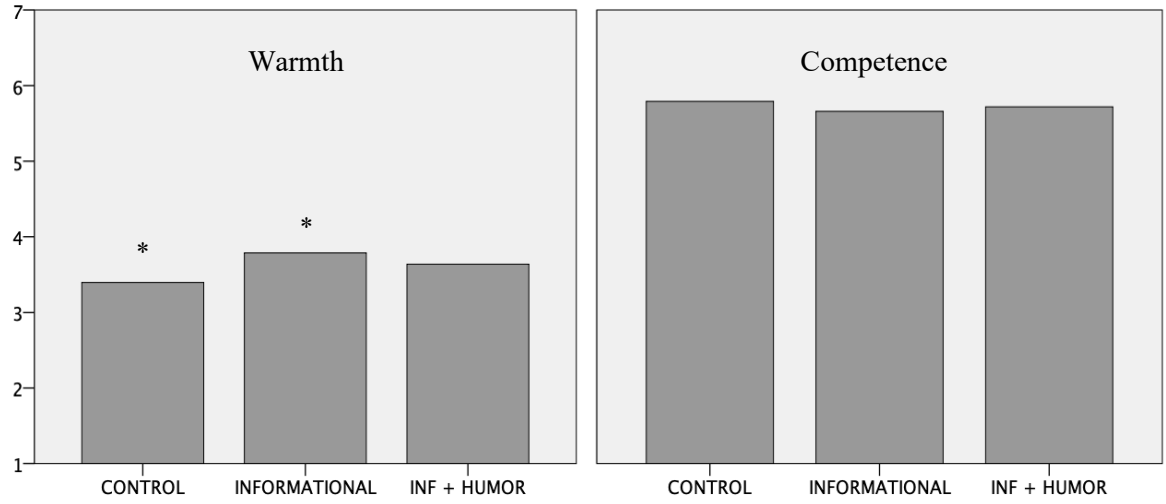

*Figure 12 - Warmth and Competence scores between conditions (Warmth - * with significant differences (Tukey HSD p<.05)).*

A GLM analysis was performed for the covariates gender, age and personal animal interest on both warmth and competence for each condition. No significant differences were found.
No differences were found between conditions for any of the other dimensions measured (intention to donate, attitudes towards conservation, approach-avoidance emotions; all $p>.05$).

Correlation analysis

Although we found correlations across almost all dimensions measured with the control condition, with mostly weak effects, only two slightly moderate correlations were found between approach emotions and competence/attitudes towards conservation ($r=.399$, $p<.01$ / $r=.428$, $p<.01$) (Table 17).

Table 17 - Correlations found with the control condition

	1	2	3	4	5	6
1.Competence	1	.260*	**.052**	.399**	.241*	.058
2.Warmth		1	-.146	.273**	.091	-.045
3.Avoidance			1	-.213*	-.274**	.153
4.Approach				1	.428**	-.241*
5.Conservation					1	-.299**
6.Donation						1

Notes: * $p < .05$; ** $p < .01$

Similarly, the informational condition, i.e., having an educator briefly explain the aquarium and direct attention to the social lives of sharks, showed a similar weak to moderate associative pattern between variables (Table 18).

Table 18 - Correlations found for the informational condition

	1	2	3	4	5	6
1.Competence	1	.372**	.051	.358**	.125	-.229*
2.Warmth		1	.039	.359**	.133	-.327**
3.Avoidance			1	-.224*	.002	.158
4.Approach				1	.288**	-.347**
5.Conservation					1	-.238*
6.Donation						1

Notes: * $p < .05$; ** $p < .01$

Even though no differences were found with any other condition, the active use of humor and directing attention to the social lives of sharks showed correlations with all dimensions

measured, although mostly weak. No association effect was found between the two stereotypical dimensions (warmth and competence) (Table 19).

Table 19 - Correlations found for the informational with humour condition

	1	2	3	4	5	6
1.Competence	1	.182	**-.284****	.386**	.247*	-.216*
2.Warmth		1	-.276**	.393**	.298**	-.361**
3.Avoidance			1	-.323**	-.309**	.413**
4.Approach				1	.377**	-.425**
5.Conservation					1	-.265*
6.Donation						1

Notes: * $p < .05$; ** $p < .01$

Between conditions, the competence/avoidance emotions correlation showed a significant change with the inclusion of humor, shifting from neutral to a weak negative effect. Correlation between competence/intention to donate also increased with both informational and humor conditions. Warmth was also more strongly correlated with the intent to donate in both conditions when compared to the control. Similar to Study 2, correlation between avoidance emotions and intention to donate showed a negative effect with the inclusion of humor.

Discussion

Even though our results did not find differences with the inclusion of humor as we aimed, we did find a slight increase in warmth between the control and informational conditions (Figure 12). This positive effect does, in fact, confirm the first objective of this study. This effect was probably due to one of two factors, i.e., the presence of an educator and the video on the social lives of sharks. There is no way of directly selecting the influence of one over the other, but considering the growing amount of evidence on the comfort of video screening and retaining attention (Turner 2015, Botterill et al. 2015), we suspect that the presence of the video played a key role in the present study's findings. Looking at the participants' ages (M=29.7, SD=9.4) and understanding what draws millennials' attention (Botterill et al. 2015; Turner 2015), the appeal of the video fits quite well. But if this is the case, how to explain the absence of influence in the informational with humor condition as it used the exact same video? We argue that, since humor preceded the video screening, it may have worked as a distractor to the video message in somewhat the same way as with the humor with shark condition in Study 2.

Our results did not confirm the second objective of this study, i.e., to improve warmth by pairing non-related humor with social information about sharks. Generally speaking, no structural change was observed in any of the dimensions under study. Nevertheless, and just as observed in

Study 2, humor did seem to have a mildly negative influence on the correlation between avoidance emotions and the intention to donate.

General Discussion

As mentioned before, some studies have found derogatory and disparaging humor to be negative in ingroup/outgroup identity (Warren et al. 2018; Abrams & Bippus 2011). Our results, however, did not confirm this negative effect. The use of humor with sharks showed a positive influence on the willingness to donate for their conservation (Study 2). This finding could be explained by the ads' content, as both portray sharks as playful and somewhat clumsy animals (ad 1: a shark with a typical pet behavior; ad 2: an ingenious hammerhead shark trying to adapt sunglasses to its different head shape). On the one hand, participants did identify the shark with prejudice. On the other hand, there was probably an empathetic feeling generated by the ads' content. This could have led to a contrast effect between prejudice and empathy. In this regard, since the shark was perceived as belonging to the threatening-awe stereotype, the prejudiced norm theory (Ford & Ferguson, 2004) argues that the derogatory humor of its innate characteristics may motivate some tolerance in those already experiencing the prejudice. Since participants were not asked how they could help shark conservation but instead were prompted to choose a donation order, this tolerance resulted in an increase in the willingness to donate for shark conservation. In contrast, the use of non-related humor (Studies 2 and 3), thus not affecting the participants' prejudice, did not show any influence on the studied dimensions.

Our cumulative results show that, although mild, it was possible to affect the warmth dimension of the shark's stereotype, but humor did not play the critical role expected in the natural setting experiment (Study 3). Overall, we did manage to slightly improve the shark stereotype, although not enough to move it a step closer to the less threatening stereotype as aimed. Results also highlight the difficulty of measuring stereotype change in a naturalistic setting, as opposed to a laboratory approach. With Study 3, we set out to try to increase the warmth perception of sharks in a naturalistic setting, such as an aquarium, because it fits particularly well with the premise for this research: aquariums are, *par excellence*, environmental education places, where people go of their own volition, often on a family trip, and are open to getting information and learning about animals (cognition). It is also a great place to see living sharks first-hand, thus giving visitors the chance to emotionally experience their presence (emotion). Without any information given beforehand, aquariums are often stereotype maintainers, as our results show with the control condition of Study 3. With the presence of an educator and the screening of a video on the unknown social lives of sharks, we could identify a slight improvement in the warmth dimension, although not enough to consider a proper change. Nevertheless, these results give us useful information for

future research and a good ground to rethink the communication paradigm for these animals, tackling their solid and stable threatening-awe stereotype.

In a final remark, our results also shed some light on the importance of integrating short videos within the strategic communication and education approaches at aquariums. Zoos and aquariums today are mostly visited by two distinct cohorts (Gen X and Millennials) with the ability to politically and socially influence the immediate conservation of sharks. With a growing number of Millennials choosing to visit these places as they reach parenthood, the need arises to adapt to their communication strategy as well as their education approach in order to be most effective in challenging the shark's stereotype.

Limitations and future research

While these studies provide some interesting insights into a possible strategy to improve the shark stereotype, aimed at a more conservationist approach, some design questions and limitations have been identified throughout the research for future approaches.

In Study 3, a naturalistic experiment, we found that many external factors definitely came into play and affected our results. The absence of a sound change between conditions may also be associated with the experimental design, in which participants spent an average of 11 minutes between exposure to the condition and answering the survey. This prolonged time, added to the presence of many distracting elements (different aquariums and interaction with family members and other visitors), may have also conditioned results. Thus, the time lapse between condition and survey should be shortened to a minimum, thus ensuring information will be retained by the participants.

In both studies, no response rate was measured, something we need to take into account in future studies if we want the sample to be as representative as possible.

One more future research idea resulting from this research is to separately study the effect of an educator's presentation vs. the screening of the shark social information video. This would more clearly determine the real influence of exposure to the social information about sharks vs. the presence of an educator on the shark's stereotype.

5. CONCLUSÃO

5.1 Conclusão geral

O presente trabalho teve como principal objetivo chegar a uma melhor compreensão da representação mental do conceito 'tubarão', como objeto social, em algumas dimensões psicológicas ainda não exploradas até ao momento.

Ao longo da sequência dos vários estudos realizados foi possível seguir uma linha teórica coerente e interligada e do qual resulta um conjunto de várias conclusões cuja aplicação prática poderá ajudar a influenciar positivamente a opinião pública ou decisores políticos em prol da conservação deste grupo zoológico. Com particular aplicabilidade prática no contexto profissional do autor deste trabalho, os resultados obtidos identificam ainda algumas implicações práticas, assim como debilidades ainda existentes na comunidade zoológica no que concerne a atuais estratégias de sensibilização e na sustentação da argumentação conservacionista junto da opinião pública.

5.2 Resumo dos resultados

O Estudo 1 permitiu a identificação da representação social do tubarão como base de compreensão da construção psicológica aprofundando o conhecimento do conceito 'tubarão' como objeto social, i.e., no detalhe da sua construção psicológica social, levando a uma melhor compreensão da sua imagem pública e, consequentemente, identificando oportunidades de atuação na perceção deste na sociedade. Os resultados obtidos confirmaram a ideia, descrita habitualmente na opinião pública, de que este objeto social é percecionado como um predador implacável e voraz, confirmando ainda a imagem do tubarão-branco como protótipo mental. De especial relevância para o contexto deste estudo, é o facto da sua representação social ser ambivalente, i.e., descrito com características polarizadas (bom vs. mau; feio vs. gracioso) mas marcadamente masculina, originando um conjunto de preconceitos associados que poderá estar na origem de algumas das resistências societais para a sua conservação. Os resultados, nomeadamente esta sua ambivalência, levou à realização de um segundo estudo complementar que procurou compreender se a perceção do tubarão poderia ser categorizado através de um estereótipo de género, assim como entender de que forma a comunalidade poderia estar associada a uma atitude mais positiva em relação à conservação e à intenção de apoiar na sua proteção. Tal como evidenciado pelo estudo anterior, os resultados confirmaram a existência de um estereótipo de género, com o tubarão sendo percecionado como marcadamente masculino (dominância da agência sobre a comunalidade), justificando, em parte, a dificuldade em modificar atitudes e comportamentos em benefício da proteção dos tubarões. Aparentemente sem grande relevância teórica ou empírica na literatura até agora, estes resultados trazem ainda à consciência a possível influência desta masculinidade associada ao tubarão. Do ponto de vista psicológico, este é um detalhe de maior importância e que

afeta sobremaneira a sua interpretação, quer pelos preconceitos e discriminações associadas, como pelas emoções geradas, e que têm certamente comprometido o sucesso de muitas estratégias de conservação. No contexto geral, estes resultados fornecem informações valiosas na urgência de repensar a comunicação em prol de uma imagem pública mais positiva do tubarão, onde o objetivo seja inverter o padrão atual de preconceito.

Apoiando-se nos resultados do estudo anterior, e seguindo o quadro teórico do Modelo do Conteúdo do Estereótipo (SCM, do original Stereotype Content Model) (Fiske et al., 2002), o Estudo 2 teve como objetivo a identificação do estereótipo do tubarão. Foi possível compreender como as dimensões super-ordinais, Calor e Competência, afetam as atitudes e a disponibilidade para a sua conservação. Os resultados obtidos descrevem o tubarão com elevada Competência e baixo Calor, encaixando no estereótipo denominado de 'respeito / ameaça' (Sevillano & Fiske, 2016a). Sendo o equivalente ao estereótipo de "inveja" no SCM 'clássico', o tubarão é caracterizado por ser competente mas frio, incluindo traços de personalidade que incluem egoísmo, desonestidade, domínio e inteligência (Fiske et al., 2002). A elevada Competência implica controlo sobre o seu também elevado estatuto social (no caso do tubarão, um predador de topo muito competente). Por outro lado, o seu baixo Calor corresponde à percepção de competição e intenção hostil. Por comparação, o golfinho (usado estrategicamente nesta investigação como comparativo emocional) foi percecionado como pertencendo ao estereótipo 'admiração / protetor', com ambas as dimensões supra-ordinais (Competência e Calor) elevadas. Neste caso, corresponde ao equivalente do estereótipo de "admiração" no SCM, o qual inclui traços de personalidade de honestidade, dominância e inteligência (Fiske et al. 2002) e, no caso particular do golfinho, é percecionado como sendo semelhante a humanos nas suas habilidades cognitivas e capacidades experienciais (Sevillano & Fiske, 2016a). Conforme afirmado por Fiske et al. (2007), a boa ou má intenção de outra pessoa (Calor) é mais importante para a sobrevivência do que a capacidade dessa pessoa de agir (Competência) com base nessas intenções. Os resultados obtidos corroboram com este raciocínio, uma vez que o golfinho, entre quatro animais pré-definidos, foi escolhido como primeira opção na intenção de doar e na responsabilidade de proteger. Contrariamente, a intenção de proteção mostrou-se negativamente associada à dimensão Competência e à masculinidade, ambas presentes no tubarão. Os resultados sugerem ainda que campanhas cujas mensagens de apelo à dimensão Calor poderão ser mais eficazes na melhoria da atitude em relação à conservação e à intenção de doar.

Pese embora alguns dos modelos para a mudança de estereótipo atualmente aceites não sejam aplicáveis no âmbito deste trabalho (cujas características temporais ou circunstanciais ultrapassam as possibilidades e objetivos da presente tese), procurou-se, através da realização do Estudo 3, dar continuidade aos resultados anteriores através da manipulação da variável já

identificada como charneira – a dimensão Calor. Procurou-se, portanto, uma estratégia para a melhoria do estereótipo através do reforço de informação de cariz social (e.g., sociedade gregária; existência de cuidados parentais; comportamentos sociais, etc.). Após a validação de uma das ferramentas de investigação (pequenos vídeos usados para manipular atitudes através do uso de humor), e com o objetivo de estudar o efeito na perceção da dimensão Calor no estereótipo do tubarão, foi realizado um estudo em ambiente laboratorial. Procurando testar o efeito da informação social, acompanhada ou não com uma abordagem humorística não relacionada e outra dirigida ao tubarão, e contrariamente às hipóteses iniciais, não foram encontradas quaisquer melhorias na dimensão Calor. A condição humorística mostrou-se, no entanto, moderadamente correlacionada com a responsabilidade de proteção, resultado importante quando um dos objetivos de uma mudança de estereótipo é promover a sua conservação. No geral, esta condição melhorou as correlações entre várias variáveis, especialmente relevantes naquelas relacionadas à responsabilidade de proteção ou intenção (doação). Seguidamente, realizou-se um estudo subsequente, agora em contexto naturalístico, para testar a conjugação da informação da vida social dos tubarões com o uso de humor como distrator emocional. A escolha da realização deste estudo em ambiente naturalístico, como num aquário, encaixou-se oportunisticamente bem numa premissa desta investigação (e com particular interesse profissional para o autor deste trabalho). Aquários são locais onde as pessoas vão motivadas, muitas vezes em viagens em família, e estão disponíveis para obter informações e aprender sobre os animais (cognição). É também um ótimo local para ver tubarões, dando aos visitantes a chance de vivenciar emocionalmente a sua presença (emoção). Com uma amostra de 303 participantes, foram testadas 3 condições experimentais à entrada de um aquário, antes de qualquer contacto visual com os tubarões. Os resultados indicam que, sem qualquer informação prévia, os aquários poderão, na realidade, promover a manutenção do estereótipo negativo do tubarão. Não foi encontrada qualquer diferença entre as condições neutra ou humor, denotando a ausência de efeito do humor como elemento distrator emocional. Efetivamente, foi a informação acerca da vida social dos tubarões, muitas vezes dissonante daquela disponível na opinião pública, que demonstrou uma ligeira melhoria na dimensão Calor, embora não suficiente para uma aproximação ao estereótipo ‘protetor’, como pretendido.

5.3 Implicações práticas

Como mencionado anteriormente, os resultados conjuntos deste trabalho permitem reavaliar e repensar a forma como a informação acerca do tubarão tem sido veiculada por entidades como centros de conservação, espaços zoológicos ou, até mesmo, por decisores políticos. Com um universo de mais de 700 milhões de visitantes por ano (WAZA 2005), os centros de conservação e

espaços zoológicos em todo o mundo têm um reconhecido papel na sensibilização, educação e no envolvimento direto em esforços de conservação. Para além das diferentes estratégias de educação para a conservação, conservação *in situ* e *ex situ*, ou em sinergias estratégicas e intersetoriais, sob a forma de lobbies políticos ou em campanhas internacionais, estas entidades procuram influenciar positivamente decisores políticos e a opinião pública para uma mobilização em prol da conservação em geral. No entanto, à parte de todos estes esforços, e à luz dos resultados obtidos, é possível considerar que, por desconhecimento do enquadramento psicológico do tubarão como objeto social, a comunicação nestes espaços tem, infelizmente, contribuído para a manutenção do estereótipo negativo do tubarão. Ao reforçarem as características associadas à masculinidade e à competência no tubarão, profundamente enraizadas na opinião pública, ao invés de fomentar uma aproximação emocional ao animal, criam uma barreira oposta ao pretendido. É também habitual os decisores políticos moverem-se em função da opinião pública que, por sua vez, é influenciada pela comunicação social. Esta última, pelo sensacionalismo e consequente garantia de audiência, promove e reforça ainda mais a imagem do tubarão como o oposto daquele que necessita de proteção.

A existência simultânea de cognições positivas e negativas, emoções e / ou comportamentos na representação social do tubarão, de um marcado estereótipo de género (e todos as suas implicações atitudinais e comportamentais), e ainda da prevalência na perceção deste animal como competente (em detrimento da sociabilidade associada), leva à necessidade de repensar parte da construção psicológica deste objeto, assim como encontrar alternativas para contrapor a perceção atual, desenhando um novo caminho na construção de uma mais condizente e positiva imagem mental do tubarão.

5.3.1 Mudança de estereótipo

Como resultado desta tese, uma das estratégias a ambicionar passa pela mudança progressiva do estereótipo agora identificado. Como quer as representações sociais, quer os estereótipos não são fixos no tempo, uma seleção cautelosa e estratégica de mensagens (maioritariamente através do reforço da dimensão Calor) poderão ser consideradas e incluídas em campanhas de conservação ou até mesmo em projetos de comunicação genérica como filmes, séries infantis ou documentários. Por exemplo, através do uso de abordagens antropomórficas cuidadosamente implementadas poderão levar a uma mudança progressiva na perceção dos tubarões no médio / longo prazo. Embora o uso ou não de antropomorfismo na comunicação gere ainda alguma discussão, evidências recentes mostram que este poderá ser um caminho a considerar (Williams et al., 2021). Conforme mencionado por Chan (2012), e usando estratégias de

comunicação baseadas no *storytelling*, através da atribuição de nomes humanos a potenciais personagens animais, valorizando personalidades únicas e natureza social, é possível criar maior interesse público na sua conservação. A identificação de um estereótipo de género no tubarão (Neves et al., 2021a) é ainda de extrema importância para qualquer abordagem de comunicação. Conforme postulado pela teoria do papel social, os tubarões ao serem percebidos como elementos masculinos carregam consigo um conjunto de perceções estereotipadas, muitas vezes contrárias à mensagem de conservação pretendida. Para contrabalançar esta característica, optar pelo uso de personagens-chave femininos, ao invés da já marcada perceção masculina, em veículos de comunicação como filmes ou até mesmo documentários, poderá ser uma estratégia a assumir (fica aqui o apelo à Disney ou Pixar para tomarem a liderança). Para além disto, a representação social identificada retrata os tubarões como animais maioritariamente solitários, separados da presença humana. A associação de humanos e tubarões no mesmo quadro de comunicação em futuras abordagens de comunicação deverá também ser considerada.

5.3.2 Educação

Em paralelo com as abordagens agora mencionadas, é importante reconhecer a influência que a educação tem na formação de atitudes e, consequentemente, na recetividade dos apelos à conservação. Ao adaptar conteúdos baseados no reforço da dimensão Calor e implementar estratégias adaptadas a diferentes grupos etários, conscientes das diferentes progressões cognitivas e adaptadas aos diferentes momentos curriculares, estar-se-á a incentivar a mudança progressiva no estereótipo anteriormente mencionada. Para além disto, a integração de conteúdos que promovam o quebrar do protótipo 'tubarão-branco', através do correto enquadramento da imensa diversidade de formas e estilos de vida presentes nas quase 500 espécies de tubarões existentes (Compagno, 2001). Cumulativamente, a integração de estratégias de educação em espaços zoológicos que incluam a presença física destes animais e / ou que desenvolvam programas pedagógicos que promovam o crescente conhecimento das espécies deverá também ser considerada. Esta integração tem vindo a ser crescentemente documentada como favorável na melhoria nas perceções e atitudes pró-conservação de muitas espécies (e.g., Learmonth et al., 2021; Learmonth, 2020; Moss & Pavitt, 2019; Collins et al., 2019; Bonamy et al., 2020). Uma outra possibilidade, complementar às anteriores, passa pelo uso de tecnologias de realidade virtual imersiva, no qual os alunos têm a oportunidade de 'mergulhar' e explorar o ambiente aquático, na presença de tubarões, sempre com a segurança emocional da ausência destes. O crescente uso destas tecnologias tem vindo a ser confirmada como positiva no reforço do conhecimento e das atitudes associadas aos temas abordados (e.g., Hutchison, 2018; Markowitz et al., 2018; Wu et al., 2020). Esta possibilidade tem a

grande mais-valia da ter aplicabilidade na sala de aula (educação formal), bem como em locais fora do espaço-escola, como nos espaços zoológicos (educação não-formal e informal).

5.4 Limitações

Como qualquer investigação, é possível apontar algumas limitações encontradas no decurso dos vários estudos empíricos realizados. Na identificação da representação social do tubarão, a amostragem foi baseada apenas em visitantes de um espaço zoológico, não permitindo, portanto, o alargamento da interpretação a uma representação mais abrangente e representativa na sociedade. Para além desta, uma outra limitação relacionada com a recolha de informação para o SCM também merece ser refletida. A validação do inquérito para o SCM foi baseada numa amostragem, em contexto laboratorial, junto de participantes (alunos universitários) num contexto muito concreto e disponível, confirmado pelos elevados valores de validação interna (valor mínimo de Cronbach alpha > 0.80). Ainda que mantendo uma boa consistência e fiabilidade (valor mínimo de Cronbach alpha de 0.71), a aplicação da mesma ferramenta junto de visitantes no final da visita ao aquário poderá ter condicionado os resultados obtidos. A amostra foi recolhida no final da visita ao aquário, tendo passado uma média de 10 minutos após a aplicação da variável em estudo. Sendo o aquário um local com inúmeros estímulos emocionais e cognitivos, este tempo intermédio poderá ter suavizado ou até mesmo anulado a variável em estudo. Para além desta, uma outra limitação prende-se com o 'custo de participação' para o visitante, sendo bastante mais elevado quando comparado com a amostragem no estudo laboratorial. A visita ao aquário implica um investimento financeiro e uma planificação antecipada do dia, para além da ansiedade criada pelas filas de espera e horários a cumprir típicas de locais deste género. É este balanço entre o tempo de dedicação ao inquérito e o plano de visita dos participantes que se refere o 'custo de participação' e, no contexto particular do universo visitante do aquário amostrado, este 'custo' pode condicionar a resposta dedicada dos participantes.

5.5 Considerações futuras

Tendo em conta as limitações e fragilidades encontradas no presente trabalho e apresentadas anteriormente, considera-se pertinente propor ainda um conjunto de sugestões para futuras investigações neste âmbito. Será interessante alargar a amostragem da representação social a outros ambientes naturalísticos, aumentado a robustez dos dados obtidos e, porventura, refletir possíveis diferenças nas suas construções mentais e implicações na conservação. Será ainda interessante alargar a amostragem da representação social, complementada pela análise do estereótipo, a outros animais, uma vez que esta é uma área muito pouco estudada e cujos resultados e implicações se

mostram muito interessantes. Neste último contexto, e com especial utilidade para centros de conservação como aquele amostrado ao longo de parte do trabalho, o alargamento a outros animais pode, inclusive, ajudar os profissionais responsáveis pela estratégia zoológica a planificar a coleção ou adaptar a comunicação tendo em conta a representação social e estereótipos existentes. Por fim, estudar possíveis influências no apelo cognitivo vs. emotivo no enquadramento do SCM.

Concluindo, espera-se que este trabalho possa ser útil como ponto de reflexão acerca da influência de alguns fatores psicológicos na forma como podemos e devemos olhar para a conservação da biodiversidade. Espera-se ainda que possa ser útil como um ponto de partida para futuras investigações que permitam compreender cada vez melhor as inúmeras nuances psicológicas associadas à representação mental deste grupo zoológico em particular e que condicionam, de forma subtil mas incisiva, a comunicação e efetividade das mensagens de conservação em benefício dos tubarões.

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