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Social Signals for Change: Examining the Role of Interpersonal Communication for Positive Ecological Progress

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Interpersonal Communication for Positive Ecological Progress

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DEDICATION

For those who persist for people and place

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student, researcher, and teacher at the University of Michigan. To my former Michigan labmate and friend, Erin Hamilton, for always being a shoulder to lean on. My family is everything to me. My parents, Mike and Virginia, have provided me with unconditional support and love no matter the path I have found myself on. I'm incredibly grateful for them, their humor, and their generosity. Last and most importantly, I would like to thank my partner, Meghan, who I feel has climbed mountains both literally and figuratively to encourage and support me throughout this process. I don't think I will ever be able to fully put into words just how much she has done for me ~ ~ ~

ABSTRACT

SOCIAL SIGNALS FOR CHANGE: EXAMINING THE ROLE OF
INTERPERSONAL COMMUNICATION FOR POSITIVE ECOLOGICAL PROGRESS

SEPTEMBER 2019

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It perhaps goes without saying that society is collectively failing to meet the challenges posed by climate change and natural resource management, among other issues. Stagnated efforts may in part be driven by social processes that have been shown to shape whether, how, and to what extent individuals engage with environmental issues. In light of these stalled efforts to advance positive change, there is a pressing need to broaden our understanding of the normative processes that support the formation and maintenance of situation-appropriate social norms. In this dissertation, I integrate research from various fields to explore the role of interpersonal communication as an underutilized application of social influence and its capacity to support widespread cooperation. Specifically, I focus on what drives individuals to intentionally communicate with others across different domain-specific issues as well as examine existing norms concerning angling behavior and the use of increasingly popular mediums and channels of communication, such as photographs shared on social media. In Chapter II ("*A Few Bad Apples or Rotten to the Core*"), I reveal how variation in consumers' attribution of blame, either to a handful of individuals or else corrupt corporate culture, drives responses to unethical

environmental corporate wrongdoing, including engagement in word-of-mouth behavior

(e.g., badmouthing). In Chapter III ("*Peer Pressure on the Riverbank*"), I show how

efficacy beliefs and reputation concerns predict recreational anglers' willingness to

impose social sanctions on others' inappropriate behavior. In Chapter IV ("*Fishing for a*

Photograph"), I reveal how individuals misperceive prevailing norms relative to catch-

and-release handling practices. Finally, in Chapter V ("*Communicating for*

Conservation"), I provide a theoretical and empirical overview of interpersonal

communication concerning environmental collective action problems, categorize the

normative nature and implications of information exchanged during a conversation, and

suggest application insights for conservation managers and practitioners. Collectively,

these chapters shed light on some of the factors that shape individuals' willingness to

communicate with others and how social norms are created, maintained, and circulated

through interpersonal interactions. This dissertation contains both previously published

work (Chapters II, III are co-authored publications) and unpublished material (Chapter

IV, Chapter V).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

There is little doubt today about the far-reaching consequences of climate change (IPCC, 2014). Nor is there any delusion among the scientific community that human activity is to blame (Cook et al., 2016). Rising global temperatures, sea-level rise, and the increasing frequency of extreme weather events are paradigmatic of increasing greenhouse gases in the atmosphere. Global biodiversity is declining at an alarming rate (IPBES, 2019) and among other issues, society is witnessing the sudden collapse of commercial and recreational fisheries (e.g., Post et al., 2002). Although environmental issues are biophysical in nature, their origins—as well as their solutions—are inextricably linked to human behavior and decision-making. Some argue that advancing change is contingent on top-down policy instruments (e.g., regulations, infrastructural changes) to modify public and organizational-level behavior. Amid the current United States administration's significant regress on all environmental endeavors, others argue that creating and maintaining the behaviors needed to solidify a thriving ecological state can only be achieved through a concerted effort to change social norms (Griskevicius, Cialdini, & Goldstein, 2008; Stoknes, 2015).

Social norms constitute the unwritten rules that guide behavior in specific contexts, cultures, and domains. At present, however, one can argue that norms are primarily maladaptive, epitomized by society's unsustainable consumption of and relationship with the earth's natural resources. In the same way that people are—socially and paradigmatically—driven to needlessly consume and/or deny anthropogenic climate change, so too can people be motivated—by others—to reduce their strain on the

environment (e.g., Rogers, Goldstein, & Fox, 2018; Schultz, Nolan, Cialdini, Goldstein, & Griskevicious, 2007). Indeed, a considerable amount of literature has revealed how individuals' behavioral decisions largely pertain to their assessment of what relevant others do and perceive as socially accepted (Cialdini, 2009).

The mechanisms through which social norms are constructed, modified, and enforced, however, remains less well examined. Prominent explanations suggest that norms are transformed through implicit and explicit forms of interpersonal communication, including expressions of approval or disapproval of others' actions (e.g., interpersonal sanctioning; Abrahamse and Steg, 2013; Balliet, 2009; Nolan, 2013). Interpersonal communication is rooted in the exchange of social information (Berger, 2014a) and has been shown to play a critical role in enhancing collective outcomes (Ostrom, 2010), fostering situation-appropriate social norms (Balliet, 2009; Sally, 1995), converging perceptions of risk (Binder, Scheufele, Brossard, & Gunther, 2011; Kasperson et al., 2009), and facilitating the diffusion and adoption of goods (e.g., word-of-mouth; Berger, 2014b). Thus, there are many reasons to suggest that interpersonal communication holds considerable promise in amplifying support for and positive engagement with environmental issues. To date, however, interventions aimed at mobilizing social change have primarily failed to target and activate individuals' voices.

While difficulties in motivating public action to mitigate and adapt to environmental issues continue to be compounded by normative environments that support inaction, understanding how social processes, including forms of interpersonal communication, function to transform and enforce social norms as well as people's willingness to intentionally communicate with others warrants further attention. The

focus of my dissertation considers how social processes, namely implicit and explicit

social signals, materialize to create and reinforce situation-specific social norms. My

research and review of relevant literature are situated to widen our understanding of how

normative processes support or hinder engagement with environmental issues.

Specifically, my work explicates how various contextual and individual-level factors

shape engagement in communicative acts. Before providing an overview of my empirical

and conceptual work, the remainder of the introductory chapter offers a theoretical and

empirical review of relevant literature supporting my rationale for examining

interpersonal communication and its potential to foster positive social and ecological

outcomes. The following sections include a discussion on the role of social influence, the

intersection of norms and social interaction, and an overview of literature exploring the

implications and drivers of interpersonal communication in the context of the

environment.

<u>Social Influence</u>

A vast body of research has revealed much in the way of how human decision-

making and behavior are susceptible to social influences (Abrahamse & Steg, 2013;

Cialdini, 2009; Cialdini, Reno, & Kallgren, 1990). In order to maintain desired group

identities and/or avoid social isolation (Hogg & Reid, 2006), people tend to conform to

the actions and beliefs of their peers (Cialdini et al. 1990; Rogers et al., 2018). Adherence

to social norms, in particular, exerts a robust influence on behavior, especially under

conditions of uncertainty (Cialdini et al., 1990). Social norms are predicated on

perceptions about the prevalence of a particular behavior or belief (i.e., descriptive norm)

as well as on perceptions about what is socially approved of behavior (i.e., injunctive

norm; Cialdini, 2009). When aligned and salient in the decision-making environment, descriptive and injunctive norms can signal a person to take a prescribed course of action (Schultz et al., 2007; Goldstein, Cialdini, & Griskevicius, 2008). Norms can also be antagonistic at times, especially when the descriptive and injunctive norm present conflicting information. In such instances, people are prone to follow the majority (Schultz et al., 2007; Smith et al., 2012). For instance, Smith et al. (2012) demonstrated that while the motivational aspects of injunctive norms are apparent, these effects can weaken when descriptive information conveys that the majority of others do not engage in the particular action. Thus, in the absence of strong injunctive signals or when norms are misaligned, salient descriptive norms can give people license to conform to what most others do.

The interplay of descriptive and injunctive norms provides an important, although not an exclusive, contribution toward understanding why society generally fails to address environmental issues. For instance, although the majority of people believe that ameliorative action should be taken to address climate change (Leiserowitz et al., 2018), there is limited descriptive evidence of people publicly expressing or endorsing their convictions (e.g., Maibach, Leiserowitz, Rosenthal, Roser-Renouf, & Cutler, 2016). Indeed, one of the less obvious, but critical limitations for environmental progress deals with the largely invisible nature of environmentally-relevant behavior as well as the lack of transparency surrounding individuals' motives for engagement (e.g., Brick, Sherman, Kim, 2017). Arguably, most environmental behaviors and decisions are made privately (e.g., household energy consumption), while behaviors that are publicly visible tend to

lack clear signals about an individual's motive for taking action (e.g., driving an electric vehicle to save gas money versus to reduce greenhouse gas emissions).

Thus, in many ways, environmentally-relevant behaviors have either unclear, weak, or entirely invisible signals that communicate a commitment to environmental progress (Stoknes, 2015). To that end, people are regularly subjected to descriptive cues that deny rather than affirm underlying beliefs regarding the need for action. This natural misalignment of anti-environmental norms promotes a far too common circumstance: not adopting a pro-environmental behavior because no one else is perceived as doing so. Taken together, social norms in the context of the environment are largely destructive. This is important because change will more likely occur when the majority of people mutually endorse environmental beliefs and actions (Cialdini, 2009; Stoknes, 2015). As part of this understanding, one could also argue that social influence is underutilized in the context of the environment and that more explicit, tangible social signals are needed to correct existing social misperceptions (e.g., Leviston, Walker, & Morwinski, 2013; Mildenberger & Tingley, 2017) and push against larger system components (Stoknes, 2015). While the literature above is helpful in understanding, at least in part, why anti-environmental behaviors may persist, it does not directly address how and under what conditions existing norms can be transformed.

Norms and Social Interaction

An understanding of how social norms materialize to influence human behavior and decision-making reveals important insights into the role of interpersonal communication in the diffusion of social information and exercise of social influence. By their very definition, norms are social phenomena. People construct and modify

normative perceptions based on social interaction, observation, and information (Abrahamse & Steg, 2013; Cialdini, 2009). The communication of norms can be indirect: people can infer norms by observing others' past and present behaviors. For instance, the repeated observation of (in)action enables people to develop perceptions about the pervasiveness or rather, the rarity of a given behavior. Norms can also be communicated directly: people intentionally talk about what is or what is not socially approved of behavior (Lapinski & Rimal, 2005; Shank, Kashima, Peters, Robins, & Kirley, 2018). Whereas descriptive norms can be inferred by the direct observation of publicly observable behaviors, such as the number of neighbors who participate in curbside recycling, injunctive norms must be learned and made salient through interpersonal communication (Lapinski & Rimal, 2005). Thus, topic-relevant conversations are critical in the process of generating shared beliefs about what behaviors are accepted by the broader community (Bouas & Komorita, 1996).

Interpersonal communication, defined as the mutual exchange of messages between individuals (Berger, 2014a; Berger & Calabrese, 1974), provides an explicit pathway to inform, explain, persuade, tell stories, and interpret information (Green & Burleson, 2003). Across various fields, the conceptualization and empirical examination of interpersonal communication suggest that it is not merely the exchange of information, but also entails relationally and socially consequential behavior (Berger, 2005; Southwell & Yzer, 2007). The effect of interpersonal communication in enhancing and creating norms of cooperation stems from decades of social dilemmas research. Since Garret Hardin famously painted a pessimistic view of people's capacity to manage common pool resources effectively, a wealth of literature in psychology, behavioral economics, and

other disciplines has provided a more optimistic view of people's capacity for cooperation (Hardin, 1968; Ostrom, 2000; 2015). Among this vast body of empirical research, interpersonal communication and sanctioning are widely recognized as two core mechanisms in supporting the activation, formation, and maintenance of context-dependent social norms (Balliet, 2009; Balliet, Mulder, & Van Lange, 2011; Ostrom, Walker, & Gardner, 1992; Sally, 1995). Stemming from early research in which brief discussions prior to laboratory prisoner's dilemma games were found to increase subsequent cooperation (Deutch,1958), literature has consistently demonstrated that when people have the opportunity to communicate with others, cooperation and collective outcomes significantly increase (e.g., Balliet, 2009; Ostrom et al., 1992; Sally, 1995; Shank et al., 2018). As to be expected, however, discussions are only as influential as the content pertains to topic-relevant issues and not unrelated endeavors (e.g., Dawes, McTavish, & Shaklee, 1977). For instance, Shank et al. (2018) demonstrated that the provision of norm talk, or messages that conveyed what group members 'should' do, significantly increased cooperation and yield during rounds of decision-making.

Apart from interpersonal communication, one of the most consistent findings in social dilemmas research highlights the central role sanctions play in fostering cooperation. Sanctions represent the process of providing some form of punishment or reward to others for engagement in actions deemed inappropriate or appropriate by others (for review see Balliet et al., 2011). The anticipated and actual approval of cooperation and disapproval of defection by others exerts a considerable influence on individuals' decision to cooperate (Balliet et al., 2011; Ostrom, 2015). Explanations for the effect of communication and sanctions argue that these processes function by creating salient,

situation-appropriate norms of cooperation (Kerr, 1995; Kerr, Garst, Lewandowski, & Harris, 1997). Taken together, this research suggests that individuals' have the capacity to influence others through intentional communicative acts. More specifically, it suggests that interpersonal sanctioning can serve an important function in transforming and enforcing norms of cooperation. To date, however, informal voluntary mechanisms such as interpersonal sanctioning and other implicit interpersonal communicative acts have rarely been explored as a means of promoting context-dependent norms and/or in regulating socially-relevant behavior.

Research on the topic of prejudice and discrimination is one of the few areas to explore interpersonal communication. Work in this area has been driven by a need to explain the persistence of racist remarks and incidents, particularly at a time when equity and egalitarian values are more widely endorsed by society (Blanchard, Lilly, & Vaughn, 1991). The social context approach holds the perspective that a failure to interpersonally regulate conspicuously prejudiced statements provides an open space for racism and other socially-constructed issues to permeate in society (Blanchard et a., 1991; Blanchard, Crandall, Brigham & Vaughn, 1994). For instance, research has found that merely overhearing others express racist sentiments decreased participants public and private expressions of anti-racist beliefs (Blanchard et al., 1991). Importantly, the researchers discovered a similar effect for experiencing anti-racist expressions: participants who overheard others expressing anti-racist sentiments subsequently reported higher egalitarian beliefs (Blanchard et al., 1994). These findings, taken together with the literature on social norms, demonstrate the downstream attitudinal and behavioral implications of interpersonal talk on collective outcomes and socially-constructed issues.

Perhaps more importantly, these studies accentuate the interpersonal nature through which normative beliefs are communicated and furthermore, how daily, seemingly inconspicuous, social interactions can leave a tangible impression on others' beliefs and behaviors concerning socially-constructed issues.

Limited work has examined the efficacy of confrontation (i.e., interpersonal sanctioning) as a strategy for regulating and reducing prejudice responding. Fundamental to the social context approach, Blanchard et al. (1991) reason that interpersonal reactions to norm-violating events (e.g., racist remarks) are critical for reinforcing existing norms as well as for creating new ones. For instance, in a simulated online conversation, researchers prompted participants to express racially-charged stereotypes during a photograph-sentence pairing task, where discriminatory responses were confronted by a confederate. Participants in the confrontation condition were more likely to reduce their use of stereotypical responses compared to those in the control group (Czopp, Montieth, & Mark; 2006). Although these findings highlight people's capacity to regulate racist sentiments meaningfully, the social costs associated with confronting may significantly shape whether or not people engage (e.g., Shelton & Stewart, 2004; Swim & Hyers, 1999). For instance, women who were primed under high-cost conditions (e.g., interviewing for a competitive, prestigious job) were less likely to confront a confederate male interviewer who behaved in a prejudiced manner compared to those primed under low-cost conditions (e.g., interviewing for a non-competitive, charity organization; Swim & Hyers, 1999).

Collectively, this string of research highlights the vast opportunities that exist for people to encourage or discourage specific beliefs or actions through their everyday

9

interactions with others. Furthermore, the findings above not only demonstrate how social displays or signals of one's beliefs hold the potential to increase (or decrease) related opinions among others but also illustrate how confrontation can produce behavioral outcomes while adhering to more socially accepted and civilly-appropriate norms of conversation (Steentjes, Kurz, Barreto & Morton, 2017). Although confrontation may be a useful tool for regulating harmful social expressions, findings detailing the social costs embedded in engagement suggest that the act of confronting may be a non-normative behavior. Thus, accruing the potential benefits of interpersonal communication and sanctioning, in particular, may rest on people's willingness to incur the costs associated with engagement.

Interpersonal Communication and the Environment

Understanding the implications and antecedents of interpersonal communication has received limited attention in the environmental domain. For good reasons, efforts to impede environmental degradation at the individual level have predominantly targeted behaviors with direct and measurable impacts on environmental outcomes rather than mobilizing action through peer persuasion. Although these behavioral endeavors are critically important in maximizing ecological outcomes (Dietz, Gardner, Gilligan, Stern, & Vandenbergh; 2009), such an approach promotes a limited conceptualization of both people's capacity for engendering change as well as the breadth of behavioral responses likely needed to achieve widespread societal and environmental progress. What is critical to realize here is that communicating with others on these topics and mitigating one's impact on the environment are not mutually exclusive endeavors. As people pursue change at the individual level, they are also bound to and will encounter others whose

actions either reflect or conflict with their values and/or society's collective interests. Thus, in addition to directing their own actions, people also possess the capacity to encourage compliance among their peers (Ostrom, 2015).

Only in recent years have academics begun to recognize and consider more bi-directional, many-to-many forms of communication, arguing that public dialogue is an essential component for social and environmental change (Moser, 2016; Stoknes, 2015). In order to create a culture of conservation, some ethicists argue that individuals are morally responsible for actively signaling to others their commitment to pro-environmental actions and beliefs (Lawford-Smith, 2015; Nolan, 2013). Engendering change through interpersonal communication echoes related calls in the literature to situate individual-level engagement in more socio-political contexts and to engage people as social citizens who play a more prominent role in disseminating information and fostering cooperation within their own social networks (Carvalho, van Wessel and Maeseele, 2017; Pearson, Schuldt and Romero-Canyas, 2016; Stoknes, 2015). Provided how people view and respond to environmental issues has become deeply entrenched in social meanings, "speaking out openly is not just an individual psychological act, it is also a political [and social] form of engagement" (Stoknes, 2015).

Nascent research has begun to elucidate on interpersonal communication in the context of the environment, including the drivers and implications of engagement and disengagement. Already, this area of research has shown that individuals are mostly unwilling to discuss climate-related issues (Maibach et al., 2016; Norgaard, 2011) or admonish a peer for their irresponsible environmental behavior (Nolan, 2013). At a descriptive level, for instance, a troubling trend has emerged relative to the overall lack of

everyday conversations on the issue of climate change. Seven out of ten Americans report 'never' or 'rarely' discussing it, and even fewer report overhearing climate-based discussions among others (Maibach et al., 2016). More concerning, however, is the lack of conversations among those very or extremely concerned about the issue. Among those most interested in global warming, more than half report 'rarely' or 'never' discussing it (57% and 54% respectively; Maibach et al., 2016). Despite the gravity of the inherently complex and compounding ecological challenges—climate disruption, resource depletion, and species decline—facing society, these issues fail to sufficiently occupy people's minds, daily conversations, and pursuits (Spence, Poortinga, & Pidgeon, 2012; Pew Research Center, 2014).

Although it is unclear and, perhaps, unlikely that other environmental issues evoke a similar silence, research suggests that climate change is largely experienced as a silenced—social and cognitive—abstraction (Maibach et al., 2016; Norgaard, 2011; Spence et al., 2012). Despite the low incidence of engagement, there are reasons to suggest that considerable gains could be made if and when individuals begin to voice their commitment to positive environmental progress (e.g., Goldberg, van der Linden, Maibach, & Leiserowitz, 2019). For instance, two-thirds of Americans trust family and friends as a source of information about global warming and further report that family and friends have the greatest ability to convince them to take action to reduce global warming (Leiserowitz, Maibach, Roser-Renouf, & Feinberg, 2013). Critically, these findings, taken together with the literature on normative influence, suggest two important insights: (1) people are open to persuasion and (2) they are open to persuasion from similar others.

The socially-constructed silence around environmental issues, in conjunction with the lack of transparency with respect to individual-level action, is problematic because it can undermine people's normative perceptions of the issue (Norgaard, 2011; Geiger & Swim, 2016). Despite the majority of Americans recognizing anthropogenic climate change (Leiserowitz et al., 2018), silence may be misconstrued as passive acceptance of anti-environmental norms (Czopp, 2013). Czopp (2013) highlighted this effect, demonstrating how witnessing an environmental activist fail to confront anti-environmental comments resulted in participants reporting less favorable attitudes towards recycling as well as reduced intentions to recycle in the future compared to those who observed a confrontation. Preliminary research, however, suggests that overt expressions of approval or disapproval of others' environmental behaviors can subsequently promote or inhibit pro-environmental engagement. For instance, Swim and Bloodhart (2013) found that individuals who were admonished for taking the elevator, subsequently engaged in pro-environmental acts. These findings parallel prior work on prejudice responding, suggesting that social regulation (or the lack thereof) with respect to harmful everyday remarks or behaviors can promote positive engagement (or perpetuate significant social issues) in the context of the environment (Blanchard et al., 1991; 1994).

Individuals' willingness to communicate with others is influenced by aspects of conversational efficacy (Geiger & Swim, 2016), pluralistic ignorance (Geiger & Swim, 2016), and for fear of social ramifications (Steentjes et al., 2017). For instance, misperceiving the distribution of public opinion on climate change in favor of denialism reduced climate-based discussions among college students (Geiger & Swim, 2016).

Relatedly, Steentjes et al. (2017) found that when compared to confronting racist expressions, confronting climate change disregard resulted in more social costs for the confronter, as measured through feelings of closeness and warmth. Thus, policing conversations of climate change and/or other environmentally-relevant behaviors may ultimately rest on individuals' willingness to incur the associated costs. With respect to recycling behaviors, Nolan (2013) found a general unwillingness to sanction among college students, though students did indicate a greater willingness to reward than punish. The more effective each sanction was perceived, the more willing students were to impose it (Nolan, 2013). Research by Maki and Raimi (2017) similarly demonstrates that perceptions of efficacy may partly drive interpersonal sanctioning. For instance, people high in environmental moral exporting, which refers to a willingness to persuade others to adopt one's moral values, endorsed the belief that confronting is effective and expressed a greater willingness to engage in such acts. These findings, although inconclusive and limited, highlight the potential role of different individual-level factors in shaping people's willingness to sanction.

Collectively, this research offers initial insight into both the implications of (dis)engagement as well as the conditions under which people are more or less likely to engage. Perhaps most important is the work identifying the social costs associated with confronting climate change disregard as well as the effect of pluralistic ignorance in regulating people's willingness to discuss it (Geiger & Swim, 2016; Steentjes et al., 2017). The lack of normative status explaining this effect adds to the general notion that prevailing social norms act as a barrier rather than a conduit to change (Markowitz & Shariff, 2012). People's unwillingness to impose sanctions on others is particularly

problematic, provided that interpersonal sanctioning may facilitate the creation and

maintenance of pro-environmental norms (Czopp et al., 2006; Swim and Bloodhart,

2013). While the emerging, socially-constructed silence surrounding climate change and

other environmental issues is problematic, the low rate of incidence suggests that there

are potentially large gains to be made if researchers are able to identify effective ways to

increase the frequency of engagement. Although the research highlighted here

predominantly focuses on the topic of climate change, interpersonal communication may

play a pivotal role in other domains.

A Note on Word-of-Mouth and Corporate Wrongdoing

Just as social interactions can promote or inhibit positive environmental behavior,

social talk concerning material goods and/or services can play an important role in

determining how consumers engage with corporations and their brands (e.g. East,

Hammond, & Lomax, 2008). Consumer word-of-mouth, defined as informal

communications directed at other consumers about the ownership, usage, or

characteristics of a particular good or service, is rooted in aspects of social influence

(Westbrook, 1987; DeMatos & Rossi, 2008). Individuals engage in word-of-mouth for

the purpose of persuasion, for instance, by recommending others to purchase or boycott

products from a particular corporation on account of their product quality, corporate

social responsibility (CSR) or misbehavior (Berger, 2014b). Although word-of-mouth

can be a valuable currency in the marketplace, it can also present significant challenges in

the event that consumers engage in negative word-of-mouth as a form of punishment for

irresponsible or unethical corporate behavior (Reichheld & Sasser, 1990). Thus,

consumers—through both their purchasing decisions and intentional interactions with

others—represent a potentially powerful force for improving and regulating corporate environmental responsibility.

Over the past decade, consumers and in turn, corporations, have placed a heightened emphasis on CSR initiatives (Lim & Tsutsui, 2012). These implied or regulated contracts dictate that corporations adhere to ethically driven standards of conduct (Dahlsrud, 2008). Despite the rise of CSR initiatives on corporate agendas, instances of corporate neglect and unethical decision-making, which can contribute to significant social and/or environmental harm, continue to make national headlines. For instance, since 2015, the marketplace has experienced a number of corporate scandals, including, but not limited to the diesel emissions issue at Volkswagen (Gates, Ewing, Russel, & Watkins, 2016), Cambridge Analytica's political interference on Facebook (Cadwalladr & Graham-Harrison, 2018) as well as fraudulent unauthorized bank accounts at Wells Fargo (Corkery, 2016; Cowley, 2017). These and other instances of corporations failing to meet regulatory or voluntary social and/or environmental responsibility contracts can create immeasurable damage for corporations, by engendering punitive consumer responses, including negative word-of-mouth (e.g., Grappi, Romani, & Bagozzi, 2013; Klein & Dawar, 2004).

Any consumer who can affect corporate outcomes—by boycotting, badmouthing or protesting—becomes a de facto regulator of corporate social and environmental issues (Sweetin, Knowles, Summey, and McQueen, 2013). Although research suggests that consumers are willing to punish corporate social irresponsibility (Sweetin et al., 2013), a dearth of literature has examined how consumers view and respond to actual instances of corporate wrongdoing and, furthermore, what individual-level and contextual factors

drive consumer-related outcomes. Limited empirical research suggests that consumer reactions to corporate social irresponsibility (e.g., purchase intentions, negative word-of-mouth) are partly driven by attributions of blame (e.g., Antonetti & Maklan, 2016; Folkes, 1988; Lei, Dawar, & Gürhan-Canli, 2012) and moral self-conscious emotions (e.g., anger; Grappi et al., 2013; Romani, Grappi, & Bagozzi, 2013a/2013b; Xie, Bagozzi, & Grønhaug, 2019). Blame attribution is considered a cognitive process defined as the degree to which consumers perceive a firm to be accountable for the causation of a harmful event: greater perceived blame is associated with stronger negative or punitive reactions among consumers (Antonetti & Maklan, 2016; Bechwati & Morrin, 2007; Grégoire, Laufer, & Tripp, 2010; Joireman, Grégoire, Devezer, & Tripp, 2013).

These findings support decades of theory and research delineating how harmful events elicit an attributional search, where individuals attempt to make sense of what went wrong and who or what is to blame (e.g., attribution theory, for review see Kelley & Michela, 1980). How individuals arrive at an overall judgment of blame has been theorized across multiple domains. Work in moral psychology proposes that blame attribution is a step-by-step process involving: (1) discerning that some event or outcome deviated from a norm, (2) assessing that an agent was involved and caused the event, and (3) deciding whether the agent brought about the event intentionally (Guglielmo, Monroe & Malle, 2009; Malle, Guglielmo, Monroe, 2012b). Comparatively, Weiner's (2000) attributional framework, which has been leveraged to explain consumers' blame attributions, suggests that blame is formed based on the assessment of three causal dimensions: stability (enduring or temporary), locus (internal or external) and controllability (controllable or not). Empirical evidence corroborates this causal flow.

When consumers attribute blame to internal causes, view the brands actions as a stable characteristic, and determine that the event could have been avoided, the more they ascribe blame to the corporation and the less likely they are to engage with the brand positively in the future (Antonetti & Maklan, 2016; Folkes, 1988; Folkes, Koletsky, & Graham, 1987; Klein & Dawar, 2004; Lei et al., 2012).

Theories of moral judgment and blame stipulate that in order to be held responsible and punishable, an agent must have conclusively and intentionally caused an event (Guglielmo et al., 2009; Malle et al., 2012; Weiner, 2000). However, when corporations engage in acts of intentional deceit and are admittedly at fault, important questions remain about whether and how variations in ascriptions of blame concerning the causal agent (e.g., whom or what within the organizational hierarchy caused the event) may differentially shape consumer reactions. That is, when corporations are irrefutably to blame for an intentional act, do differences in consumer responding (e.g., negative word-of-mouth) emerge as a function of whether they assign culpability to individual actors within the corporation (e.g., CEO, software engineers) or else, to the corporation as a collective whole (e.g., corporate culture)?

<u>**Motivations for Dissertation Research**</u>

There are many reasons—theoretical, empirical, and practical—to suggest that leveraging forms of interpersonal communication as an alternative pathway to engagement holds considerable promise. Although significant strides have been made in recent years to enhance the field's understanding of what motivates individuals to confront unethical corporate behavior and others' (in)appropriate environmental behavior, important questions remain about how and whether other contextually-salient social and

individual-level (e.g., reputational concerns) factors drive engagement across disparate contexts. Additional research is also needed to understand how social influence impacts decision-making in non-traditional, albeit increasingly utilized communication mediums and channels (e.g., information conveyed on social networking platforms). Vast opportunities now exist for people to share information, in the form of text or photographs, yet limited work has explored individuals' personal and normative perceptions of sharing nature-based experiences on social media. An understanding of individuals' personal and normative perceptions of such practices may present valuable insights for conservation managers or organizations seeking to promote a shared conservation ethic among users who actively participate in and share nature-based experiences on social media.

Building off these ideas and the initial empirical efforts explored throughout the introduction, this dissertation focuses on the intersection of normative influence and interpersonal communication. In broadening the field's understanding of interpersonal communication in the context of the environment, the studies and conceptual framework I discuss address several far-reaching and context-dependent questions:

- First, how willing are individuals to impose social sanctions on others' (in)appropriate behaviors in order to sustain coupled human-ecological systems or take retributive actions (e.g., badmouth) in the wake of corporate environmental wrongdoing?
- Second, what is the effect of contextually-salient social and individual-level factors in shaping individuals' willingness to sanction environmental transgressions across scales and contexts of decision-making?

- Third, what are anglers' personal and normative perceptions concerning whether and how a fish should be held and exposed to air post-catch?

- Fourth, do normative misperceptions exist concerning recreational angling practices as well as the use of social media for depicting angling-related events?

Overview of Papers

This dissertation examines these research questions in a series of three empirical papers. Additionally, the final chapter (Chapter V, *'Communicating for Conservation'*) summarizes theoretical and empirical research on interpersonal communication, proposes a conceptual framework delineating the types of information exchanged during a discussion, and highlights relevant approaches conservation managers and practitioners can employ to create and scaffold meaningful interactions among relevant stakeholders. The thrust of my dissertation focuses on understanding what shapes individuals' willingness to confront perceived or actual harm, including consumers' badmouthing unethical corporate behavior (e.g., organization-level) as well as recreational users imposing social sanctions on others' (in)appropriate conservation behavior. Although each empirical Chapter (Chapters II-IV) addresses a distinct aspect of interpersonal communication, the three overlap in ways that begin to shed light on the drivers and implications of communicating with others. Below, I briefly introduce and summarize key findings from each of the three empirical papers and outline the content of the final chapter. Chapter II has been published as a co-authored article in the Journal of Consumer Behavior (with Daniel Chapman, Brian Lickel, and Ezra Markowitz) and Chapter III has been published as a co-authored article in the Journal of Environmental Management (with Andy Danylchuk, Steven Cooke, and Ezra Markowitz).

In the first paper (*Chapter II, 'A Few Bad Apples or Rotten to the Core'*), I begin by examining brand patrons' reactions to unethical environmental corporate behavior and the extent to which variation in ascriptions of blame, as well as consumers' proximity to the scandal, drive future engagement with the brand (e.g., purchasing decision, word-of-mouth). The study draws on an isolated incident of corporate wrongdoing, in which Volkswagen intentionally circumvented emissions regulations on upwards of 6 million vehicles worldwide (Gates et al., 2016). Specifically, I explore how brand patrons' ascriptions of blame for causing the wrongdoing, either to 'a few bad apples' or else to 'rotten corporate culture,' drives consumer reactions to the scandal, including their intentions to badmouth the corporation to others. Findings from this correlational research suggest that patrons who attributed blame to Volkswagen's 'rotten corporate culture' were less likely to engage positively with the brand in the future (e.g., buy their products, spread positive WOM). This effect was mediated by feelings of anger and perceptions of trust related to Volkswagen behaving ethically in the future. These findings highlight the importance of attributions in shaping expressions of blame for corporate wrongdoing (e.g., Folkes, 1988). The content of this chapter is reproduced in full as it appears in print (see Appendix A for full citation and publication details).

The second paper (*Chapter III, 'Peer Pressure on the Riverbank'*) examines a similar, although distinct, question in the context of recreational fishing. Over the past decade, research in this domain has consistently demonstrated how anglers' behavior and decision-making influences the way fish biologically respond to catch-and-release angling events (e.g., Cooke et al., 2013a). The relationship between anglers' behavior and the condition of released fish has raised important questions about anglers' capacity and

willingness to monitor and enforce best practices among the fishing community. In this paper, I build on work by Chapman et al. (2017), to explore recreational anglers' intentions to impose social sanctions on others' (in)appropriate handling practices. Findings reveal that several individual-level (e.g., perceived efficacy) and contextually salient—social—factors (e.g., reputational concerns) drive anglers' past sanctioning behavior and future sanctioning intentions. In particular, efficacy beliefs relative to the impact of sanctioning in promoting change as well as anglers' concern about their reputation in the angling community predicted both past engagement and future sanctioning intentions. Age, concern for fishing populations, and management familiarity also predicted anglers' past sanctioning behavior. Additionally, though anglers reported low engagement in past sanctioning behaviors, they simultaneously expressed elevated intentions to sanction others in the future. These findings also echo recent work, suggesting that formal conservation policies, such as the institution of formal angling capture and handling regulations, may support people's ability to detect norm-violations and therefore, impact their willingness to interpersonally regulate and enforce others' actions (e.g., Nolan, 2017). The content of this chapter is reproduced in full as it appears in print (see Appendix A for full citation and publication details).

In the third paper (*Chapter IV, 'Fishing for a Photograph'),* I begin to explore existing norms around catch-and-release handling practices, particularly those dealing with whether and how a fish should be held and exposed to air post-catch. Building on the literature detailing how fish respond to the angling event, it is important to understand which handling and social media sharing practices are widely endorsed in the angling community. Specifically, I assess anglers' personal and normative beliefs towards

handling and social media sharing practices that differentially depict a fish post-catch (e.g., partially submerged in water, air exposed), and whether and how individuals' own beliefs relate to their perceived level of agreement among other anglers. I find that the majority of participants agree with the practice of handling (and sharing images of) fish partially submerged or fully underwater, whereas greater disagreement exists for the horizontal and the vertical holds. Additionally, results indicate evidence of both overestimation and underestimation of normative beliefs (e.g., perceived level of support among other anglers) with respect to handling and social media sharing practices. For instance, although the majority of anglers in the sample disagreed with the vertical hold practice, participants simultaneously misperceived that the majority of other anglers view it as an appropriate practice. These findings, particularly those detailing the relationship between participants personal and normative beliefs about the appropriateness of handling and social media sharing practices suggests that there is a need to correct existing misperceptions. Given the effect of perceived norms on behavior, such an effort may be necessary in fostering the adoption of catch-and-release best practices among the angling community.

In the final paper (*Chapter V*, '*Communicating for Conservation'*), I summarize the capacity of interpersonal communication to promote widespread cooperation in the context of environmental collective action problems. Drawing on direct and indirect evidence, I propose a typology that characterizes the nature of information exchanges that exist when people talk with one another about such problems. As part of this discussion, I highlight how such exchanges differentially convey, either implicitly or explicitly, normative information about what is socially approved or disapproved of behavior. The

chapter also details how features of many environmental collective action problems, including attributes of the target behavior as well as the issue itself, position interpersonal communication as a unique and necessary social influence approach. Notable social, contextual, and individual-level factors are discussed in terms of how each can impact engagement as well as conversational outcomes. In conclusion, I underscore several approaches conservation managers and practitioners can employ to leverage the power of social influence through interpersonal communication.

CHAPTER II

"A FEW BAD APPLES" OR "ROTTEN TO THE CORE": PERCEPTIONS OF CORPORATE CULTURE DRIVE BRAND ENGAGEMENT AFTER CORPORATE SCANDAL

<u>Introduction</u>

With consumers expressing a growing interest in patronizing corporations on account of their ethical conduct, corporate social responsibility initiatives are occupying an increasingly important role in corporate agendas (Brown & Dacin, 1997; Creyer, 1997; Luo & Bhattacharya, 2006; Mohr & Webb 2005; Mohr, Webb, & Harris, 2001; Sen & Bhattacharya, 2001). When confronted with egregious corporate scandals, brand patrons are faced with difficult decisions about how and whether to engage with the offending company in the future. To date, limited research has examined the specific factors that influence how and to what extent consumers are differentially motivated to engage with a brand following actual instances of intentional corporate malfeasance that affect both brand patrons and the general public.

In 2008, the Volkswagen Group (VW) launched the 'Clean Diesel' engine ad campaign designed to debunk the 'diesel is dirty' (mis)conception and announced their new line of environmentally friendly, high performance diesel engine vehicles (Pemberton, 2015). However, less than a decade later VW admitted to intentionally installing 'defeat device' software on their turbocharged direct injection (TDI) diesel engine vehicles to evade U.S. emissions regulations. Volkswagen's fraudulent engineering has resulted in excess nitrogen oxide (NO_x) emissions from over 500,000 vehicles (TDI models 2009-2015) registered in the U.S. and an additional 11 million vehicles worldwide (Gates et al., 2016). Volkswagen's unethical conduct could have

potentially drastic negative effects on existing owners' intentions to remain loyal to the brand in the future.

Here, we report findings from a matched samples survey of TDI and non-TDI VW consumers in which we investigated how reactions to the scandal predict future brand engagement intentions. Specifically, we explored how two important factors—consumers' proximity to the scandal and perceptions of VW's corporate culture—predict expectations of future wrongdoing, feelings of anger and consumers' intentions to engage with the brand in the future. Further, to more comprehensively explore the effects of proximity and perceptions of corporate culture on consumers' future brand engagement, we also examined how and to what extent both expectations of future ethical action and anger mediate these effects.

Predicting Future Brand Engagement

In the wake of corporate scandals, consumers can play an instrumental role in determining the financial success of corporations by choosing to either engage or disengage from the company (Reichheld & Sasser, 1990). Underscoring consumers' future brand engagement is the basic choice of whether or not to continue purchasing from a corporation. Additionally, consumers can also affect company outcomes by talking with other potential consumers about the company, its behavior and its products. The examination of such word of mouth behaviors (Westbrook, 1987) is not a trivial endeavor, as research demonstrates that interpersonal communication influences individuals' decision-making, including in the context of consumption (Christiansen & Tax, 2000; Engel, Langner, & Schmitt, 1995; Katz & Lazarsfeld, 1955; Walker, 1995).

Thus, in the present study, we measured brand engagement not only in terms of future

purchasing intentions but also in terms of interpersonal communication about the brand.

Extant research examining the antecedents of consumers' purchase and word of

mouth intentions following corporate product and service failures highlights a variety of

factors, including customer satisfaction (Andreaseen, 1999; Bolkan, Goodboy, &

Bachman, 2013; Susskind, 2005), corporate social responsibility evaluations (Klein &

Dawar, 2004; Russell, Russell, & Honea, 2016), prior consumer-brand relationships and

expectations (Dawar & Pillutla, 2000; Grégoire & Fisher, 2008; Grégoire, Tripp, &

Legoux, 2009; Lei et al., 2012; Trump, 2014), and moral or self-conscious emotions

(Antoletti & Maklan, 2016; Grappi et al., 2013; Johnson, Matear, & Thomson, 2010;

Romani et al., 2013a). However, as far as we have been able to determine, no past

research has explicitly examined whether individuals' beliefs about the nature of an

organization's 'corporate culture' influence future brand engagement. Given that media

coverage of corporate scandals often seems to highlight the role of corporate culture in

driving unethical decisions, e.g., indicating that either the entire company is morally

bankrupt or else that just a few "bad apples" are responsible for the wrongdoing, we

hypothesized that variation between individuals with respect to such beliefs may help

explain differential responses of consumers to the VW emissions scandal.

Predicting consumers' future brand engagement, as a function of both how

consumers attribute blame as well as how proximately or distally affected they are by a

corporation's actions, has the potential to inform how organizations' design and direct

effective communication, marketing and organizational responses. If consumers perceive

an instance of wrongdoing to be a symptom of a pervasive corrupt corporate culture,

which may have negative downstream effects on future brand engagement, this may

provide a powerful motive for the organization to make changes to respond to

consumers' ethical expectations of organizational culture moving forward. Thus, the

recent VW diesel emissions scandal provides a unique real-world context within which to

study these consumer decision-making dynamics and build on preexisting themes in

consumer behavior research.

Ascribing Culpability: Immoral Characters or Corrupt Culture

Addressing the question of consumers' beliefs about corporate culture is an

important consideration in the present context as VW has accepted internal responsibility

for intentionally installing the 'defeat device' software. While the chairman of VW has

claimed that the scandal was caused by the 'misconduct and shortcomings of individual

employees' (Boston, Varnholt, & Sloat, 2015), others have suggested the scandal was the

result of VW's corporate culture, once described as 'cutthroat, confident, and insular'

(Ewing & Bowley, 2015). Examining whether VW owners' divergent beliefs about

corporate culture for causing the scandal predicts future brand engagement extends

existing literature on attributions of responsibility with respect to corporate wrongdoing

and product failures (Antolleti & Maklan, 2016; Coombs, 2007; Folkes, 1984; Folkes,

1988; Lei et al., 2012).

Extensive theory and research suggests that individuals seek out and develop

causal stories that allow ascriptions of blame and responsibility after witnessing unethical

behavior (Heider, 1956; Malle, Guglielmo, & Monroe, 2014; Weiner, 1985). Thus, in the

wake of a corporate scandal, it is reasonable to assume that consumers will first seek to

address the question of culpability. Indeed, attributions of responsibility influence

consumers' reactions to corporate failures (Coombs and Holladay, 2002; Folkes, 1988; Klein & Dawar, 2004; Laufer & Coombs, 2006; Lei et al., 2012). However, most of this research has examined consumers' attributions either as the function of three causal dimensions of locus, stability and controllability (Folkes, 1984), the influence of contextual base-rate information (Lei et al., 2012), or else the degree to which consumers hold corporations responsible (Antoletti & Maklan, 2016). When consumers attribute blame to external corporate factors, view the brand's actions consistent with similar organizations, or ascribe lower levels of responsibility to the corporation, they are more likely to positively engage with the brand in the future (Antoletti & Maklan, 2016; Folkes, 1988; Folkes et al., 1987; Klein & Dawar; 2004; Lei e al., 2012). Yet, when corporations are admittedly responsible for the wrongdoing, attempts to answer the question of culpability often implicate the extent to which the corporation's organizational culture, characterized by widespread corruption, enabled or even supported the malfeasance (e.g., 'Enron': Simms & Brinkmann, 2003).

Building on this idea and the work cited above, we hypothesized that consumers' ascriptions of responsibility, either to an entire organization (i.e., as a result of a perceived corporate culture that is "rotten to the core") or else to a small handful of employees (i.e., "bad apples") may strongly influence intentions to engage with the organization in the future (e.g., purchase its products, speak positively with others about it). Consumers should be more willing to engage with a corporation if the incident is perceived as an uncharacteristic, isolated event attributable to the actions of a handful of rogue employees rather than to an organizational culture characterized by deep-seated, persistent corruption. Therefore, the following prediction was made:

H1: Perceiving the scandal to be a symptom of a rotten corporate culture rather

than a small number of individual employees will negatively influence future

brand engagement intentions.

In addition, we also sought to examine mechanisms that might shed light on

reasons why corporate culture beliefs would influence future brand engagement. Based

on past literature, we focused on expectations of future ethical action and anger about

corporate wrongdoing as two important factors to explore.

Trust and the Expectation of Future Ethical Action

Intentional corporate deception and unethical behavior, such as that perpetrated

by VW in the emissions case, likely undermines consumers' trust in the corporation,

which is to say, consumers will have low confidence in the reliability, honesty, and

responsibility of the organization (Morgan & Hunt, 1994) as well as a missing

'expectation of ethically justifiable behavior' (Hosmer, 1995, p. 399). This is important,

as research in relational marketing indicates that trust plays a central role in helping to

build and maintain positive consumer-company relationships (Bhattacharya & Sen, 2003;

Morgan & Hunt, 1994; Sirdeshmukh, Singh, & Sabol, 2002). Stronger levels of brand

trust are associated with greater brand loyalty (Delgado-Ballester & Luis Munuera-

Alemán, 2001; Lau & Lee, 1999), positive word of mouth (Gremler, Gwinner, & Brown,

2001; Ranaweer & Prabhu, 2003) and purchase intentions (Kang & Hustvedt, 2014).

Hence, the following hypothesis was made:

H2: Expectations of future ethical action will have a positive effect on

future brand engagement.

We also expected that consumers' expectations of future ethical behavior should depend at least in part on their beliefs about the root causes of the wrongdoing. Thus, confidence in a corporation's propensity for future ethical action should increase if consumers perceive that the culpable party (i.e., 'a few bad apples') represents only a small subset of the entire corporation (and thus, presumably, can be easily removed). Conversely, if consumers perceive the root of the wrongdoing as endemic (i.e., a 'rotten' corporate culture), than we should expect lower expectations of future ethical action and, in turn, a reduced willingness to engage with the brand in the future. Indeed, trust is shown to be an important factor in regulating consumer-company relationships (Esch, Langner, Schmitt, & Geus, 2006; Morgan & Hunt, 1994), explaining the effect of attributions of corporate social responsibility initiatives on purchase intentions (Kang & Hustvedt, 2014; Vlachos, Tsamakos, Vrechopoulos, & Avramidis, 2009). We anticipate that owners who believe that the emissions scandal reflects the decisions of a 'few bad apples' will report stronger expectations of future ethical action and that these expectations should result in an increased likelihood to engage with the brand. Therefore, we also hypothesized that:

H3: Expectations of future ethical action will partially mediate the effect of corporate culture beliefs on future brand engagement.

Affective Reactions to Corporate Wrongdoing

Corporations' ethical misconduct is likely to arouse an emotive response, providing consumers with an additional source of motivation to act. An emerging body of literature highlights the role negatively valenced emotions, such as anger, play in shaping consumers' future brand engagement following instances of corporate social

irresponsibility (Antoletti & Maklan, 2016; Grappi et al., 2013; Johnson et al., 2010; Romani et al., 2013). Heightened feelings of anger can motivate retaliatory consumer actions, including boycott behavior (Cronin, Reysen, & Branscombe, 2012; Klein, Smith, & John, 2004) and negative word of mouth (Antoletti & Maklan, 2016; Grappi et al., 2013). Given the extent of VW's corporate social responsibility failure, we hypothesized:

H4: Anger will negatively influence future brand engagement intentions.

We also anticipated that the extent to which individuals are angry may be contingent on whether they believed the scandal was the product of 'a few bad apples' or a 'rotten corporate culture'. As with trust, prior research indicates that anger influences consumer-company relationships following instances of corporate wrongdoing. For example, anger regulates the effect of evaluations of perceived corporate social irresponsibility (Antoletti & Maklan, 2016) and moral/social transgressions on negative word of mouth (Grappi et al., 2013). Perceiving that a scandal reflects a corporate culture that is 'rotten to the core' should elicit elevated feelings of anger about the scandal, and in turn, a decreased willingness to engage with the brand. If consumers ascribe a 'few bad apples' responsible, then we should expect lower expressions of anger, and increased future brand engagement. Thus, we hypothesized that:

H5: Anger will partially mediate the effect of corporate culture beliefs on future brand engagement.

Proximity Effects on Future Brand Engagement

In addition to the anticipated effects of corporate culture beliefs, we also anticipated a second potentially critical factor affecting future brand engagement in the context of the VW emissions scandal, namely, whether current brand patrons were

directly affected by the scandal (i.e., TDI owners) or only indirectly affected (i.e., other VW owners that may suffer from reputational and lesser financial damage from being associated with the brand).

Many of the consequences of the VW scandal are diffuse and have impacts on the general public in the form of respiratory illness, air pollution, and even premature death (Barrett et al., 2016; Holland, Mansur, Muller, & Yates, 2016; US EPA, 1999). In addition to these diffuse consequences, current patrons of VW suffer additional proximal forms of harm. In the US, those facing the most direct impacts are the roughly 500,000 TDI owners that have been unwittingly put in a position of both owning and operating vehicles harmful to environmental and public health, and being forced to make a decision of whether to sell back or repair their vehicle under the partial settlement with U.S. regulators (US EPA, 2016). There are likely also negative psychological and social costs of the scandal (e.g., loss in reputation, feelings of guilt or shame) felt both by directly affected owners as well as others affiliated with the VW brand through their vehicle ownership. Therefore, we examined whether owners' proximity to the scandal (TDI owner vs. non-TDI VW owner) influenced future brand engagement intentions. In addition to testing the direct effects of proximity on brand engagement, we also explored (a) whether proximity moderates the influence of corporate culture beliefs on future brand engagement, and (b) whether expectations of future ethical action and anger at VW also function as mediators of the hypothesized proximity effect.

The role of personal proximity relates to Jones' (1991) concept of moral intensity, which argues that individuals make ethical decisions contingent on the characteristics of the issue, including the dimension of proximity or a feeling of nearness (e.g., social,

cultural, physical, psychological; McMahon & Harvey, 2006). In effect, heightened proximity leads to increased moral intensity and ultimately, a moral obligation to take action, such as disengaging from a brand after an instance of unethical corporate wrongdoing. Whereas prior research has largely assessed proximity based on participants perceived degree of similarity and/or closeness to hypothetical victims (e.g., McMahon & Harvey, 2006), here proximity is operationalized by individuals' actual vehicle ownership status, as TDI owners are more directly affected than non-TDI owners. In a related vein, past research on corporate wrongdoing indicates that while brands do sometimes benefit from a 'halo effect' among patrons, such that greater brand connectedness or loyalty can buffer the negative effects of a scandal on company engagement (Ahluwalia, Burnkrant, Unnava, 2000; Ahluwalia, Unnava, & Burnkrant, 2001; Cheng, White, Chaplin, 2012), these benefits are often reduced or disappear altogether when a brand's actions are personally relevant or directly harm consumers (Grégoire et al., 2009; Grégoire & Fisher, 2008; Johnson et al., 2010; Trump, 2014). Thus, the following hypothesis was made:

H6: Proximity to the scandal will negatively affect future brand engagement.

TDI owners directly affected by VW's actions should be less likely to engage with the VW brand in the future than VW owners only indirectly affected by the scandal. When considering potential mediators of these effects, anger at VW for the scandal seems likely to be a particularly potent factor. That is, those most directly affected by a company's actions are likely to be those most angry at the company. While we expected anger to be the primary mediator of effects of proximity, it is also theoretically plausible that individuals' expectations of future ethical action would be negatively impacted by being more proximally harmed by the company. This direct experience of harm may

34

extend the salience of the company's wrongdoing, making it more difficult for the company to restore the trust of these consumers. We therefore tested both anger and future expectations of ethical action also as mediators of the effects of proximity on brand engagement but expected anger to be the stronger mediator:

H7: Anger and expectations of future ethical action will mediate the effects of proximity on future brand engagement; the mediation effect will be stronger for anger than expectations of future ethical action.

Interactive or Independent Effects?

The generation of parallel hypotheses for proximity and corporate culture beliefs raises questions with regard to whether and how these two potent factors interact to influence consumer responses. On the one hand, corporate culture beliefs and proximity may both play important but independent roles in influencing expectations of future ethical action, anger at VW, and ultimately future brand engagement. On the other hand, proximity may in fact moderate the influence of corporate culture beliefs on these outcomes. For example, being a VW TDI owner directly affected by VW's actions may amplify the effects of perceiving VW's corporate culture as 'rotten to the core' such that individuals in this category may be the least likely to expect future ethical action from VW, the most angry at VW for the scandal, and the least motivated to exhibit positive brand engagement in the future. We examined of these possible patterns of results. Figure 1 depicts a full conceptual model of the study predictions.

H8: Proximity and beliefs about corporate culture will interact, such

that TDI owners ascribing responsibility to a 'rotten corporate culture' will amplify (i.e., multiplicative interaction) feelings of anger and expectations of future ethical action.
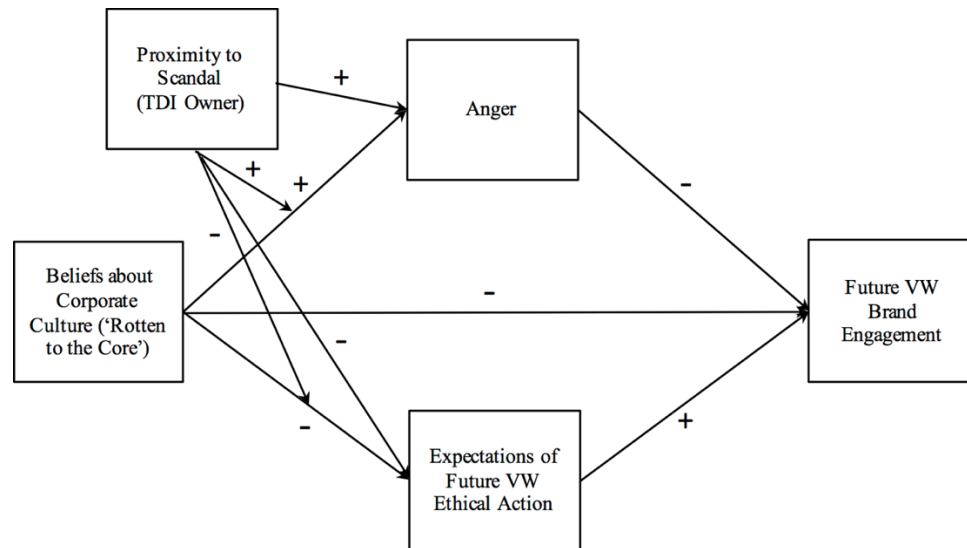
Figure 1. The conceptual model representing the anticipated direct and indirect effects among the study measures using TDI owners and "Rotten" corporate culture as the reference levels for proximity and beliefs about corporate culture, respectively. The lines extending from proximity to scandal to the lines indicating the effects of culture on anger and expectations of future ethical action represent the potential interactive relationship between corporate culture and proximity, such that TDI owners' ascribing responsibility to VW's corporate culture will amplify (i.e., multiplicative interaction) feelings of anger and expectations of future VW ethical action in the indicated directions.

Materials and Methods

Participants

Owners of Volkswagen vehicles residing in the United States were recruited to participate in a survey by the marketing research firm, YouGov. Initial ownership criteria included owning or leasing a Volkswagen 2.0L TDI vehicle manufactured between 2009 and 2016. Volkswagen owners of non-TDI vehicles (e.g., unrestricted model years of

non-diesel engines) were recruited as a matched sample to participate in the study based on age, gender, education, income and geographical region.[1] The survey was administered after the tentative announcement of the settlement agreement with U.S. regulators in June, 2016 and prior to release of information about the final agreement. Aside from ownership and the matching criteria, no other exclusion criteria were applied. The study was approved by the University of Massachusetts Institutional Review Board (Protocol ID: 2015:2808). A total of 592[1] surveys were completed, and participants were compensated for completing the survey. Table 1 displays socio-demographic characteristics.

Table 1. Socio-demographics characteristics by VW ownership group

Gender (n = 592)	TDI	%	NonTDI	%	Income (n = 592)	TDI	%	NonTDI	%
Female	124	48.2	178	53.1	0 - 29,999	24	9.3	45	13.4
Male	133	51.8	157	46.9	30,000 - 49,999	29	11.3	45	13.4
Race (n = 592)	TDI	%	NonTDI	%	50,000-69,999	50	19.5	58	17.3
White	210	81.7	281	83.9	70,000 - 99,999	50	19.5	73	21.8
African American	5	1.9	12	3.6	> 100,000	78	30.4	72	21.5
Hispanic	11	4.3	18	5.4	Non Disclosure	26	10.1	42	12.5
Asian	13	5.1	6	1.8	Region (n = 592)	TDI	%	NonTDI	%
Native Am.	4	1.6	0	0.0	Northeast	49	19.1	65	19.4
Mixed	5	1.9	11	3.3	Midwest	37	14.4	62	18.5
Other	9	3.5	7	2.1	South	96	37.4	112	33.4
Educ. (n = 592)	TDI	%	NonTDI	%	West	75	29.2	96	28.7
No high school	1	0.4	3	0.9	Party identity (n = 592)	TDI	%	NonTDI	%
High school grad.	24	9.3	26	7.8	Democrat	81	31.5	142	42.4
Some college	38	14.8	71	21.2	Republican	66	25.7	59	17.6
2-year college	32	12.5	19	5.7	Independent	82	31.9	104	31.0
4-year college	78	30.4	124	37.0	Other	14	5.4	21	6.3
Post Graduate	84	32.7	92	27.5	Not Sure	14	5.4	9	2.7

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[1] When indicated, further detail on study and analysis procedures is located in the supplementary information.

Measures

Participants responded to a large survey, which included questions to investigate the predicted relationships. One dichotomous item gauged *beliefs about Volkswagen's corporate culture* by asking the following: "Do you think the Volkswagen emissions situation reflects the decisions of a "few bad apples" within the company or instead reflects that the company's corporate culture is "rotten to the core"?". A single item measured participants' *expectation of future ethical action* by VW: "Do you trust Volkswagen to act ethically in the future?" (1 = *not at all*, 7 = *completely*). *Feelings of anger* about the VW emissions situation was assessed by one item: "How angry do you feel about the Volkswagen emissions situation?" (1 = *not at all angry*, 7 = *extremely angry*).

Three items measured participants' intentions to engage with Volkswagen in the aftermath of the emissions situation. Participants indicated how unlikely or likely they would be to purchase a Volkswagen vehicle in the future (1 = *extremely unlikely*, 7 = *extremely likely*). Two additional items assessed participants' positive and negative word-of-mouth intentions. Participants indicated the extent to which they were motivated to 'Recommend Volkswagen vehicles to other people' (1 = *not at all motivated*, 7 = *extremely motivated*) and 'Encourage other people not to buy a Volkswagen because of the scandal' (1 = *not at all motivated*, 7 = *extremely motivated,* reverse coded). The three items were averaged to create a composite measure of *future brand engagement* that was used throughout the analyses ($\alpha = .71$). See Table 2 for an overview of descriptive statistics and correlations between study measures.

Table 2. Descriptive statistics and correlations for study independent and dependent measures

	Count	%			
Beliefs about corporate culture					
A few bad apples'	419	70.8			
Rotten to the core'	172	29.1			
No response	2	0.8			
	M	**SD**	**(1)**	**(2)**	**(3)**
Expectations of future ethical action	4.46	1.75	1		
Feelings of anger			-0.510	1	
Future brand engagement			0.682	-0.507	1

Note. For all correlations p's < .001

Results

Analytic strategy

The analyses below were performed in several stages to test the hypotheses. First, the relationship between corporate culture beliefs and proximity to the scandal were examined, as well as potential interactive effects of these variables on the other study measures. As described in the results that follow, there was insufficient statistical evidence in support of analyzing the full interaction model depicted in Figure 1. Therefore, for both beliefs about corporate culture and proximity to the scandal, separate sets of independent t-tests, regressions and mediation analyses were performed to test for the hypothesized effects. In addition to hypothesis testing using traditional frequentist methods, where possible the hypotheses were also tested using Bayes factors (BF) under a Bayesian model comparison framework (Jeffreys, 1961; Morey, Romeijn, & Rouder, 2016b). Bayes factors are a Bayesian alternative to null hypothesis significance testing, and reflect the relative support for a specified alternative model (BF_{10}; e.g., a model predicting that the true effect size is greater than 0) or a null model (BF_{01}; e.g., a model predicting that the true effect size is equal to 0). $BF_{10} > 1$ provides evidence in favor of

the alternative (with larger values providing greater evidence), while $BF_{10} < 1$ indicates evidence in favor of the null. An expanded discussion of this approach, related references and a description of the specific model priors utilized for our hypothesis testing can be found in the supplementary materials.[1] A full analysis of the individual items from the future engagement composite measure is also located in the supplementary materials (see Appendix B). Unless otherwise stated, all analyses were performed in R version 3.3.1. (R Core Team, 2016). The relevant data, analysis code, and survey materials can be accessed at [https://osf.io/ghc5y/].

Relationship Between Corporate Culture Beliefs and Proximity to the Scandal

A χ^2 test was first calculated to examine whether proximity to the scandal (VW TDI owner vs. VW non-TDI owner) influenced perceptions of corporate culture leading to the scandal as the product of a rotten corporate culture, relative to a few bad apples. Results suggest a small statistical effect, $\chi^2 (1, N = 591) = 4.038$, $p = .044$, Fisher's $Z_r = .083$, 95% confidence intervals of Z_r [.002, .164][2], $BF_{10} = .847$. The probability of selecting "rotten corporate culture" was slightly greater given the respondent was a TDI owner (.3359), than a non-TDI owner (.2567). However, the effect size of this analysis is small with a lower-bound confidence interval just above zero, suggesting a weak effect. Furthermore, the Bayes factor of .847 indicates weak, anecdotal evidence in favor of the null hypothesis (i.e., that the two factors are independent) over the alternative. Conditional probabilities calculated using Markov chain Monte Carlo sampling for the posterior distribution (10,000 iterations) revealed similar estimates to the χ^2 analysis. The

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[2] Unless otherwise stated, values in brackets displayed immediately after a reported statistic represent 95% confidence intervals for that statistic.

conditional probability of selecting rotten corporate culture given the participant was a TDI owner was higher (.3372, 95% credibility interval [2816, .3964]) than for a non-TDI owner (.2581, 95% credibility interval [.2122, .3064]).[1]

We also examined whether beliefs about corporate culture and proximity to the scandal interacted to influence expectations of future ethical action by VW, anger, and future brand engagement intentions. There was not a significant interaction for expectations of future ethical action, $F (1, 587) = 2.061, p = .152$, anger at VW, $F (1, 587) = .307, p = .580$, or on future engagement intentions, $F (1, 587) = 2.031, p = .155$. For each of these analyses, Bayesian model comparison indicated that models containing no interaction term were between 2 and 7 times better than models containing the interaction terms. Therefore, a full moderated mediation model was not tested and we instead performed separate t-tests, regressions, and mediations for the corporate culture measure and proximity to the scandal.

Effects of Corporate Culture Beliefs on Expectations of Future Ethical Action, Anger, and Future Brand Engagement

Independent samples t-tests were performed to examine the effects of beliefs about corporate culture on expectations of VW to act ethically in the future, anger, and future brand engagement intentions. Due to disparate sample sizes between groups on the corporate culture beliefs measure, Welch's two sample t-tests were performed for all analyses. Table 3 displays the results of these analyses. Beliefs about corporate culture had strong effects on expectations of future ethical action, anger and future brand engagement, such that those who blamed VW's rotten corporate culture reported lower expectations of future ethical action by VW, more anger and lower intentions to engage

with VW in the future. Figure 2 graphically displays the effects of corporate culture

beliefs on expectations of future ethical action and anger. Panel A of Figure 3 depicts the

effects of corporate culture beliefs on future brand engagement intentions.

Table 3. Regression model predicting future brand engagement from corporate culture
beliefs, expectations of future ethical action by VW, and anger

Predictor	b	SE	p	lmg	95% Confidence Intervals of b	
					LCI	UCI
Corporate Culture Beliefs (0 = rotten culture)	.289	.108	.008	.141	.077	.501
Expectations of Future Ethical Action	.454	.030	< .001	.615	.395	.512
Anger	-.143	.025	< .001	.244	-.193	-.093

Note. The *lmg* metric is a calculation of the relative importance of each indicator in a regression model and reflects the partitioning of the R^2 averaged over all possible orders of entering the variables into the model (Grömping, 2006; Lindemann, Merenda, & Gold, 1980). Thus, higher *lmg* metrics indicate a greater contribution to the R^2. *Lmg* was calculated using the "relaimpo" package for R (Grömping, 2006, version 2.2-2).
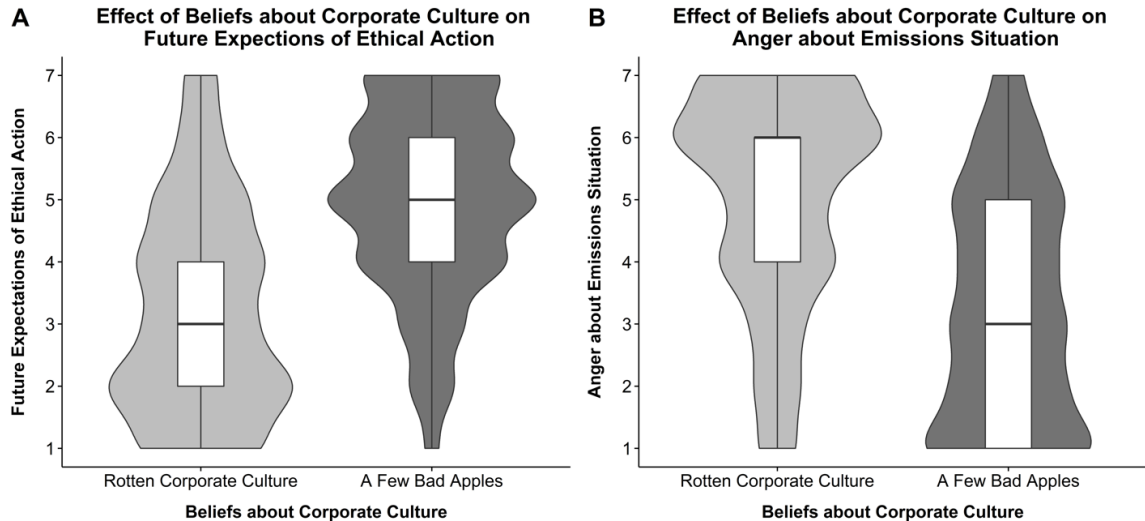
Figure 2. Violin plots of the effects of corporate culture beliefs on expectations of future ethical action by VW (a) and anger as a result of the scandal (b). Violin plots depict a boxplot within a rotated kernel density plot (Hintze & Nelson, 1998).
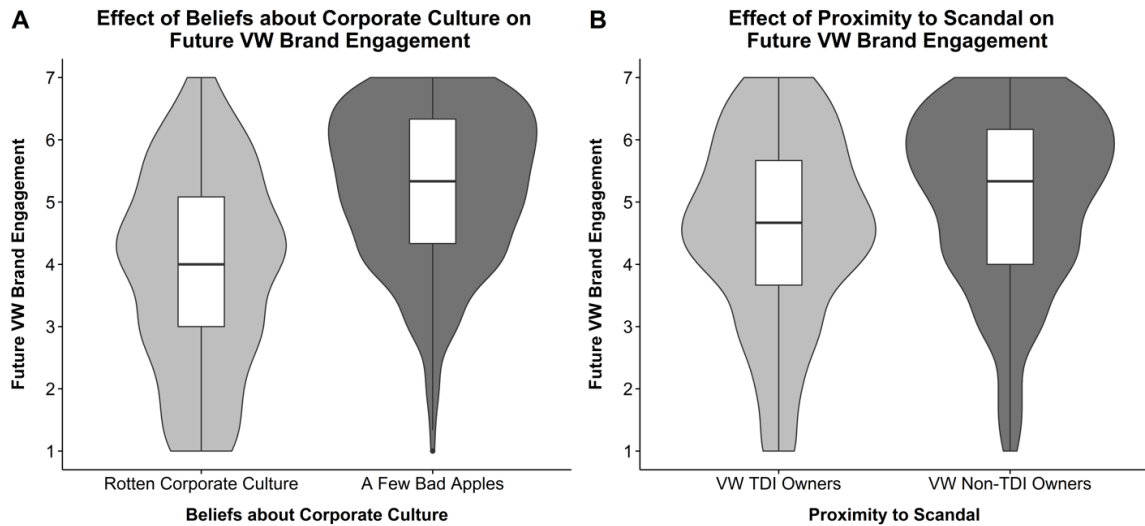
Figure 3. Violin plots of the effects of corporate culture beliefs (a) and proximity to the scandal (b) on future engagement intentions.

Multiple Regression and Mediation Analyses Predicting Future Brand Engagement

Prior to testing the mediation model, a regression analysis was performed entering beliefs about corporate culture, future expectations of ethical action by VW, and anger as simultaneous predictors. Table 4 displays the results of this analysis. This model accounted for 50% of the variance in future patronage intentions (adj. $R^2 = .5037$). Believing the scandal to be a product of a few bad apples was associated with greater future engagement intentions, as was expectations of future ethical action by VW. In contrast, anger about the emissions situation was a significant predictor of lower intentions to engage with VW in the future.

Additionally, model comparison was performed using Bayes factors to evaluate how well the model performed compared to a null model (i.e., intercept only model; Rouder & Morey, 2012). Of all possible model combinations involving corporate culture beliefs, expectations of future ethical action, and anger, the model containing all three had the largest Bayes factor, $BF_{10} = 7.625e+85$. When compared against the next best

model—one only containing future expectations and anger ($BF_{10} = 3.613e+85$)—the full

model performed roughly 2 times better ($BF_{10} = 2.110$).

To examine whether expectations of future ethical behavior and anger mediate the

relationship between corporate culture beliefs and future engagement, a multiple

mediation model was tested and the significance of the indirect effects were quantified

using bias-corrected bootstrapped confidence intervals (10,000 samples, calculated using

lavaan version 0.5-22 for R, Rosseel, 2012). Figure 4 displays the mediation model and

the regression coefficients for each path. Results of the analysis indicate that expectations

of future ethical action by VW partially mediated the effects of corporate culture beliefs

on engagement, $b = .801$, $SE_{boot} = .092$, bootstrapped 95% CI's [.629, .990]. Anger about

the emissions situation also partially mediated the effects of corporate culture beliefs on

future engagement intentions, although to a lesser degree, $b = .258$, $SE_{boot} = .052$, 95%

bootstrapped CI's [.163, .368]. We also performed the multiple mediation analysis

controlling for proximity to the scandal. The covariate analyses were performed using

Hayes' (2013) macro for SPSS 22, which provides easily implementable templates to

perform more complex regression-based analyses. The results did not substantively

change, and the indirect effects of expectations of future ethical action, $b = .807$, $SE_{boot} = $

.091, bootstrapped 95% CI's [.644, .997], and anger, $b = .207$, $SE_{boot} = .050$, bootstrapped

95% CI's [.117, .312], were nearly identical to the prior analysis.

Table 4. Effects of proximity to the scandal on expectations of future ethical action by
VW, anger, and future brand engagement

	TDI Owners ($n = 257$)		Non-TDI Owners ($n = 335$)				
	M	SD	M	SD	t (df)	Cohen's d [95% CIs]	BF_{10}
Expectations of Future Ethical Action	4.304	1.732	4.573	1.751	-1.868[†] (553.779)	-.154 [-.317, .009]	.502

					7.460***	.623	
Anger	4.424	1.969	3.236	1.856	(533.769)	[.457, .790]	2.929e+10
Future Brand Engagement	4.545	1.508	5.085	1.384	-4.473*** (525.698)	-.375 [-.539, -.211]	1728.41

Note. *** $p < .001$, † $p = .062$
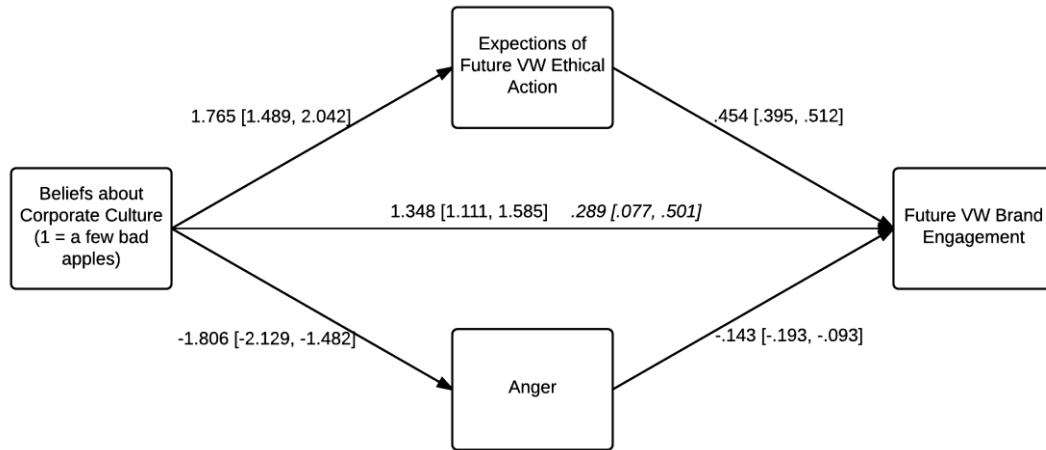
Figure 4. Multiple mediation model for the effects of corporate culture beliefs on future VW engagement intentions. Unstandardized regression coefficients are displayed with 95% confidence intervals in brackets and the direct effect of corporate culture beliefs on future engagement intentions is displayed in italics.

Influence of Proximity to Scandal on Expectations of Future Ethical Behavior and Future Brand Engagement

Welch's independent samples t-tests were also calculated to examine whether, collapsed across corporate culture beliefs, proximity to the scandal (i.e., being a directly affected VW TDI owner or a tangentially affected non-TDI VW owners) influenced expectations of future ethical action by VW, anger, and/or future brand engagement. Table 5 displays the results of these analyses. Proximity only had a weak effect on future expectations of ethical action by VW, but had strong effects on anger and future brand engagement such that TDI owners directly affected by the scandal reported greater anger and lower intentions to engage with VW in the future. Panel B of Figure 3 depicts the

effects of proximity on engagement intentions. Figure 5 displays the effects of proximity

on expectations of future ethical behavior and on anger.

Table 5. Regression model predicting patronage intentions from proximity to the scandal, expectations of future ethical action by VW, and anger

Predictor	b	SE	p	lmg	95% Confidence Intervals of b	
					LCI	UCI
Proximity to the Scandal (0 = TDI Owner)	.242	.090	.007	.032	.065	.418
Expectations of Future Ethical Action	.486	.028	< .001	.697	.430	.542
Anger	-.138	.026	< .001	.271	-.189	-.087

Figure 5. Violin plots of the effects of proximity on future expectations of ethical action (a) and anger at VW (b).

Multiple Regression and Mediation Analyses with Proximity to the Scandal as the Predictor

Identical to the regression model involving corporate culture beliefs, the model

predicting patronage intentions from proximity to the scandal, beliefs about future ethical

action by VW, and anger at VW also predicted 50% of the variance (*adj. R² = .5037*).

Table 6 displays the effects of each predictor on patronage in this model. Bayesian model comparison using Bayes factors indicates that the best fitting model (relative to the null) was the model including all three predictors, $BF_{10} = 7.849e+85$. The next best fitting model was one omitting the proximity measure, $BF_{10} = 3.613e+10$. The Bayes factor comparing the full model to the reduced model indicates that the full model fit was approximately 2 times better than the reduced model ($BF_{10} = 2.171$), providing anecdotal evidence for improved model fit. Consistent with the results for corporate culture beliefs, these results indicate that once expectations of future ethical action by VW and anger at VW are included in the model, being directly affected by the scandal or not has a reduced effect on future patronage.

Table 6. Regression model predicting patronage intentions from proximity to the scandal, expectations of future ethical action by VW, and anger

Predictor	b	SE	p	lmg	95% Confidence Intervals of b	
					LCI	UCI
Proximity to the Scandal (0 = TDI Owner)	.242	.090	.007	.032	.065	.418
Expectations of Future Ethical Action	.486	.028	< .001	.697	.430	.542
Anger	-.138	.026	< .001	.271	-.189	-.087

Mediation analyses were again performed using bootstrapped confidence intervals (10,000 samples, 95%, bias-corrected) to quantify the significance of the indirect effects. Consistent with our hypotheses, anger at VW significantly mediated the effects of proximity on future patronage intentions, $b = .165$, $SE_{boot} = .036$, 95% bootstrapped CI's [.102, .245], while future expectations of ethical action by VW were not a significant mediator, $b = .132$, $SE_{boot} = .071$, 95% bootstrapped CI's [-.007, .271]. Figure 6 provides

a graphical display of the mediation model and estimates for each path. As with the results for beliefs about corporate culture, we also performed this mediation analysis while entering corporate culture beliefs as a covariate. These results were highly consistent, with anger, $b = .129$, $SE_{boot} = .032$, bootstrapped 95% CI's [.073, .201], but not expectations of future ethical action, $b = .062$, $SE_{boot} = .059$, bootstrapped 95% CI's [-.054, .177], mediating the effects of proximity on patronage intentions.
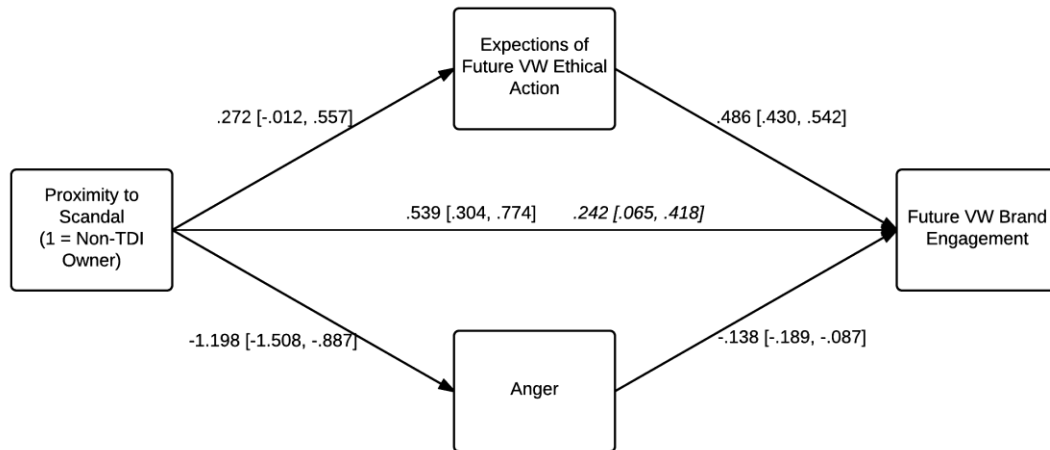
Figure 6. Multiple mediation model for the effects of proximity on future VW engagement intentions. Unstandardized regression coefficients are displayed with 95% confidence intervals in brackets and the direct effect of proximity on future engagement intentions is displayed in italics.

Discussion

When confronted with acts of corporate malfeasance, consumers are faced with a stark yet oftentimes surprisingly complex and challenging decision: whether or not to continue patronizing the offending brand. Simultaneously, transgressing brands are faced with decisions of how to alleviate the potential negative downstream effects from such events. Here, we examined how two previously underappreciated factors—consumers'

proximity to a corporate scandal and their attributions regarding the 'cultural'

underpinnings of a recent case of corporate wrongdoing—relate to intentions to engage

with the transgressing brand in the future. Results of our survey of TDI and non-TDI VW

owners reveal that participants' beliefs about the role that corporate culture played in

causing the diesel emissions scandal both directly and indirectly influence intentions to

engage with VW in the future. As predicted, participants who attributed the scandal to a

'rotten' corporate culture reported weaker expectations of future ethical action by VW,

were more likely to be angry, and were less willing to engage with VW than were those

who believed the scandal was caused by the actions of a 'few bad apples' within the

organization.

These findings support the assertion that consumers may largely exonerate

corporations if they believe the wrongdoing was caused by the actions of a relatively

small number of errant employees. One plausible explanation for this effect is that these

consumers believe the problem can easily be fixed by removing the individuals

responsible, whereas a rotten corporate culture may be viewed as an unmovable barrier to

positive change in corporate behavior. While corporate scandals materialize under

varying circumstances, past research on attributions of responsibility has focused on

whether culpability is internal or external to the corporation (Folkes, 1984; Folkes et al.,

1987). But, when corporations are admittedly at fault, we suggested and our results reveal

how attributions of internal corporate culpability, either to a handful of 'bad apples'

within the company or else to a corporate culture that is 'rotten to the core,' differentially

affect consumers' reactions to wrongdoing.

Our research also revealed some unexpected yet important findings. Contrary to our prediction, participants' proximity to the scandal did not amplify the effect of beliefs about corporate culture when ascribing blame to VW's rotten corporate culture. This follows prior research that finds moral intensity to be a weak predictor of behavior in general (McMahon & Harvey, 2007), although it is also plausible that variability in owners' proximity to the scandal failed to reach a threshold necessary to result in significant changes of beliefs about corporate culture (Jones, 1991). However, results indicated partial support for our expected independent effects of proximity, such that participants who were directly affected by the scandal (i.e. TDI owners) were more likely to be angry about it and less likely to engage with VW in the future.

Our results also amplify and extend previous research in relational marketing that identifies trust as a vital component in consumer-company relationships (Chaudhuri & Holbrook, 2001; Morgan & Hunt, 1994) as well as the emerging body of literature that situates anger as a key factor in shaping consumers' retaliatory actions to corporate social irresponsibility (Antoletti & Maklan, 2016; Grappi et al., 2013; Romani et al., 2013). In fact, our results reveal that expectation of future ethical action and anger accounted for half of the variability in future brand engagement. Also consistent with our predictions, expectation of future ethical action emerged as the prominent mediator between beliefs about corporate culture and future engagement while anger mediated the relationship of proximity on future brand engagement.

Understanding consumers' reactions to unethical corporate scandals has important implications for corporations seeking to respond to potential negative downstream consumer outcomes (Coombs, 2007), for those seeking to further punish the offending

company in the marketplace (Johnson et al., 2010) and even for non-transgressing, competing brands (Trump & Newman, 2016). In the wake of wrongdoing, it is necessary for corporations to evaluate and acknowledge the nature of the scandal, partially as a function of consumers' reactions to it. Here, we highlighted three considerations, in addition to consumers' proximity to the scandal, that corporations can focus on when determining their response and communication strategies. Our findings suggest that mollifying suspicions about the corporate culture at VW, placating feelings of anger and rebuilding a repository of trust that underscores the corporation's commitment to future ethical action may all be necessary steps for VW in the coming years.

As scandals unfold, corporations, like VW, should be responsive in the way they manage consumers' expectations about the corporation's culture and their commitment to engage in ethical business practices in the future. For transgressing corporations seeking to mitigate the residual effects of a perceived corrupt corporate culture (e.g., VW and the recent Wells Fargo banking scandal), our results suggest the importance of demonstrating a commitment to fostering an ethical corporate culture in the future. While these efforts are intrinsically important for helping to prevent future wrongdoing by the organization, it may also help to rebuild consumers' trust in the corporation. Additionally, research in crisis communication provides useful frameworks to analyze the characteristics of corporate mishaps and parallel response strategies—including the use of apology and proactive versus reactive responses—that corporations can employ to help protect themselves in the wake such events (Coombs, 2007).

Clearly, there are other factors also at work in shaping current VW owners' future behavioral intentions, including financial incentives, brand identification and loyalty

(Chapman et al*.,* unpublished; Creyer, 1997). Given research on consumers' willingness to patronize unethical corporations at reduced costs with the understanding that corporations are incurring a financial punishment (Creyer, 1997), we suspect that the estimated $10 billion USD included in the settlement for owner compensation will play an important role in determining owners' engagement with VW in the future (US EPA, 2016). Although managing the reactions of directly affected brand patrons may be more attainable through direct compensation, corporations might also consider monitoring the reactions of indirectly affected brand patrons, as well as the general public.

Because the present research is correlational and represents existing brand patrons' reactions to a single instance of corporate malfeasance, we are necessarily limited in our ability to make causal claims and generalizations to other instances of corporate wrongdoing. Study limitations also include the use of single-item measures to gauge primary study constructs, as well as the use of self-reported intentions to assess future brand engagement. However, we believe our findings provide practical and broad insight into how existing brand patrons respond to actual instances of unethical corporate behavior and the factors that may differentially shape consumers' reactions post-scandal. Future research is needed to fully address these limitations (e.g., expanded scale measures, empirical design) and understand the nature of consumers' beliefs about corporate culture as well as identify factors that may influence consumers' attributions of internal culpability as we define here (e.g., exposure to media coverage of a scandal, pre-existing corporate reputation). Extending the work conducted here to other instances of corporate wrongdoing (e.g., Wells Fargo banking scandal of 2016) would increase the generalizability of the observed effects.

Conclusion

The findings presented here further our understanding of how and to what extent corporate wrongdoing affects consumers' willingness to engage with companies after a scandal. Our findings suggest that individuals' beliefs about the role corporate culture plays in permitting or causing a scandal as well as personal proximity to the fallout both have powerful direct and indirect implications for consumers' reactions. Additionally, our research supports existing literature that suggests trust (i.e., expectations of future ethical action) and anger are important mediators of consumer-company relationships, particularly in the context of corporate malfeasance. These findings produce a number of practical insights, particularly for advocates, regulators and organizations seeking to better understand consumers' reactions to egregious, high profile unethical corporate actions that impact not only brand patrons but the general public as well.

Bridge to Chapter III

As discussed in Chapter I, this dissertation partly examines how different individual-level and contextual factors shape individuals' willingness to engage in overt forms of interpersonal interaction. In Chapter II, the results reveal how existing brand patrons, who experienced an unexpected collective action problem, responded to the Volkswagen emissions scandal. Specifically, variation in brand patrons' ascriptions of responsibility, either to 'a few bad apples' or 'corrupt corporate culture', predicted responses to corporate wrongdoing, including negative WOM (see Appendix B for separate analyses of individual items comprising the future engagement composite measure). In Chapter III, I shift from ascertaining what drives blame expressions of corporate actors (e.g., Volkswagen) to understanding how such expressions materialize

towards individual-level actors (e.g., anglers) in the context of recreational angling. In the

same vein, the theme of Chapter III remains focused on determining what motivates an

individual to sanction an agent who is perceived responsible for creating some form of

harm or violating a norm. However, in Chapter III, I consider individual's willingness to

impose social sanctions on their peers (in)appropriate angling practices. Specifically, I

examine how different individual-level and contextually salient (social) factors, such as

perceptions of efficacy and reputational concerns, predict anglers' past sanctioning

behavior and future sanctioning intentions.

CHAPTER III

PEER PRESSURE ON THE RIVERBANK: ASSESSING CATCH-AND-RELEASE ANGLERS' WILLINGNESS TO SANCTION OTHERS' (BAD) BEHAVIOR

<u>Introduction</u>

Catch-and-release (C&R) angling constitutes the majority of recreational angling activity, as ~60% of the world's 47.1 billion fish caught annually are released (Cooke & Cowx, 2004). As our understanding of the fate of fish released by anglers has grown over the past few decades, a stark pattern has emerged illustrating how variability in angling behavior (e.g., air exposure, handling) plays a key role in determining the outcome of the angling event for the fish (Arlinghaus & Cooke, 2009; Cooke & Schramm, 2007; Cooke et al., 2013a; Muoneke & Childress, 1994). While general and species-specific tenets for C&R best practices have been recommended to optimize the survival and biological fitness of angled and released fish (for review see Brownscombe, Danylchuk, Chapman, Gutowsky, & Cooke, 2017), a strong limiting factor to the realized conservation value of C&R angling is the extent to which recreational anglers are willing to accept, adopt and engage in appropriate (best) practices and refrain from harmful ones. Put another way, C&R angling is a tool that relies on individual-level human decision-making to achieve conservation and management goals (Cooke, Suski, Arlinghaus, & Danylchuk, 2013c; Fulton, Smith, Smith, & van Putten, 2011). Indeed, more broadly speaking, "conservation means behaviour" (Schultz, 2011).

Recreational C&R fisheries may be conceptualized as paradigmatic common pool resource dilemmas as competition for fish and the picture-perfect angling moment can fuel uncooperative and socially (as well as biologically) suboptimal angling behavior

(Hardin, 1986; Ostrom, 2000). Individual motivation for compliance may be further

attenuated by the lack of formal monitoring and enforcement capabilities common to

expansive recreational fisheries (Sutinen, 1993). Thus, the transition to and adoption of

C&R best practices will likely occur when the majority of recreational anglers

meaningfully share and hold similar beliefs and values (Arlinghaus, 2006b; Biel &

Thorgensen, 2007). Recent work by Chapman et al. (2018) and others suggest that one

underappreciated mechanism to facilitate the broader adoption of C&R best practices,

and ultimately, the cultivation of a shared conservation ethic, is anglers' willingness and

ablility to monitor and advocate for best practices within their angling community

(Granek et al., 2008). This is important because prior research indicates that various

forms of interpersonal communication, including informal social sanctions (e.g.,

admonishing bad angling behavior), can shift normative perceptions and shared values,

and, in turn, can increase cooperative behavior (Balliet, 2010; Cialdini, 2009; Ostrom et

al., 1992; Ostrom, 2000).

Interpersonal Communication and Cooperation

The importance of interpersonal communication, and social sanctioning in

particular, in fostering cooperative behavior and facilitating situation-appropriate social

norms has been illustrated in classic social dilemma and game theory experiments for

decades (Balliet, 2010; Balliet et al., 2011; Ostrom et al., 1992; Ostrom, 2000). In fact,

much of this research demonstrates that significant increases in cooperative behavior and

total yield occur when participants are permitted to communicate (e.g., administer

sanctions) between rounds of decision-making (Balliet, 2009; Ostrom et al., 1992). The

communication of topic-relevant information relayed to defectors (or cooperators) can

help establish social expectations and norms of cooperation (Ostrom, 2014) by realigning transgressors' behavior toward the acceptable norm (e.g., admonishment) or by reinforcing the appropriateness of a compliant action (e.g., praise). Nolan (2013) and others have extended this work in the context of environmental behavior, arguing that in order to achieve a culture of environmental conservation, concerned individuals must be willing to confront or sanction others' environmental transgressions (Maki & Raimi, 2016; Nolan, 2017; Swim & Bloodhart, 2013). For example, Swim and Bloodhart (2013) found that verbally admonishing individuals following elevator use increased the likelihood of subsequently using the stairs, while Schultz et al. (2007) demonstrated how impersonal expressions of disapproval can help above-average energy consumers reduce their consumption rates.

Although the effectiveness of social sanctions in buttressing cooperative behavior are well-known, it is unclear how or if these behaviors will manifest in the context of recreational C&R fisheries. Prior research indicates angler-to-angler interactions as a primary channel through which communication about responsible angling practices occurs (Nguyen et al., 2012), while exchanges over social media represent another avenue to signal one's commitment to best practices (e.g., #Keepemwet Fishing; Danylchuk, Danylchuk, Kosiarski, Cooke, & Huskey, 2018). Thus, there may be a clear opportunity to leverage preexisting communication channels among anglers. These oftentimes rudimentary and even transient interactions that exist between anglers can play a powerful role in shaping individual behavior and beliefs, particularly when expressing the approval or disapproval of others' actions or intentions. Nevertheless, realizing the potential benefits of angler-to-angler communication hinges on individuals'

willingness to engage with one another, yet research has only recently begun to examine the determinants of such action (Chapman et al., 2018; Maki & Raimi, 2016; Nolan, 2013; 2017).

Predicting Engagement

In recognizing the potential of interpersonal communication to cultivate and maintain the adoption of C&R best practices, Chapman et al. (2018) modeled anglers' intentions to sanction others in a golden dorado (*Salminus brasiliensis*) fishery on the Juramento River in Argentina. Results revealed that younger anglers who expressed higher environmental concern compared to others, who identified angling as important to their lifestyle, and who were more open to engaging in zero air exposure angling events were the most willing to admonish other anglers' C&R transgressions (Chapman et al., 2018). Left unexamined by Chapman et al. (2018) are two other sets of factors previously identified as potentially important drivers of sanctioning behavior: perceived efficacy and contextually salient social factors (Nolan, 2013). When considering the question of what may motivate recreational anglers to express disapproval or approval of others' [in]appropriate actions or intentions, prior research indicates that particular emphasis should be given to the explicit social implications of engagement (e.g., perceived norms) as well as the degree to which individuals perceive the result of these socially costly behaviors—sanctioning and C&R best practices—as effective in achieving desired conservation outcomes (Nolan, 2013).

One critical factor that may influence the degree to which anglers sanction others is whether anglers maintain the belief that cooperative behavior and ecological outcomes can be improved by sanctioning and/or through evidence-based C&R best practices,

respectively (Nolan, 2013; Norgaard, 2011). Research from a variety of fields suggests that individuals' willingness to take on a behavior is predicated on their perceived capacity to take action as well as their beliefs about the efficacy of the action in achieving desired outcomes (Bandura, 1986; Ajzen, 1991; Witte, 1992). Among a college sample, Nolan (2013) found that the perceived effectiveness of a sanctioning act significantly predicted individuals' willingness to impose a range of social sanctions on others' recycling behaviors. Thus, in the present context, if individuals perceive social sanctioning as an effective way to increase cooperative, evidence-based C&R angling behavior, they should be more willing to sanction. Likewise, a perception of evidence-based C&R best practices as an effective conservation angling practice in reducing threats to steelhead is also likely to increase sanctioning behavior.

Another factor that may influence individuals' willingness to sanction others in this context is a belief that their opinions about C&R best practices are shared by other anglers. Research on social norms reveals that people's behavior is often heavily influenced both by their understanding of what is socially acceptable (e.g., injunctive norms) and by what most other people are doing (e.g., descriptive norms; Cialdini, 2009). Social norms are instrumental in shaping environmental decisions (e.g., Schultz, 1999) and pro-social behaviors more generally (Krupka & Weber, 2009), and they have been recognized as influential in both the social dilemmas (Ostrom, 1990; Biel & Thogersen, 2007) and recreational fisheries literatures (van Poorten, Arlinghaus, Daedlow, & Haertel-Borer, 2011; Stensland, Aas, & Mehmetoglu, 2013; Bova, Halse, Aswani, & Potts, 2017; Danylchuk, Tiedemann, & Cooke, 2017). Thus, we anticipate that anglers who perceive that the majority of other anglers are aware of and/or use C&R best

practices should express a higher propensity to sanction. Sanctioning propensity may also be predicted by a somewhat distinct social influence: anglers' professed concern over their reputation within the angling community. Status motives have been demonstrated to increase pro-environmental behaviors, especially when behaviors are publicly observable and costly (Griskevicius, Tybur, Van den Bergh, 2010). Provided that interpersonal sanctioning offers individuals a means to publicly express their commitment to C&R best practices (i.e., either by educating transgressors or else praising cooperators), anglers highly concerned about their own reputation should be more motivated to engage. In order to broaden our understanding of individuals' motivations to sanction for conservation, the factors introduced here and those previously identified by Chapman et al. (2018) and others were examined in the context of a highly revered, wild steelhead C&R fishery located in the Bulkley River in British Columbia (BC), Canada.

Study Site and Species

The Bulkley River has one of the most iconic wild steelhead fisheries remaining in the world, with an average run size of 20, 873 steelhead (MFLNRO, 2016). From late August to early November, anglers from across the world converge on the river for the opportunity to angle for wild steelhead (*Onocorhynchus myskiss*). Given their physical characteristics, steelhead are highly revered by recreational anglers for their size (e.g., upwards of 120 cm, 25 kg) and formidable fight. The proximity of the Bulkley River to roadways and population centers, non-resident license access, dramatic scenery and wild steelhead runs, has situated the river, or 'steelhead paradise', as one the most angled rivers in BC (MOE, 2010). During the 2010-2011 season, roughly 12,200 angler days were logged during the season (Beere, 2014). Various organizations are collectively

responsible for managing the river, while access is open to resident, non-resident and First Nation peoples, whom secure an aboriginal right to harvest, primarily salmon, for dietary, social and ceremonial purposes on their territory (Muckle, 2007). For all other recreational anglers, provincial law has mandated since 1997 that all angled wild steelhead must be released (MFLNRO, 2016). Although co-migrating salmon are primarily harvest-oriented (e.g., catch limits), C&R angling is imposed as a regulatory tool for steelhead in order to maximize long-term socio-economic opportunity while minimizing mortality (MFLNRO, 2016).

Given the species' high vulnerability to human-induced changes to the environment, including habitat degradation (NRC, 1996), fishing pressure and fisheries interactions (Stewart & Lewysnky, 1988), native (wild) populations of steelhead have drastically declined (NOAA, 2016; Kendall, Marston, & Klungle, 2017). Native steelhead populations of the Skeena watershed (e.g. Bulkley) stand in contrast to the fate of the once iconic steelhead runs of the United States Pacific Northwest (PNW), which are now closed to recreational C&R angling due to population collapses. Twelve distinct populations of steelhead identified in the US PNW are listed as either threatened or endangered under the Endangered Species Act, or a as species of concern under the National Marine Fisheries Service (NOAA, 2016). Thus, sustaining the long-term viability of the Bulkley River's wild steelhead fishery has significant economic and socio-cultural value for both present and future stakeholders.

The influence of C&R angling and angler behavior are of primary concern on the Bulkley River, as is the sustainability of the steelhead population. In 2013, the Bulkley River Angling Management Plan (BRAMP) was introduced to address longstanding

concerns of overcrowding, quality of experience, abundance of jet boat use and general lack of angler etiquette (Dolan, 2008; MOE, 2010; MFLNRO, 2016). Upon recommendations from the plan, the province adopted regulations that imposed new time and area restrictions on anglers, particularly non-resident anglers (e.g., weekday access unless guided). Despite these regulations, concerns over access, pressure and etiquette remain contentious in the region.

Present Research and Objectives

The present study examines individuals' self-reported sanctioning propensity within the context of an internationally renowned wild steelhead C&R recreational fishery and in particular illustrates the value of identifying how and to what extent various social-psychological factors and angler characteristics shape engagement. We draw on recent domain-specific (i.e., Chapman et al., 2018) and domain-general (i.e., Nolan, 2013) research to guide item selection in constructing the survey instrument used. In addition to items that emerged as important predictors in the preliminary Chapman et al. (2018) work—age, years fishing, management familiarity, fishing significance, and anglers' concern about fishery—we also include contextually salient social factors (e.g., reputational concern, normative perceptions) and perceptions of efficacy. Based on prior research (Griskevicius et al., 2010; Nolan, 2013), we suspect that recreational anglers' sanctioning propensity will largely be determined by their perceptions of others' beliefs and practices, a concern for their reputation, and the extent to which they believe that cooperation and/or conservation value is likely to increase as a result of both interpersonal sanctioning and implementation of evidence-based C&R best practices.

The present research also focused on multiple context-dependent predictors that we anticipate would influence recreational anglers' sanctioning propensity in this C&R recreational fishery. These included relevant angler characteristics (e.g., age, fishing experience, fishing avidity, angling club membership; Fisher, 1997; Gigliotti & Peyton, 1993; Oh & Ditton, 2006), as well as key social-psychological constructs, such as perceptions of angler threat, familiarity of management practices and concern for steelhead populations (Stern, Dietz, Abel, Guagnano, Kalof, 1999; Nguyen et al., 2013). The present research also examined recreational anglers' self-reported *past* sanctioning behavior, which has not previously been studied. Thus, the present study investigated both anglers' future intentions as well as their engagement in such behavior in the past.

Method

Sampling Frame and Distribution

The target population included recreational anglers age 18 and older who were active in the Bulkley River steelhead fishery (i.e., angled at least one season). Survey recruitment and distribution occurred from September 27 to November 30, 2016 and coincided with a systematic research study that examined how wild steelhead respond to C&R angling events, which aimed to identify species-specific best practices (Twardek et al., 2018). Opportunistic in-field intercept sampling, local social media and fishing reports were used to recruit respondents. Anglers were recruited to participate at popular walk-in fishing sites, boat launches and a fishing outfitter located in Smithers, BC. Respondents who completed the survey in-person used a portable electronic tablet. Due to time restraints and in recognition of anglers' primary motivation to be on river, an identical online survey was distributed via a regional non-profit organization's Facebook

page and a local online fishing report. The survey was administered using the QuestionPro platform. The study was approved by the University of Massachusetts Amherst Institutional Review Board (Protocol ID: 2016-3318).

Survey Instrument and Key Study Measures

The questionnaire included a series of close- and open-ended questions investigating a range of social-psychological constructs and angling segmentation characteristics of Bulkley River steelhead anglers. Survey item selection was broadly informed by Chapman et al. (2018), with new measures generated to assess perceived efficacy, social influences and items specifically relevant to the Bulkley River steelhead fishery.

Eight items assessed respondents' past sanctioning behavior and future sanctioning intentions. Exploratory principle components analysis revealed a two-component structure. As expected, the four items that measured anglers' frequency of *past sanctioning behavior* over the past angling season hung together and were combined into a composite measure ($\alpha = .78$; e.g., "Made a comment on social media (e.g., Facebook, Twitter, Instagram) addressing an individual's inappropriate post-catch handling practices"; 1 = *never*, 7 = *all the time*). The four items that assessed *future sanctioning intentions* also formed a reliable composite measure ($\alpha = .74$; e.g, "If researchers were able to develop species-specific catch-and-release best practices for Bulkley River Steelhead based on solid scientific research, would this make you more or less likely to approach and educate others who do not adopt Steelhead specific catch-and-release best practices?"; 1 = *much less likely*, 4 = *neither less nor more likely*, 7 = *much more likely*). It is important to note that while past sanctioning was assessed on the

recalled frequency of prior engagement in such actions, future sanctioning intent was measured conditional on evidence-based best practices. As a result, caution should be taken in making direct comparisons between respondents' responses to these two sets of related yet distinct items.

Seven items gauged anglers' perception of threats to Bulkley River steelhead (1 = *not at all*, 7 = *extremely)*. Exploratory principle components analysis revealed a three-factor solution, however one item was dropped from the first factor for not meeting the critical loading value (e.g., Illegal harvesting'). The factors included (1) angler threat (e.g., "Overfishing from recreational anglers", "Inappropriate angling and handling practices"), (2) human-induced environmental threats (e.g., "Impacts of climate change", "Habitat degradation and pollution from industrial activities") and (3) other catch threats (e.g., "Overharvesting [bycatch from commercial salmon fishing]", "Gillnetting practices"). Given our interest in predicting anglers' willingness to impose sanctions on others' potentially harmful handling practices, only *perceived angler threat* was included in final analyses (r = .565). Full item descriptions, descriptive statistics, zero-order pairwise correlations, exploratory principle components analyses assessing sanctioning propensity and perceptions of threat are reported in the Supplementary Information.

One item assessed level of *perceived concern* for steelhead populations compared to other anglers ("Compared to most recreational anglers, would you say that you are less or more concerned about the Bulkley River Steelhead population?"; 1 = *much less concerned,* 4 = *neither less nor* more; 7 = *much more concerned*). A single item measured self-reported *management familiarity* ("How familiar are you with management techniques and approaches used to make decisions about the Bulkley River

Steelhead fishery?"; 1 = *not at all familiar*, 7 = *extremely familiar*). Three items assessed

anglers' belief in science (e.g., evidence-based C&R practices). A three-item composite

measure for *belief in science* was calculated (α = .88; e.g., "How confident are you that

research-based catch-and-release best practices can help maintain and preserve Bulkley

River Steelhead populations?"; 1 = *not at all confidence*, 7 = *extremely*). One item

assessed the importance of fishing to anglers' lifestyle (e.g., "How important is

recreational angling as part of your lifestyle?"; 1 = *not at all important*, 7 = *extremely*

important)

Reputation concern was assessed with two items and averaged together to create a

single composite measure (*r* = .462, e.g., "Are you concerned that other recreational

anglers might view you negatively if you inappropriately handled a steelhead post-

catch?"; 1 = *not at all concerned*, 7 = *extremely concerned*). Two items assessed anglers'

normative perception of the pervasiveness of C&R best practices within the Bulkley

River steelhead fishery. Respondents were asked to indicate the percentage of anglers

(e.g., 0-100 percent) who they believed know about steelhead C&R best practices as well

as the percentage of anglers who they believed currently practice C&R best practices.

The two-items were averaged together to create a composite measure of *normative*

perception (*r* = .755). Respondents also indicated the extent to which they perceived

sanctioning as effective. A single item measured *perceived sanctioning efficacy* (e.g., "I

feel that I can help protect steelhead populations by informing anglers that their post-

catch handling practices might impact steelhead well-being."; 1 = *strongly disagree,* 4 =

neither disagree nor agree, 7 = *strongly agree*). Finally, respondents indicated their age

(continuous), years spent fishing on the Bulkley River (continuous), their country of

residence (Canadian vs. non-Canadian) as well as whether or not they belonged to an

angling club (yes or no).

Analytical Approach

Two ordinary least squares (OLS) linear regression models were run to predict

anglers' past sanctioning behavior and future sanctioning intentions. Model 1 included a

subset of relevant predictors highlighted in Chapman et al. (2018), as well as individuals'

membership to angling clubs and/or organizations, which has previously been identified

as a useful angler segmentation characteristic (Gigliotti & Peyton, 1993). Model 2

consisted of the same parameters, plus the variables identified through extant research in

other fields as potentially critical determinants of anglers' sanctioning behavior and

intentions (e.g., perceptions of efficacy). Parameter characteristics are highlighted by *lmg*

relative importance, a calculation of the contribution of each parameter in the regression

model that reflects the partitioning of the model's R^2; higher *lmg* metrics indicate greater

contribution to the R^2 (Grömping, 2007). Model quality and comparison are indicated

with Akaike information criteria (AIC; Akaike, 1973). To address for potential model

overfitting, least absolute shrinkage and selection operator (LASSO, Tibshirani, 1996)

linear regression was also performed (see Supplementary Information in Appendix C).

All analyses were performed in R version 3.3.1 (R Core Team, 2016). Additional survey

materials can be accessed at https://osf.io/64c3d/.

Results

Survey Sample Description

A total of 197 surveys were completed with a 65.2% completion rate. The

majority of participants completed the survey online (89.8%) compared to on tablets in

the field (10.2%). In addition to basic demographic and angling characteristics presented

in Table 7, specific information related to angling experience, self-reported knowledge,

and communication behaviors were collected. Most anglers reported that the majority of

their recreational angling is C&R (97.3%, 5 or above) and voluntary (98%, 5 or above).

Further, 93.3% of participants indicated a high level (5 or above) of understanding of

general C&R best practices and species-specific C&R best practices for steelhead (98%;

5 or above). Additionally, 55.4% of participants reported regularly communicating with

friends or acquaintances about C&R practices for steelhead in the past few months, while

52.8% reported that other recreational anglers have informed their angling practices (5 or

above). Only 22.8% (5 or above) of respondents indicated that they use social media

platforms (e.g., Facebook, Instagram, Twitter) to share C&R-related experiences.

Table 7. Socio-demographic and angling characteristics for Bulkley River anglers

Age (n=194)		M=51.84, SD=14	Yrs fishing Bulkley (*n*=197)	M=13.02, SD=10.64	
Gender (*n*=196)		%	Country of residence (*n*=184)		%
Female	13	6.6	Canada	114	62
Male	182	92.9	Other	70	38
Prefer not to say	2	1.0	Primary handler post-catch (*n*=197)		
Gear type (*n*=197)			Yes	179	90.9
Fly fish	170	86.3	No	18	9.1
Conventional tackle	5	2.5	Education (*n*=191)		
Use both	22	11.2	Grade 8 or less		
Member of angling club (*n*=194)			Some high school	2	1.0
Yes	92	47.4	Graduate high school	12	6.3
No	102	52.6	Some college or tech. school	62	32.5
River license access (*n*=196)			Graduate college	69	36.1
Guided lodge access	14	7.1	Post-graduate	46	24.1
Non-canadian unguided access	59	30.1	Time on Bulkley this season (*n*=195)		
British Columbia resident	95	48.5	A few days	28	14.4
Non resident canadian access	19	9.7	A week	58	29.7
Other	9	4.6	A couple weeks	56	28.7

Yrs fishing rod and reel (*n*=195)			A month	15	7.7
Less than a year			Full season	38	19.5
1-5 years	3	1.5	**Angled for steelhead in other locations**		
6-10 years	2	1.0	California	27	
11-15 years	9	4.6	Great Lakes	27	
16-20 years	5	2.6	Idaho	45	
21 or more years	176	90.3	Oregon	86	
			Washington	84	

Descriptives

Participants reported low engagement in past sanctioning behavior ($M = 3.21$, $SD = 1.38$), but relatively strong future intentions to sanction others ($M = 4.97$, $SD = 1.20$). Perceived concern for steelhead populations was high ($M = 5.79$, $SD = 1.05$), while participants' familiarity with management practices ($M = 4.29$, $SD = 1.66$) and belief in science or evidence-based C&R angling were slightly above the midpoint ($M = 4.91$, $SD = 1.54$). Perceptions of angler threat ($M = 4.57$, $SD = 1.40$), reputation concern ($M = 4.53$, $SD = 1.88$), and normative perception ($M = 51.12$, $SD = 22.52$) were all similarly endorsed. Participants reported strong perceptions of sanctioning efficacy ($M = 5.26$, $SD = 1.47$). For importance of fishing to anglers' lifestyle ($M = 6.55$; $SD = .67$), 65% of respondents indicated 'very important'. Due to severe skew and ceiling effect, this item was removed from further analysis. Additionally, analyses revealed no observable difference among anglers whom completed the survey in the field versus online; thus, this factor was not considered in subsequent analyses. Zero-order pairwise correlations among all key variables are reported in Supplementary Information.

Model Results

Results of the linear regression analyses are presented in Table 8. For past sanctioning intentions, Model 1, which included a subset of social-psychological and angling segmentation parameters, explained 23% of the variance (adj. $R^2 = 0.20$). Concern for steelhead populations contributed the most to the model's R^2 ($lmg = 0.067$) compared to other factors, followed by age ($lmg = 0.062$) and perceived angler threat ($lmg = 0.039$). Model 2 accounted for 41% (adj. $R^2 = 0.37$) of the variance in past sanctioning behavior. Perceived sanctioning efficacy emerged as the predictor with the greatest relative importance ($lmg = 0.121$), almost double the second largest contributor in age ($lmg = 0.073$). In addition, reputation concern ($lmg = 0.061$), perceived concern ($lmg = 0.044$), and management familiarity ($lmg = 0.033$) emerged as significant predictors. Model comparison using AIC indicated that Model 2 ($AIC_{past2} = 500.2$) was the best fitting model for past sanctioning behavior compared to Model 1 ($AIC_{past1} = 534.9$).

Table 8. Results of linear regression predicting past sanctioning behavior and future sanctioning intentions

Model	Predictor	Past Sanctioning Behavior				Future Sanctioning Intentions			
		b	t	p	lmg	b	t	p	lmg
1	Age	-0.029	-3.66	.000	.062	-0.006	-0.90	.370	.002
	Perceived concern	0.345	3.48	.001	.067	0.217	2.46	.015	.052
	Angler threat	0.179	2.36	.020	.039	0.320	4.71	.000	.137
	Management familiarity	0.094	1.42	.157	.026	0.008	0.14	.892	.002
	Yrs Bulkley	0.012	1.15	.253	.009	0.006	0.64	.523	.004
	Country of residence	0.333	1.55	.122	.025	0.152	0.80	.428	.006
	Club membership	0.094	0.46	.645	.002	0.201	1.10	.271	.010
		$R^2 = .23$; Adj. $R^2 = .20$ df (7,152)				$R^2 = .21$; Adj $R^2 = .18$ df (7,152)			
2	Age	-0.032	-4.45	.000	.073	-0.009	-1.59	.114	.005
	Perceived concern	0.241	2.62	.010	.044	0.067	0.90	.371	.026
	Angler threat	0.003	0.03	.973	.016	0.120	1.87	.063	.064

Management familiarity	0.134	2.23	.027	.033	0.041	0.84	.403	.005
Yrs Bulkley	0.013	1.40	.165	.010	0.009	1.15	.252	.005
Country of residence	0.273	1.41	.160	.022	0.097	0.62	.540	.005
Club membership	-0.114	-0.61	.540	.002	0.020	0.14	.893	.004
Sanction efficacy	0.311	4.60	.000	.121	0.408	7.39	.000	.256
Belief in science	0.127	1.76	.081	.026	0.066	1.13	.262	.044
Norm perception	0.002	0.36	.718	.002	-0.004	-1.09	.277	.012
Reputation concern	0.148	2.79	.006	.061	0.134	3.10	.002	.065
	$R^2 = .41$; Adj. $R^2 = .37$				$R^2 = .49$; Adj. $R^2 = .45$			
	df (11,148)				df (11, 148)			

Note. Regression analysis was completed on complete pairwise observations (n = 160). Country of residence referent (1 = Canada; 0 = non-Canadian); Club membership referent (1 = Yes; 0 = No).

In contrast to past sanctioning behavior, the models predicting future sanctioning intent revealed a different structure, particularly for Model 2. Model 1 accounted for 21% of the variance in future sanctioning intentions (adj. $R^2 = 0.18$). Both perceptions of angler threat (*lmg* = 0.137) and perceived concern (*lmg* = 0.052) emerged as significant predictors of future intent. Compared to Model 1, Model 2 explained 49% of the variance (adj. $R^2 = 0.45$) in future sanctioning intentions. Perceived sanctioning efficacy contributed over half of the model's R^2 (*lmg* = 0.256), followed by reputation concern (*lmg* = 0.065) and perceived angler threat (*lmg* = 0.064). AIC model comparison indicated that Model 2 ($AIC_{future} = 435.2$) out performed Model 1 in predicting future sanctioning intentions ($AIC_{future} = 497.3$).

Discussion

Human decision-making can present pervasive challenges to natural resource managers due to negative impacts on ecosystems and species, yet resource users can also contribute positively to conservation management outcomes in unexpected ways. In the present research, we examined one potentially powerful pathway to maximize the

conservation value of the C&R management approach: leveraging interpersonal communication, and social sanctioning in particular, to encourage uptake and proliferation of C&R best practices. Consistent with our predictions, greater perceived capacity to influence the angling practices of others and professed concerns about one's own reputation were strongly predictive of both past and future sanctioning. In fact, perceptions of sanctioning efficacy contributed over half of the predictive power of the model when predicting future sanctioning intentions. These results are consistent with past work demonstrating the effect of social influence on behavior (Bamberg & Möser, 2007) and further highlight the role that anglers have to play in perpetuating the adoption of C&R best practices.

One of the more intriguing findings of the present work is the high level of endorsement we observed for future sanctioning behavior. This is particularly interesting given the way in which future sanctioning items were framed: anglers reported their intention to act relative to a conditional, if-then scenario that communicated the existence of and subsequent transgression against an evidence-based C&R best practice. Based on prior research suggesting that the presence of a formal sanctioning system (e.g., mandatory recycling program) may support the informal sanctioning of non-cooperators (Nolan, 2017), these preliminary but suggestive findings suggest that future research should examine whether the presence (or knowledge of) evidence based C&R best practices (or formal policies) influences anglers' willingness to sanction non-compliant anglers. In addition, though it is clear that the future sanctioning items were endorsed more strongly than the past sanctioning items, we cannot draw strong inferences based on the present work because the two sets of items were (intentionally) constructed in

different ways. Still, the observed differences suggest a need for additional future exploration using parallel measures.

Although recreational fisheries are context-dependent and function at the intersection of site-specific socio-cultural, economic, political and ethical factors (Arlinghaus, 2006b), our results suggest that more generalizable social psychological factors and angler segmentation characteristics play a critical role in shaping anglers' willingness to engage in behaviors that may promote C&R fisheries health. The results highlighted here suggest that in addition to perceptions of concern and typology (e.g., age), contextually salient social factors (e.g. reputation) and perceptions of efficacy may also be critically important in shaping anglers' sanctioning propensity. Our findings may be particularly useful to fisheries managers seeking to identify 'soft' approaches that may increase the involvement of anglers in the conservation management process and achieve conservation objectives.

What might this look like in practice? First, managers should identify context-appropriate ways to increase the social desirability of adopting C&R best practices. Because anglers' propensity to sanction is partially explained by their own professed concerns about their reputation, fisheries managers could increase the saliency and public visibility of "doing or communicating the right thing". The promotion of such "*see something, say something*" campaigns or programs could be enticing to individuals who are both concerned about anglers' threat to steelhead and their own reputation within the community. Still, concerns over the dynamics of the interaction need to be addressed, including the associated real and perceived costs (e.g., social and physical) that may deter engagement (Steentjes et al., 2017). Perhaps more importantly, fisheries managers should

73

be encouraged by our results suggesting that anglers' efficacy beliefs strongly motivate their future sanctioning intentions. Thus, encouraging individuals to advocate for C&R best practices—and letting them know that their voices matter—within their angling communities may go a long way towards increasing cooperative angling. Given the lack of monitoring and enforcement capabilities common to recreational fisheries (Sutinen, 1993), this belief and alternative framework offers an encouraging and cost-effective means to promote valuable and necessary conservation practices.

Together, the various forms of interpersonal communication highlighted here could help overcome notable human dimensions obstacles nested within recreational fisheries (and other conservation settings more broadly), including the lack of shared values (Arlinghaus, 2006b) and feelings of personal inefficacy to effect positive change. Although it is important to consider traditional avenues to accurately foster anglers' knowledge and adoption of C&R best practices, various forms of interpersonal communication may enable anglers to develop a deeper understanding and appreciation of C&R best practices, by conveying strong social norm messages about what is both socially appropriate and commonly practiced by the greater angling community. Fortunately, channels between anglers represent a dominant communication pathway (Nguyen et al., 2010) and furthermore, social networks are pervasive in recreational fisheries. Angling clubs, online forums and social media platforms constitute an array of existing arenas through which individuals can spread critical conservation information and create a context wherein the consequences of inappropriate angling behavior carry salient, potentially costly, social implications. Given the well-established gap between intentions and actual behavior (for review see Sheeran, 2002), it remains unclear whether

anglers' observed endorsement of sanctioning in the future will translate into actual behavior. This remains an important question for future research, and assessing the practical implications of interpersonal sanctioning in the context of conservation management.

With the popularity of recreational angling increasing worldwide and the associated negative impacts of anglers' handling practices, identifying and facilitating meaningful opportunities for anglers' direct involvement in the conservation process could help reduce stressors to fish (Cooke et al., 2013b). Such alternative, participatory-based institutions, ranging from anglers' direct involvement in advocacy and monitoring to research and management design, have been shown to positively impact fisheries (Granek et al., 2008). While continuing to examine what regulates anglers' propensity to engage is important, further research is needed to explore the downstream implications of such engagement, including both influences on the receiver (e.g., changes in behavior) as well as the communicator (e.g., impacts to reputation and perceived self-efficacy). In particular, future research should examine what messages are most effective in inducing cooperation, how these processes may influence anglers' sense of stewardship across fisheries, and whether sanctioning may spillover into other forms of engagement. There is also a clear and pressing need to examine the dynamics uncovered here in other conservation and resource management contexts (e.g., forestry, hunting).

Conclusion

In isolation, C&R best practices and other user-management guidelines intended to mitigate humans' negative impacts on ecological systems are likely to fail as people rarely have the incentive to act alone. While C&R angling offers recreational fisheries

managers a sustainable alternative to the traditional catch-and-harvest model, maximizing

the conservation potential of this approach is largely dependent on anglers' voluntary

adoption of C&R best practices. Forms of interpersonal communication that can leverage

the power of social norms and social influence—including social sanctions—offer a

potentially powerful yet low-cost avenue through which to increase cooperative behavior

and persuade individuals to act in socially responsible ways. Although limited research

has explored this role for resource-users to date, managers should consider how this

framework manifests and can be applied to other conservation management contexts,

particularly those that rely on voluntary compliance and which operate with limited

enforcement capabilities.

Bridge to Chapter IV

Chapter II and III present results from correlational research examining

individuals' willingness to punish others' unethical or inappropriate actions, either

towards corporate actors or at the individual level. Whereas Chapter II highlights the role

attributions of blame play in shaping consumer responses following corporate

misconduct, Chapter III reveals how perceptions of efficacy and concerns about one's

reputation influences recreational anglers' willingness to impose social sanctions on

others' inappropriate fishing practices. In Chapter IV, I shift from understanding what

drives individuals' willingness to sanction normative transgressions and instead, assess

what the prevailing norms are with respect to handling practices in the context of catch-

and-release angling. Indeed, if individuals are expected to monitor and enforce the

actions others, there must be a clear and shared understanding of what constitutes socially

acceptable and unacceptable behavior. Thus, in Chapter IV I explore anglers' personal

and normative beliefs towards catch-and-release handling practices and angling-related imagery shared on social media that differentially depict how a fish is held and exposed to air post-catch. I further examine how perceptions of other recreational anglers' agreement with such practices (e.g., normative estimations) relates to an individual's own beliefs, whether one's perceptions of others' beliefs are accurate or inaccurate, and whether differences emerge between relevant subpopulations within the angling community (e.g., fly fishing versus conventional tackle).

CHAPTER IV

FISHING FOR A PHOTOGRAPH: EXPLORING ANGLERS' NORMATIVE PERCEPTIONS OF CATCH-AND-RELESE IMAGERY

<u>Introduction</u>

Catch-and-release (C&R) angling is on the rise across the world (Cooke & Cowx, 2004). Either performed in compliance with mandated regulations or practiced voluntarily, C&R angling operates on the premise that fish experience minimal impacts upon release (Cooke & Cowx, 2004). Although often employed as a conservation management tool, recent research has systematically documented how aspects of the angling event can result in negative consequences for the released fish (Cooke et al., 2013a), including physiological and behavioral impairment (Bower, Danylchuk, Brownscombe, Thiem, & Cooke, 2016; Danylchuk et al, 2014; Lennox et al., 2015) and increased susceptibility to post-release predation (Danylchuk et al, 2007). Provided anglers' behavior and decision-making partly determines the biological fitness of an angled and released fish, maximizing the conservation value of C&R is largely contingent on the adoption of scientifically-validated capture and handling techniques that reduce fitness consequences (Brownscombe et al., 2017).

Challenges to anglers' adoption of and engagement with prescribed best practices are not insignificant, particularly in a recreational context where behavior is seldom formally or easily monitored and enforced (Green & McKinlay, 2009; Sutinen, 1993). Even with mandated regulations, non-compliance has been a persistent problem among recreational fisheries worldwide (Arias & Sutton, 2013; Blank & Gavin, 2009; Smallwood & Beckley, 2012). In the absence of regulation and enforcement, the widespread adoption of C&R best practices is more likely to occur when beliefs about

appropriate capture and handling practices are mutually endorsed and performed by the

broader angling community (Bova et al., 2017; Cialdini, 2009; Ostrom, 2014). Thus, the

accurate interpretation of socially accepted standards of practice—social norms—is

critical in guiding situational and/or culturally appropriate behavior (Cialdini, 2009;

Rogers et al., 2018). However, if prevailing or perceived social norms conflict with

scientifically-validated best practices, anglers may be inclined to engage in practices that

result in suboptimal outcomes for angled and released fish. Given the large influence of

social norms on behavior and decision-making (Cialdini, 2009), important questions

remain with respect to what post-catch handling practices anglers personally and

normatively perceive to be appropriate, and whether one's own beliefs align with the

broader angling community and scientifically-validated tenets. Understanding how

anglers collectively view capture and handling practices, particularly those concerning

whether and how a fish should be held and exposed to air post-catch, could hold

important outreach implications for conservation managers and practitioners seeking to

encourage the adoption of best practices.

Among other aspects of the angling event, one of the key determinants impacting

how fish respond post-catch involves the amount of time they are exposed to air

(Brownscombe et al., 2017; Suski et al., 2007). Fish are removed from water for hook

removal, but also for the purpose of documentation (e.g., photography). Concurrent with

the advent and rise of social networking platforms (e.g., Twitter, Facebook, Instagram),

an increasingly common behavior among anglers as well as angling-related companies is

to photograph and share images of individuals alongside their catch on social media.

Although it is unclear how exposure to social media images impacts people's beliefs and

attitudes, it is likely that such imagery conveys normative information about the prevalence of certain handling and social media sharing practices within the community (e.g., Fournier, Hall, Ricke, & Storey, 2013; Litt & Stock, 2011).

The diversity and breadth of the recreational angling community (Fisher, 1997) makes it difficult to discern what constitutes prevailing social norms relative to different handling practices, particularly those dealing with whether and how a fish should be held and exposed to air post-catch. The present chapter addresses this issue by exploring recreational anglers' personal and normative beliefs (e.g., perceptions of other anglers' beliefs) towards handling practices and social media images that differentially depict how a fish is held and exposed to air post-catch. Specifically, I present findings that reveal how perceptions of other recreational anglers' agreement with such practices relates to an individual's own beliefs, and how one's perceptions of others are often inaccurate.

Catch-and-Release Angling and Social Media

Concurrent with the rise of social media platforms, such as Facebook, Instagram, and Twitter, visual imagery (i.e., photographs) has become an increasingly popular medium and channel for people to share their experiences (Whiting & Williams, 2013), promote desired social identities (Barker, 2009; for review see Kuss & Griffiths, 2011) and, for companies, a way to lure consumers (Ashley & Tuten, 2014; Murdough, 2009). For instance, Instagram, the main mobile photo-sharing network, has emerged as a popular online platform worldwide with over one billion active monthly users (Clement, 2019). For recreational anglers, social media platforms, including Instagram, have developed into online resource, enabling anglers not only to document and boast pictures of themselves alongside their catch, but also to gain access to other anglers' experiences,

beliefs, and angling-related information (Kuss & Griffiths, 2011). As of June 2019, there were 3,291,297 images registered with the hashtag #catchandrelease on the platform, which depict different aspects of a C&R angling event.

The use of social media for documenting C&R-related imagery has been a topic of debate among the angling community. Popular media, among other outlets, has acknowledged concerns among the angling community regarding the disclosure of secret fishing locations and the pervasiveness of C&R images portraying practices that do not match scientifically-validated best practices (e.g., elongated air exposure; Danylchuk et al., 2018; Holson, 2018). One of the significant impacts of immediate mass communication provided by social media is that it can reveal otherwise difficult to access information about others' behaviors and beliefs (Leonardi, 2014). Although such social exchanges can be a source for good, the promulgation of images depicting practices that conflict with scientifically-validated capture and handling tenets may communicate counterproductive information to the angling community. Indeed, beyond the immediate physiological consequences of removing a fish from water, sharing images of air exposed fish may convey suboptimal normative messages to others that such practices are generally accepted and prominent among the angling community (e.g., Litt & Stock, 2011).

Out of concern for the proliferation of air exposed fish on social media and how fish are being handled generally, the Keepemwet Fishing campaign (KWF; Danylchuk et al., 2018) has led a grassroots movement to disseminate information on best practices as well as to transition the norms that govern online sharing of photographs showing the outcome of a C&R angling event. To achieve these goals, KWF informally introduced

81

the '#keepemwet' hashtag as a way to articulate the best practice of minimizing air

exposure by using an easily discernable and actionable phrase (Danylchuk et al., 2018).

The use of the #keepemwet hashtag on social media sites has increased steadily since

2013; Danylchuk et al., 2018). The campaign has also sought to model appropriate

practices. For instance, images (and handling practices) promoted on the campaign's

social media page tend to display images of fish either partially submerged in water or

else photographed entirely underwater.

In addition to scientifically-validated concerns about the way fish are being

handled post-catch, either for the purpose of documentation or not, trepidations about the

impact of C&R photographs are not misplaced. Visual imagery, including photographs,

can promote issue engagement, but also can convey information that may undermine both

ecological and societal outcomes (Chapman, Corner, Webster, & Markowitz, 2016;

O'Neil & Nicholson-Cole, 2009; O'Neill & Smith, 2014). Recent research has explored

how people think about and engage with photographs depicting different aspects of

climate change, including images related to causes, impacts, and solutions (Chapman et

al., 2016). Distressing photographs (e.g., natural disasters and melting ice) have been

shown to prompt strong negative reactions, including feelings of hopelessness that further

undermine individuals' willingness to take action (O'Neill & Nicholson-Cole, 2009).

Perhaps more importantly, however, is whether and how the circulation of C&R-related

imagery online impacts anglers' normative perceptions about what most recreational

anglers do and approve of.

The Importance of Social Norms

For a recreational context primarily dependent on voluntary compliance, understanding the role and impact of social norms is paramount. Social norms represent a system of shared meanings and beliefs that can guide situation-specific behavior (Cialdini, 2009; Lapinski & Rimal, 2005). Descriptive norms are defined as people's perceptions about what most others do, whereas injunctive norms refer to perceptions about what is socially approved of behavior (Lapinski & Rimal, 2005; Cialdini, 2009). Descriptive and injunctive norms can exert a strong influence on behavior, particularly when aligned and salient in the decision-making context (Cialdini et al., 1990; Kallgren, Reno, & Cialdini, 2000). For instance, if individuals hold the belief that most people don't litter and are simultaneously presented with clear injunctive signals that do not condone littering, an individual is less likely to litter (Cialdini et al., 1990). Much research has demonstrated how descriptive norms are an important predictor of behavior and decision-making. People are prone to follow the actual or perceived majority, especially when the injunctive norm presents conflicting information or is relatively ambiguous (e.g., Schultz et al., 2007; Smith et al., 2012).

The development of perceptions about what others do and approve of is facilitated by social interaction. People infer descriptive norms either directly or indirectly by observing the prevalence (or rarity) of a given action or belief (e.g., modeling, opinion polls; Hogg & Reid, 2006; Lapinski & Rimal, 2005). Although individuals may implicitly infer injunctive norms based on the frequency of engagement, explicitly understanding what others approve or disapprove of must be made salient through interpersonal communication (Lapinski & Rimal, 2005). Thus, the direct observation of

other anglers' handling practices is likely to reveal descriptive information concerning how most other anglers handle fish post-catch. Images of post-catch C&R angling posted to social media may also contribute to anglers' perceived norms around handling practices (Litt & Stock, 2001; Fournier et al., 2013). For instance, recent research examining adolescents risk cognition demonstrates that individual's normative beliefs are susceptible to descriptive norm information conveyed on social media (e.g., Litt & Stock, 2011). In an experimental study, researchers manipulated the descriptive norm by adjusting the ratio in which participants viewed alcohol-related content or non-alcohol related content in Facebook profiles (e.g., imagery, text) of similarly aged students (e.g., 3:1 profiles with alcohol versus no alcohol, or vice versa). Participants who observed a majority of Facebook profiles with alcohol-related content reported more favorable attitudes towards alcohol use and increased willingness to consume alcohol compared to participants who viewed a majority of Facebook profiles with non-alcohol related content (Litt & Stock, 2011). These findings suggest that the way anglers present their handling practices to others on social media likely conveys descriptive information about the prevalence of a given behavior, particularly if one handling position is promulgated more often than others (e.g., fish held horizontally above the water).

Attention to the normative underpinnings of C&R handling practices and social media engagement is especially important in the context of C&R angling because the adoption of best practices is largely dependent on voluntary compliance. Although it is said that a picture is worth a thousand words, it remains unclear how recreational anglers perceive photographs documenting the outcome of a C&R angling event and whether individuals' personal and normative perceptions vacillate based on the content of the

image. That is, does the nature of how the fish is held (e.g., partially submerged in water versus air exposed) elicit divergent personal and normative beliefs among anglers in terms of the prevalence and appropriateness of a given practice? Furthermore, do individual's normative beliefs relate to their own opinions towards different handling and social media practices?

Social Norm Misperceptions

Since norms are rarely, if ever, explicitly stated, people can misinterpret the level of support for or the extent of engagement with a particular belief or behavior (Cruz, Henningsen, & Williams, 2000). Social norm misperceptions can take many forms. Pluralistic ignorance describes instances when an individual privately rejects a belief, but incorrectly assumes that the majority of others endorse it (Miller & McFarland, 1987). Comparatively, false consensus occurs when people overestimate the prevalence of beliefs that are similar to their own opinion (Ross, Greene, & Harris, 1977). There is fairly widespread evidence of pluralistic ignorance and false consensus effects across multiple domains, including beliefs about climate change (Leviston et al., 2013; Mildenberger & Tingley, 2017), support for renewable energy technologies (Sokoloski, Markowitz, & Bidwell, 2018), and compliance within recreational fisheries (Bova et al., 2017). For instance, in South Africa's Eastern Cape rock and surf fishery, Bova et al. (2017) found that anglers overestimated the rate of non-compliance among their peers with respect to bag limits and undersize fish, among other regulations.

The practical implications of understanding the role of social misperceptions are many. Normative misperceptions are problematic because they can lead people to act in a manner that is incongruent with their personal beliefs and/or adopt erroneous perceptions

about prevailing social norms, altering not only the salience of an issue, but the perceived importance of it as well (e.g., Miller & McFarland, 1987; Prentice & Miller, 1996). For instance, after manipulating the distribution of college students' opinion in a classroom in favor of the denialist position, Geiger & Swim (2016) found that students who held the actual majority of opinion—that climate change is happening and anthropogenic—were less willing to discuss the topic in a subsequent group discussion. Other longitudinal research has shown that adolescents are more likely to start smoking when they perceive that the majority of their peers and adults smoke (Botvin, Botvin, Baker, Dusenbury, & Goldberg, 1992). Thus, irrespective of its actual prevalence, an opinion or behavior that is perceived to be descriptively rampant, can problematically function as the norm of reference in guiding consequential and at times, counter-attitudinal behavior. In the context of C&R angling, although a handling practice may be perceived by most anglers as inappropriate, such as holding a fish vertically by gripping the jaw, anglers may inaccurately perceive that the majority of others approve of the practice.

How these social cognitive biases materialize is less unclear, but they are likely influenced by a range of motivational, social, and informational processes. False-consensus effects may be shaped by people's selective exposure to like-minded others and the salience of their shared beliefs or serve a purely functional value in fulfilling people's need for social support (for review see Marks & Miller, 1997). Conversely, pluralistic ignorance may arise from systematic media reporting and the overrepresentation of minority—though at times completely inaccurate—opinions (e.g., Boykoff, 2011; Noelle-Neumann, 1974; Shamir & Shamir, 1997). As social media has been shown to play a role in circulating socially-relevant information about what most

others do (Litt & Stock, 2011), it may also drive misperception effects (Fournier et al., 2013). In a recent study, researchers examined whether alcohol-related content posted to social media sites, including individuals' Facebook profiles, influenced college students perceived norms around drinking (Fournier et al., 2013). Participants who viewed Facebook profiles with alcohol-related content estimated higher drinking norms among their peers than those who did not. These findings suggest that exposure to social media can influence individuals' normative estimations relative to what most others do and/or believe. Taken together, research on pluralistic ignorance and false consensus effects in related environmental domains suggests that an individual's beliefs about what other anglers handling and social media sharing practices may not accurately capture the opinions of the recreational angling community.

Present Research

No prior work that we are aware of has examined recreational anglers' personal and normative perceptions about whether and how a fish should be held and exposed to air post-catch. Thus, the present study had several objectives. At a descriptive level, the primary objective was to assess anglers' personal beliefs with respect to whether and how a fish should be held and exposed to air post-catch as well as the appropriateness of sharing related imagery on social media. The research also focused on ascertaining whether certain handling practices, such as holding a fish partially submerged in water or air exposed, are perceived as more or less common than others both in terms of handling practices and the types of images anglers encounter on social media. Another avenue of this research examined anglers' estimated level of agreement with handling and sharing practices among the broader angling community, and furthermore, how anglers' own

87

opinion relates to their normative perceptions. Although this research was primarily exploratory, the emergence of norm misestimation in related areas of research (e.g., fishing compliance) suggests that significant pluralistic ignorance and/or false consensus effects may exist between anglers' own opinion and their estimated level of agreement among others. Additionally, since descriptive norms have been shown to fuel misestimation effects (Litt & Stock, 2011), the present research also explored whether perceptions of prevalence predicted normative estimations.

In addition to these primary, mostly descriptive trends, the study also explored whether differences in anglers' personal beliefs would emerge as a function of a number of relevant individual-level and contextually salient social-psychological factors. For instance, do subpopulations of people within the angling community (e.g., anglers who predominantly fly fish versus those who use conventional tackle) differ in terms of the practices that they deem are appropriate or with respect to the perceived pervasiveness of a practice? To examine these and related questions, the study focused on multiple context-dependent predictors that might influence recreational anglers' personal agreement with different handling and social media sharing practices. These factors included relevant angler characteristics, such as age and the type of gear anglers use for C&R angling (e.g., Fisher, 1997; Gigliotti and Peyton; 1993; Oh & Ditton, 2006), as well as relevant social psychological constructs, including social media use, the importance of documenting one's catch, relative awareness of best practices, and perceived impact of air exposure.

We expected that factors signifying greater concern for fishing populations, awareness of best practices, and perceived impact of air exposure would positively

predict anglers' personal beliefs with handling practices and social media images, particularly for handling positions that coincide with scientifically-validated best practices (i.e., partially submerged, underwater holds). Additionally, we suspected that these same variables would negatively predict anglers' agreement with handling and sharing practices that expose fish to air. Comparatively, we suspected that the importance of documenting fish post-catch would positively predict personal agreement for all handling positions but be particularly powerful for positions that fully expose fish to air (i.e., vertical, horizontal). We also anticipated meaningful differences to emerge relative to context-specific demographics, particularly based on the type of gear anglers use to practice C&R angling (e.g., fly fishing versus conventional tackle). For instance, we suspected that fly fishing anglers would agree with practices that adhere to scientifically-validated to a greater extent and report encountering these angling practices more frequently in images on social media and while fishing (i.e., partially submerged, underwater hold) compared to conventional anglers.

Finally, the present study was also used as an opportunity to further examine anglers' willingness to impose social sanctions on others' inappropriate angling behaviors. As detailed in Chapter III, the involvement of recreational anglers' in monitoring and enforcement, through their intentional conversations with others, has received increasing attention. Anglers' willingness to impose social sanctions on others' inappropriate angling behaviors is influenced by a number of factors, including levels of concern, perceived efficacy, reputation concerns, age, perceived angler impact and management familiarity (Chapman et al., 2017; Guckian et al. 2018). To replicate and extend our understanding of what drives anglers' sanctioning intent, several of the

aforementioned factors as well as other relevant constructs, including perceived responsibility to sanction others and activist identity (Guckian & Markowitz, unpublished), were included in the survey to predict sanctioning intent.

Methods

Sampling Frame and Distribution

The target population included recreational anglers above the age of 18 and was not restricted to any geographic location. Survey recruitment and distribution occurred from May 28th to June 20th, 2019. Participants were recruited through various social media sites, including those maintained by regional, national, and international recreational angling organizations and industry (e.g., MoldyChum.com, Patagonia Fly Fishing, International Game Fish Association). Participants were not compensated for their participation, though were entered into a compensation lottery where one participant was randomly selected to receive a Patagonia Stormfront Roll Pack. The survey was administered online through the software program, Qualtrics, and was approved by the University of Massachusetts Amherst Institutional Review Board (Protocol ID: 2018: 4956).

Study Measures and Procedure

Participants responded to a survey, which included several questions to examine participants' personal and normative beliefs about C&R handling and social media sharing practices as well as to investigate predicted relationships. The survey began with participants responding to several questions designed to assess relevant angler characteristics, concern, identity and social media use. Two items measured participants'

relative concern with respect to the health and condition of an angled and released fish as well as the overall health and condition of fish populations (e.g., 'Compared to other anglers you know, would you say that you are less or more concerned about the health and condition of an angled and released fish?', 1 = *much less*, 7 = *much more;*). The items were combined into a composite for *relative concern* ($r = .74$). Participants were then asked about how important a number of social identities are to their sense of self (e.g., How important or unimportant are each of the following to your sense of who you are as a person, 1 = *not at all important*, 7 = *extremely important*). Here we focus on the extent participants identified as an *activist*. *Documentation importance* was assessed by one item: 'How important, if at all, is it for you to photograph yourself with your catch during a catch-and-release angling event?' (1 = *not at all important*, 7 = *extremely important*). Only participants indicating that they use social media responded to this question.

Participants were then asked several questions to gauge their personal and normative perceptions of images depicting the outcome of a C&R angling event. Figure 7 displays the images that participants responded to, including those depicting a partially submerged fish, a fish held horizontally, vertically, and underwater. For clarity, the descriptive text appearing alongside the images in Figure 7 also accompanied each image in the online survey. The same images were used for assessing participants' perceptions of handling practices as well as social media sharing. To estimate the perceived descriptive norm of handling practices (e.g., *perceived handling prevalence*), participants were asked how often they encounter other anglers engaging in each position depicted in the images (e.g., 'How frequently or infrequently would you say you see other anglers

handling fish in ways demonstrated in the images when you are out fishing?', 1 = *never*,

7 = *all the time*), creating four separate items. The same process was used to assess the

perceived social media prevalence for each image (e.g., 'How frequently or infrequently

would you say that you see images like these on social media?', 1 = *never*, 7 = *all the*

time).

Participants then indicated their personal agreement or disagreement with

handling and social media sharing practices, as well as the percent of other anglers they

believe agree with the practice. The image conditions (e.g., partially submerged,

horizontal hold, vertical hold, underwater hold) were presented randomly to avoid the

potential for order effects. One item assessed participants' *personal agreement* with the

handling practice depicted in each image (e.g., 'It is ok to handle fish in the way

demonstrated in the photo', 1 = *strongly disagree*; 6 = *strongly agree*), creating a total of

four items. Since we were mainly interested in differences between those who agreed and

disagreed with the practices (rather than the extent of agreement or disagreement), we

converted the 6-point scale into a dichotomous scale, which was coded as: 0 = *disagree*; 1

= *agree*.

An identical process was used to assess participants' *personal agreement with*

sharing images on social media. To assess the perceived injunctive norm of each

handling practice (i.e., *perceived norm estimation*), participants were asked to indicate

what percent of recreational anglers would agree with the statement, 'It is ok to handle

fish in the way it is being handled in this image' (continuous scale, 0-100%). This

process was repeated for each image, creating four separate norm estimation items for

handling practices. The same process was used to assess participants' *norm estimation* for

other anglers' agreement with the appropriateness of sharing images on social media (e.g., 'It is ok to share images like this on social media' (continuous scale, 0-100%).

Relative awareness of C&R best practices was assessed using one item (i.e., 'Compared to other recreational anglers that you know, would you say you know less or more about catch-and-release practices that increase the likelihood of survival of an angled and released fish?' 1 = *much less*, 7 = *much more*). One item was used to assess *angler impact* on the fitness of an angled and released fish (e.g., 'To what extent (if at all) do you think recreational anglers' decisions and behaviors influence the likelihood of survival of an angled and released fish?, 1 = *not at all*, 7 = *a great deal*). A separate item was used to gauge *exposure affect*, which assessed beliefs about the impact air exposure has on fish (e.g., 'How do you think a fish is affected by being held out of the water to take a photograph?', 1 = *positively affected*, 7 = *extremely negatively affected*).

Before responding to a series of demographic questions, two measures assessed *sanctioning intent* (e.g., 'How likely are you to personally express your disapproval to an angler that you see engaging in practices that are harmful to the survival of an angled and released fish?'; 1 = *not at all likely*, 7 = *extremely likely*). The two items were combined into a composite ($r = .87$). Participants were also asked the extent to which they felt personally responsible for monitoring and enforcing the angling practices of others (e.g., It is my responsibility to approach and educate anglers when they engage in practices that are harmful to the survival of an angled and released fish, 1 = *strongly disagree*, 7 = *strongly agree*).

A. Holding a fish partially submerged in water.

B. Holding a fish horizontal above the water.

C. Holding a fish vertically above the water.

D. Holding a fish below the surface of the water.

Figure 7. Images used to depict common handling practices during the C&R angling event and photographs that are shared on social media.

Participants

A total of 1,857 people agreed to participate in the study. Prior to analysis, a number of participants were excluded from the sample for either incomplete data, failure to meet basic screening questions (e.g., did not fish recreationally), or for unusually long survey response times (longer than 30 minutes), leaving a total of 1,560 participants in the sample. Of the participants remaining in the sample, 1,404 identified as recreational anglers, with smaller numbers identifying as fishing guides (n = 115) and even less as competitive or professional anglers (n = 41). Due to the study's focus on recreational anglers, the descriptive and inferential results reported here examine the subset of

participants who identified as recreational anglers (n = 1,404). Analysis of the smaller

subsamples can be provided upon request.

Table 9 displays socio-demographic and angling-related characteristics. In

addition to the factors presented in the table, the majority of anglers reported residing in

the United States (*n* = 1,097), followed by Canada (*n* = 196), with lesser numbers from

Australia (*n* = 7), Great Britain (*n* = 6), Germany (*n* = 5), Sweden (*n* = 4), Argentina (*n* =

2), Bahamas (*n* = 2), Switzerland (*n* = 2), New Zealand (*n* = 2), Singapore (*n* = 2), and

Japan (*n* = 2), while several other countries were indicated as primary residence for at

least one participant (non-disclosure, *n* = 138). Given the study's focus on exposure to

and beliefs about C&R imagery depicted on social media, a number of questions were

asked to better understand participants' use of social media. The majority of participants

reported that they visit social media sites (e.g., Twitter, Facebook, Instagram) 'at least

once a day' (4 or above on 6pt scale; 81.27%), with 115 (8.19%) participants indicating

that they 'never' use social media. Of the participants who reported using social media,

94.57% report following angling-related accounts and frequently encounter C&R-related

imagery (e.g., person holding a fish) on social media (5 or above on 7pt scale; 83.79%).

Furthermore, for participants who use social media, 80.29% had previously shared an

image of themselves C&R angling on social media.

Table 9. Socio-demographic and angling characteristics for sample participants

Age	*M*=43.9; *SD*=15.5		Percent Fishing C&R	*M*=90.3; *SD*=17.5	
Money spent on fishing expenditures over past two years	*M*=6610; *SD*=28934.59		Percent C&R Voluntary	*M*=93.1; *SD*=17.9	
Gender	*n*	%	Education	*n*	%
Female	129	8.7	Grade 8 or less	0	0
Male	1315	88.6	Some high school	20	1.3
Prefer not to say	10	0.7	Graduated high school	80	5.4
Non-disclosure	30	2	Some college	323	21.8

Gear type			Bachelor's degree	605	40.8
Fly fishing	1113	79.3	Post-graduate degree	421	28.4
Conventional	291	20.7	Non-disclosure	35	2.4
C&R fishing location			Belong to angling club		
Freshwater	1088	73.3	Yes	747	50.3
Marine	320	21.6	No	700	47.2
Non-disclosure	37	2.5	Non-disclosure	37	2.5

Analytic Approach

Analyses occurred in several stages in order to explore response patterns and relationships among key variables. First, perceived prevalence was examined to determine whether differences emerged between types of handling practices as well as social media images. This included an examination of whether and how subpopulations (e.g., gear type; fly fishing vs. conventional tackle) differed in terms of the extent they viewed each practice or image posted to social media as more or less prevalent. Next, response patterns for participants' personal agreement with each handling and social media sharing practice were examined. Chi-square analyses were run to assess the relationship between personal agreement and gear type (fly fishing versus conventional tackle), followed by a series of logit regressions, which explored the impact of other factors in addition to gear type (e.g., documentation important, exposure affect, age and relative awareness). As seen in the results, response patterns for the partially submerged and underwater hold revealed that the vast majority of anglers agree with the appropriateness of each practice. Due to limited variation, additional analyses predicting personal agreement (or disagreement) focused on only the vertical and horizontal hold.

Next, the relationship between personal agreement and norm estimation (beliefs about the level of support among the broader angling community) was examined to

determine whether there was evidence of norm misestimation effects. A series of linear regressions were run to determine the impact of personal agreement and perceived prevalence on norm estimation for the horizontal and vertical hold positions. Finally, an ordinary least squares regression examined sanctioning intent. Relative concern, sanctioning responsibility, activist identity, angler impact and relative awareness were entered into the model. For the sanctioning model, information on *lmg* relative importance is provided as a representation of the contribution of each parameter in the regression model that reflects the partitioning of the model's R^2; higher lmg metrics indicate greater contribution to the R^2 (Grömping, 2007).

Results

Perceived Prevalence of Handling Practices and Images on Social Media

Response distributions for perceived prevalence of handling practices are depicted in the left-hand panel of Figure 8, while the left-hand panel of Figure 9 displays the response distribution for perceived prevalence of images on social media (only includes responses of participants who reported using social media). Overall, similar patterns were observed relative to what handling practices and social media images participants perceived as the most common. Two one-way repeated measures ANOVAs were conducted to determine whether there was a main effect of handling practice or image type on perceived prevalence. For handling type, a main effect was found $F(3, 4202.2) = 315.26$, $p < .001$, $\eta^2 = .19$. Post-hoc comparisons revealed significant differences among all handling types, with the exception of the contrast between the partially submerged ($M = 4.03$, $SD = 1.48$) and vertical hold positions ($M = 4.13$, $SD = 1.78$, $p = .290$). The

horizontal hold was viewed as the most common handling practice among participants, ($M = 5.01$, $SD = 1.40$), whereas the underwater hold was the least ($M = 3.37$, $SD = 1.63$).

A main effect was also found for image type on perceived prevalence of images on social media, $F(3, 3859.4) = 407.59$, $p < .001$, $\eta^2 = .24$. Post-hoc comparisons revealed significant differences between all image types. Notably, the horizontal hold image was perceived as the most common handling position depicted in social media posts ($M = 5.69$, $SD = 1.14$), compared to the partially submerged hold ($M = 4.77$, $SD = 1.39$, $p < .001$, $d = .45$), vertical hold ($M = 4.52$, $SD = 1.59$, $p < .001$, $d = .58$) and underwater hold ($M = 4.02$, $SD = 1.57$, $p < .001$, $d = .82$).

Relationship between Perceived Prevalence and Gear Type

The right-hand panels of Figures 8 and 9 display the results for perceived prevalence grouped by gear type for handling practices and social media images, respectively. To examine the relationship between gear type and perceived prevalence for handling practices and social media images, two 4-level within subjects variable (holding position; partially submerged, horizontal hold, vertical hold, underwater hold) by 2-level between subjects variable (gear type; conventional, fly fishing) models were run. For handling practices, a small, significant interaction was found between holding position and gear type $F(3,4199) = 87.67$, $p < .001$, $\eta^2 = .06$. Listwise comparisons suggest that participants who practice conventional fishing more often see others handling fish vertically above the water ($M = 4.93$, $SD = 1.58$) than participants who practice fly fishing ($M = 3.92$, $SD = 1.77$, $t(4942) = 9.90$, $p < .001$, $d = .73$). Fly fishing participants indicated that they more often see others partially submerging fish in water ($M = 4.19$, $SD = 1.43$) or handling fish underwater ($M = 3.53$, $SD = 1.61$) compared to conventional

fishing participants ($M_{partial}$ = 3.42, *SD* = 1.53, t(4942) = -7.63 , p < .001, *d* =.55;

$M_{underwater}$ = 2.73, *SD* = 1.55, *t*(4942) = -7.86, p <.001, *d* = .58). No difference emerged

for the horizontal hold position.

A similar interaction effect was found between gear type and perceived

prevalence of social media images, F(3, 3856) = 99.33, p <.001, η^2 = .07. Listwise

comparisons revealed that fly fishing anglers more often encounter images of fish

partially submerged in water (*M* = 4.95, *SD* = 1.29) and held underwater (*M* = 4.23, *SD* =

1.48) than participants who practice conventional fishing ($M_{partial}$ = 4.09, *SD* = 1.52,

t(4268) = -9.07 , p < .001, *d* = .72; $M_{underwater}$ = 3.20, *SD* = 1.63, *t*(4268) = -10.75, p

<.001, *d* = .86). Participants who practice conventional fishing more often encounter

images depicting a vertical hold (*M* = 5.14, *SD* = 1.45) compared to fly fishing

participants (*M = 4.36, SD* = 1.58, t(4268) = 8.15, p < .001, *d* = .65). No effect emerged

for gear type and the horizontal hold position.

**Perceived Prevalence of
Handling Practices**

**Perceived Prevalence of Handling
Practices by Gear Type**
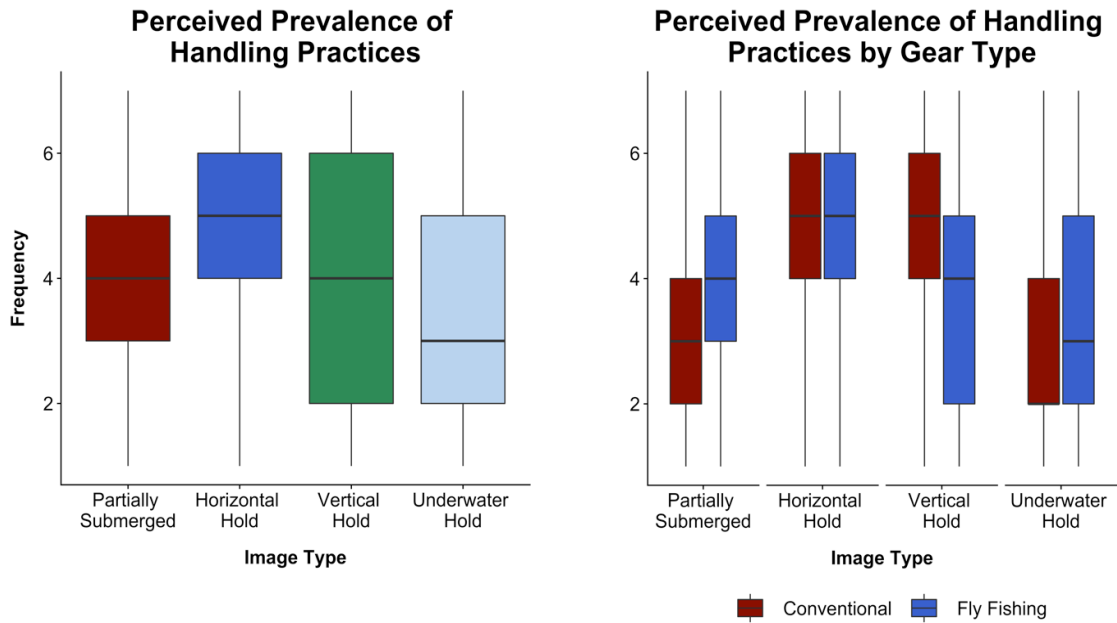
Figure 8. Boxplot depicting the perceived prevalence of handling practices (left-hand panel). The right-hand panel displays perceived prevalence of handling practices grouped by gear type.

**Perceived Prevalence of Images
on Social Media**

**Perceived Prevalence of Images on
Social Media by Gear Type**
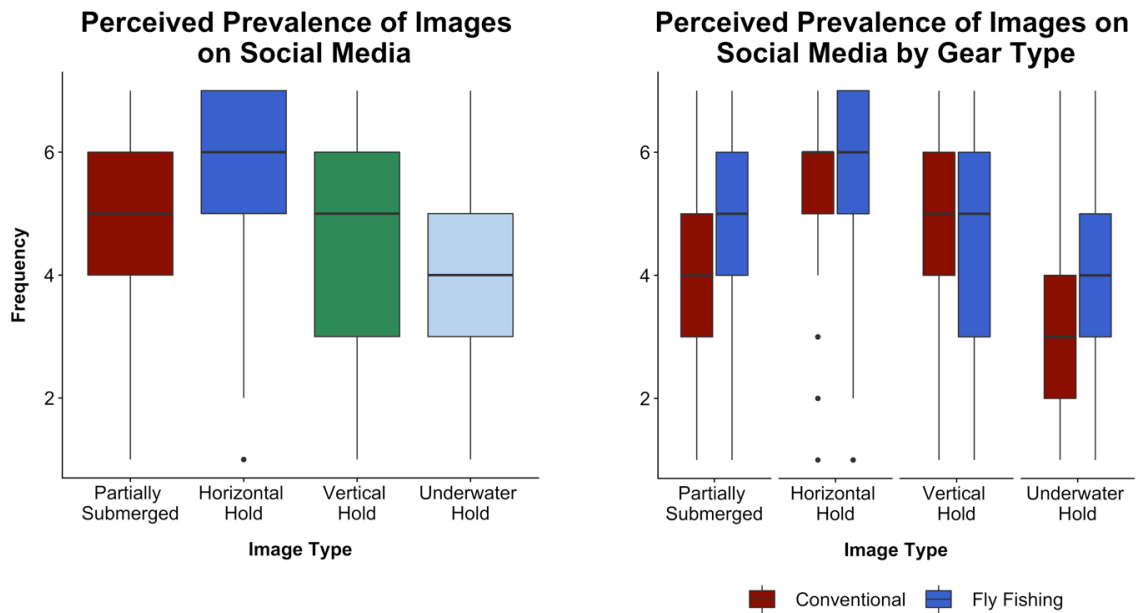
Figure 9. Boxplot depicting perceived prevalence of images on social media (left-hand panel). The right-hand panel displays perceived prevalence of images on social media grouped by gear type.

Personal Agreement with Handling and Sharing Practices

Figure 10 displays response patterns for personal agreement with the appropriateness (or inappropriateness) of handling and social media sharing practices. Overall, participants largely agreed that holding fish partially submerged or underwater are acceptable handling practices. Comparatively, greater variability is observed with respect to handling fish horizontally, while most participants disagreed with the practice of handling fish vertically. Almost identical patterns of agreement and disagreement were found for participants' beliefs about the appropriateness of sharing images on social media (right-hand panel of Figure 10).
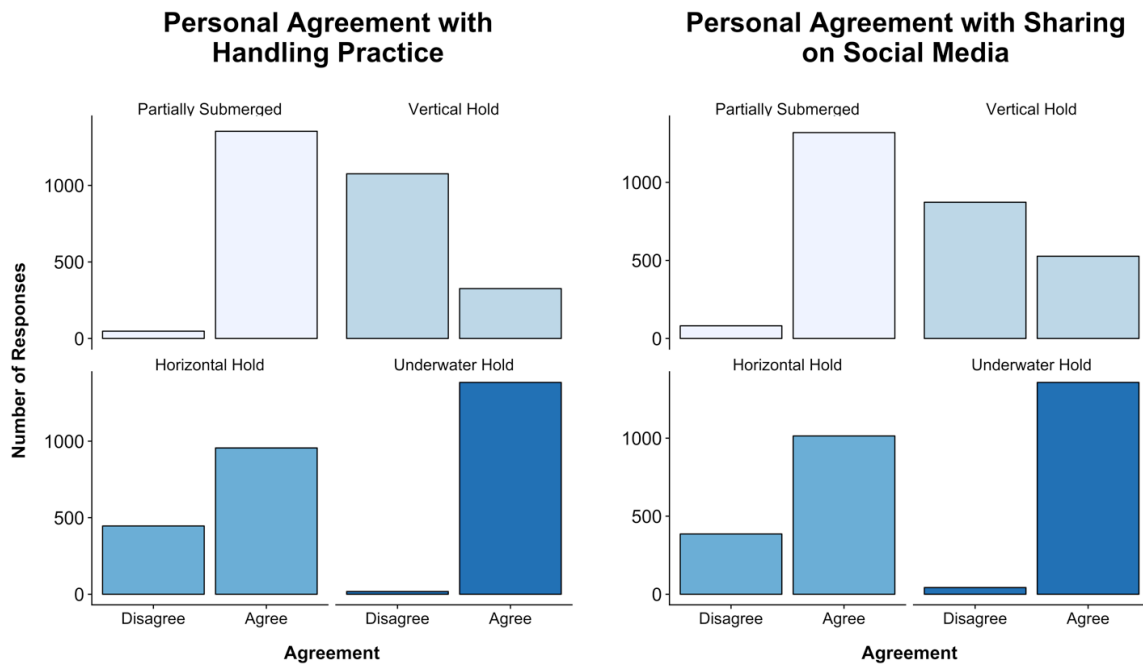
Figure 10. Response patterns for personal agreement with handling practice and sharing images on social media.

Relationship Between Personal Agreement and Gear Type

Due to insufficient variation in personal agreement for the partially submerged and underwater hold positions for both handling and social media sharing practices

101

(greater than 94% agreement in each case), additional analyses focused only on the

horizontal and vertical holding positions for both handling and social media sharing

practices. Chi-square tests were calculated to examine whether gear type influenced

participants' agreement with handling and social media sharing practices. Results suggest

a significant effect of gear type on each handling and sharing practice for both the

horizontal and vertical hold positions. For handling fish with a horizontal hold, χ^2 (1, N =

1402) = 22.53, p < .001, Fisher's Zr = .127, 95% confidence intervals (CIs) of Zr [.075,

.180]. The probability of agreeing that holding the fish horizontally above the water is ok

was greater for conventional anglers (.797) than fly anglers (.652). A slightly weaker

effect was found for handling fish in the vertical hold position, χ^2 (1, N = 1402) = 10.88,

p = .001, Fisher's Zr = .088, 95% confidence intervals (CIs) of Zr [.036, .141]. The

probability of agreeing that the vertical hold is ok was greater for conventional anglers

(.306) than fly anglers (.214). Similar trends emerged when analyzing the relationship

between gear type and personal agreement with sharing images on social media. For

sharing images depicting a horizontal hold, χ^2 (1, N = 1400) = 17.32, p < .001, Fisher's

Zr = .112, 95% confidence intervals (CIs) of Zr [.059, .164]. The probability of agreeing

that sharing images depicting a horizontal hold on social media is appropriate was greater

for conventional anglers (.821) than fly anglers (.699). For sharing images depicting a

vertical hold, χ^2 (1, N = 1401) = 16.99, p < .001, Fisher's Zr = .111, 95% confidence

intervals (CIs) of Zr [.058, .163]. Conventional anglers (.481) were more likely to agree

that sharing images of a vertical hold is appropriate compared to fly anglers (.350).

A series of logit regressions were run to examine whether participants' agreement with the horizontal and vertical holding positions (for both handling and social media sharing practices) differed as a result of age, gear type, exposure affect, documentation importance, and relative awareness. Table 10 displays descriptive statistics for these measures, while correlations are reported in Table 11. Results indicate that age, exposure affect, gear type (fly fishing), and relative awareness negatively predicted whether a person agrees with a handling or social media sharing practice for the horizontal and vertical positions, whereas documentation importance positively predicts agreement (see Table 12 for logit and odds ratio estimates).

Table 10. Descriptive statistics for study measures

	M	**SD**
Relative concern	5.73	1.02
Activist	3.97	1.75
Documentation importance	3.19	1.58
Angler impact	6.31	0.69
Exposure affect	5.10	1.08
Relative awareness	5.30	1.14
Responsibility	4.68	1.45
Sanctioning intent	4.32	1.65

Table 11. Correlation for relevant predictors and personal agreement with handling and sharing practices for horizontal and vertical positions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gear (1)	1								
Exposure affect (2)	.07**	1							
Documentation Importance (3)	-.06*	-.22***	1						
Relative awareness (4)	.02	.12***	-.01	1					
Age (5)	-.01	.11***	-.20***	.05*	1				

Handle horizontal (6)	-.13***	-.41***	.28***	-.11***	-.22***	1			
Handle. vertical (7)	-.09***	-.22***	.12***	-.09***	-.14***	.24***	1		
Sharing horizontal (8)	-.11***	-.36***	.30***	-.13***	-.27***	.74***	.22***	1	
Sharing vertical (9)	-.11***	-.26***	.16***	-.13***	-.17***	.28***	.65***	.38***	1

Note. *p < .05. **p < .01. ***p < .001. For gear type (0 = Conventional; 1 = Fly Fishing).

Table 12. Logit regression results for predicting personal agreement for horizontal and vertical handling and social media sharing practices

	Logit			Odds Ratio		
	Estimate	Wald $\chi2$	Pr > $\chi2$	Point estimate	95% CI lb	ub
Handling: Horizontal Hold						
Gear type (Fly)	-.720	-3.62	<.001	.487	.327	.714
Exposure affect	-1.131	-12.36	<.001	.323	.269	.385
Documentation importance	.299	6.00	<.001	1.349	1.225	1.489
Relative Awareness	-.111	-1.67	.094	.895	.786	1.019
Age	-.024	-4.89	<.001	.976	.966	.985
Handling: Vertical Hold						
Gear type (Fly)	-.429	-2.71	0.007	.651	.479	.890
Exposure affect	-.417	-6.20	<.001	.659	.577	.751
Documentation importance	.072	1.62	<.001	1.075	.985	1.173
Relative Awareness	-.151	-2.57	.106	.860	.767	.965
Age	-.017	-3.53	<.001	.983	.973	.992
Social Media Sharing: Horizontal Hold						
Gear type (Fly)	-.730	-3.46	<.001	.482	.315	0.722
Exposure affect	-.934	-10.31	<.001	.393	.328	0.467
Documentation importance	.370	6.85	<.001	1.447	1.304	1.612
Relative Awareness	-.233	-3.28	.001	.792	.688	.909
Age	-.031	-5.87	<.001	.970	.960	.980
Social Media Sharing: Vertical Hold						
Gear type (Fly)	-.523	-3.55	<.001	.593	.444	.791
Exposure affect	-.425	-6.82	<.001	.654	.578	.738
Documentation importance	.111	2.77	.006	1.118	1.033	1.210

Relative Awareness	-.204	-3.81	<.001	.815	.733	.905
Age	-.017	-3.88	<.001	.983	.975	.992

Note. Gear type is coded as 0=conventional tackle; 1=fly fishing.

Perceived Norm Estimation for Handling and Sharing Practices

Mean scores for perceived norm estimation for handling and social media sharing practices are reported in Table 13 alongside the actual percentage of personal agreement for the study sample. Both overestimation and underestimation of actual agreement is evident for several variables. For handling practices, respondents slightly underestimated the level of agreement with the partially submerged and underwater holding positions and overestimated the perceived norm relative to the horizontal holding position. A more significant discrepancy is observed for handling fish vertically above the water, where respondents largely overestimated other anglers' level of agreement compared to what the actual sample agreed with (by upwards of 36%). Almost identical trends emerged with respect to social media sharing practices.

Table 13. Percent sample agreement and norm estimation for each holding position for handling and social media sharing practices

	Handling or Image Type			
	Partially Submerged	Horizontal Hold	Vertical Hold	Under-water Hold
Handling practice				
% Sample Personal Agreement	96.58%	68.19%	23.31%	98.65%
Mean Perceived Norm Estimate	87.31%	75.54%	59.69%	90.63%
Sharing on social media				
% Sample Personal Agreement	94.22%	72.43%	37.69%	96.86%
Mean Perceived Norm Estimate	88.06%	78.92%	65.52%	90.80%

Note. 'Percent sample personal agreement' is calculated based on the percent of sample who agreed with the appropriateness of each handling and sharing practice.

Perceived Norm Estimation and Personal Agreement

The relationship between personal agreement and perceived norm estimations was examined in further detail. First, we explored whether perceived norm estimations differed depending on participants' own agreement with the handling and social media sharing practice for the horizontal and vertical holds. A series of Welch's t-test indicated significant differences between anglers who agreed versus disagreed with each handling and social media sharing practice. Those who personally agreed with handling fish in the horizontal and vertical holding positions estimated that significantly more others agreed with the practices than those who personally disagreed with it $t(657.77) = 13.135$, p $<.001$, $d = .85$ and $t(707.7) = 14.677$, $p <.001$, $d = .80$, respectively. Similarly, those who personally agreed that sharing images depicting a horizontal and vertical hold on social media overestimated the number of anglers who agreed with their practice compared to those who disagreed $t(518.96) = 11.357$, $p <.001$, $d = .81$ and $t(1325.2) = 14.499$, p $<.001$, $d = .75$, respectively. Figure 11 provides a visual representation of these trends. Additionally, a series of ordinary least squares regressions were conducted to examine whether and how personal agreement and perceptions of prevalence predicted participants norm estimation for handling and social media sharing practices relative to the horizontal and vertical hold positions. Results suggest that when controlling for personal agreement, perceptions of prevalence positively predicted participants' perceived norm estimations for handling and social media sharing practice (see Table 14).

Perceived Norm Estimate of Agreement with Handling Practice by Personal Agreement

Perceived Norm Estimate of Agreement with Sharing on Social Media by Personal Agreement
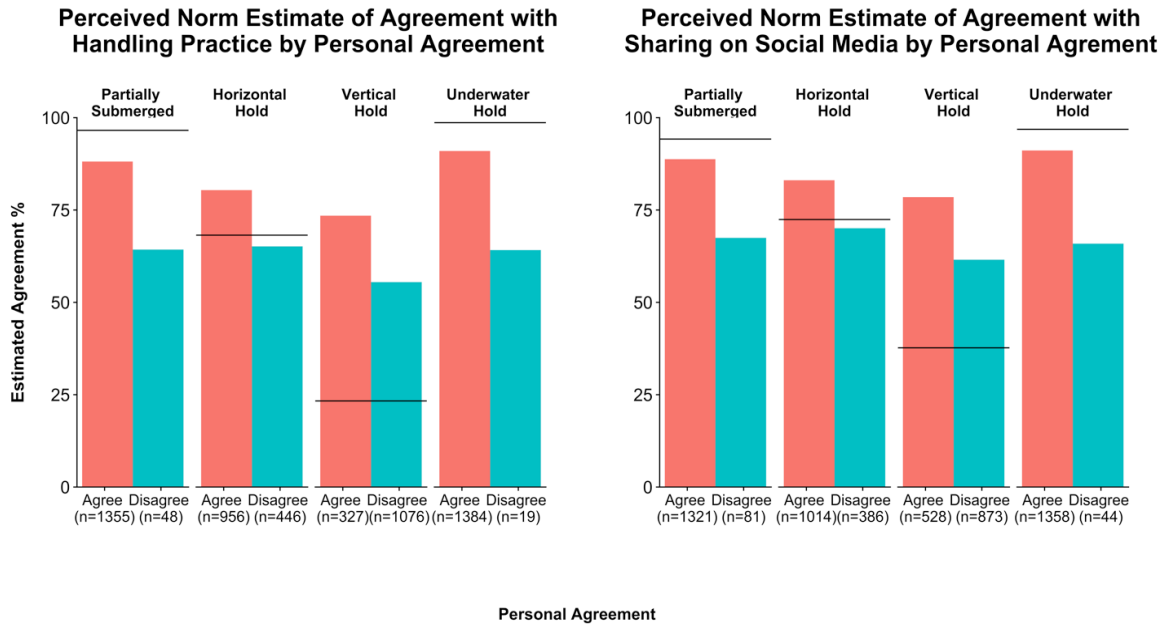
Figure 11. Mean perceived norm estimate grouped by personal agreement (e.g., agree versus disagree) for handling practices (left-hand panel) and social media sharing practices (right-hand panel). The horizontal lines represent the actual percentage of participants in the sample who agree with the handling or sharing practice for each holding position, respectively.

Table 14. Predicting perceived norm estimation for horizontal and vertical holds

	β	t	p-value	$R^2_{adjusted}$
Handling: Horizontal Hold				
Personal agreement	13.287	13.00	<.001	.18
Perceived prevalence	3.044	8.94	<.001	
Handling: Vertical Hold				
Personal agreement	16.224	11.45	<.001	.13
Perceived prevalence	2.345	6.95	<.001	
Social Media Sharing: Horizontal Hold				
Personal agreement	14.390	12.60	<.001	.15
Perceived prevalence	3.142	7.79	<.001	
Social Media Sharing: Vertical Hold				
Personal agreement	17.100	12.59	<.001	.14
Perceived prevalence	2.722	6.73	<.001	

Predicting Sanctioning Intent

Drawing on previous work (e.g., Chapman et al., 2017; Guckian et al., 2018), I further examined the replicability of relevant factors in predicting sanctioning intentions. Descriptive statistics for sanctioning intent as well as relevant predictors (e.g., relative concern, angler impact, perceived responsibility) can be viewed in Table 10 and correlations are presented in Table 15. Since age did not correlate with sanctioning intent, it was not included in model. The overall model predicting sanctioning intent was significant, $F(5, 1380) = 173.0$, $p < .001$, $R^2_{adjusted} = 0.38$. Relative concern ($\beta = .124$, $p = .001$, lmg $= .015$), perceived responsibility ($\beta = .657$, $p < .001$, lmg $= .329$), and activist identity ($\beta = .044$, $p = .039$, lmg $= .026$) all positively predicted sanctioning intent, while angler impact ($\beta = .050$, $p = .171$, lmg $= .008$) and relative awareness ($\beta = .025$, $p = .466$, lmg $= .007$) had small, positive coefficients.

Table 15. Correlations between relevant predictors and sanctioning intent

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Relative concern (1)	1						
Angler impact (2)	.17***	1					
Responsibility (3)	.15***	.16***	1				
Age (4)	-.01	.04	-.04	1			
Relative awareness (5)	.41***	.17***	.15***	.05*	1		
Activist (6)	.24***	.10***	.29***	-.12***	.17***	1	
Sanctioning intent (7)	.18***	.14***	.61***	.00	.15***	.24***	1

Note. *p < .05. **p < .01. ***p < .001.

Discussion

Encouraging the adoption of scientifically-validated capture and handling practices will be challenging, particularly in a recreational context where compliance can be difficult (e.g., Arias & Sutton, 2013). One mechanism that can support anglers'

voluntary cooperation with C&R best practices is the presence of strong, salient social norms that facilitate situation-appropriate behavior (e.g., Mackay et al., 2019). However, limited research has examined prevailing social norms in the context of C&R recreational fishing and, furthermore, if there is convergence or divergence with respect to anglers' beliefs about whether and how a fish should be held and exposed to air post-catch. In this study, we sought to address this gap and explore anglers' personal and normative beliefs relative to the perceived appropriateness of various handling and social media sharing practices that differentially depicted fish being handled and exposed to air post-catch.

Overall, findings reveal that the vast majority of anglers agreed with the practices of handling fish either partially submerged or underwater, whereas slightly greater variation was observed for the horizontal hold position (68% agreement). Of particular interest, the majority of participants reported disagreeing with the vertical hold position, suggesting that handling (and sharing images of) fish in this position is widely recognized as an inappropriate practice. These findings are mostly promising, especially since anglers' personal beliefs generally align with the best practice of limiting (or eliminating) air exposure post-catch (Brownscombe et al., 2017). However, results also indicated evidence that participants inaccurately overestimated and underestimated levels of agreement for handling and social media sharing practices among the angling community (i.e., normative estimation). Minor discrepancies (underestimations) emerged between personal agreement and normative estimations with respect to the partially submerged and underwater holds (handling and sharing practices), with participants estimating that the majority of other anglers support the practices. Greater variation emerged with respect to anglers' personal agreement with the horizontal hold position. Those who

agreed with handling and sharing images of fish held in this position, overestimated the level of support among others.

Collectively, these findings reveal that anglers tend to inaccurately impute others' beliefs. This suggests that prevailing norms may be a point of confusion or relatively unknown within the angling community (see also Mackay et al., 2019). Perhaps most critically, evidence of pluralistic ignorance was apparent among participants who disagreed with the vertical hold position. For instance, despite holding the majority opinion (~76% of sample disagreed with vertical hold as a handling practice), these participants vastly overestimated the level of support among other anglers (average norm estimation of 60%). Although the present work did not examine the behavioral implications of pluralistic ignorance or false consensus effects, evidence of pluralistic ignorance contributing to counter-attitudinal and consequential behavior has been well-documented elsewhere in the literature (e.g., Prentice & Miller, 1996). In the context of C&R angling, individuals may feel justified in their decision to handle a fish vertically or post a similar image to social media, provided that they perceive that the majority of other anglers condone the practice. While further work is needed to assess these dynamics in greater detail and whether misperceiving social norms can impact anglers' engagement with scientifically-validated best practices, these findings highlight the need for conservation managers and practitioners to correct existing social misperceptions.

Because of their widespread popularity among the public, social media platforms (e.g., Facebook, Instagram) and the images shared on them hold the potential to convey important normative information (Litt & Stock, 2011; Fournier et al., 2013). However, the current proliferation of images with fish exposed to air may act as a barrier rather than

a conduit to change. The results of the study raise additional concerns about the alignment of descriptive and injunctive norms with respect to both handling and social media sharing practices. Images (and handling practices) depicting partially submerged and underwater fish were widely endorsed as appropriate by the majority of participants, but at the same time these images (and handling practices) were among the least common in terms of perceived prevalence, particularly among conventional tackle users. Previous work has shown that when injunctive norms are ambiguous, salient descriptive norms can direct consequential behavior (Schultz et al., 2007; Smith et al., 2012). Thus, this conflicting information may create further uncertainty surrounding the injunctive norm and, perhaps, result in a common social-psychological problem: not engaging in a particular action because no one else is perceived as doing so (Cialdini, 2009). Indeed, the normative—descriptive—status of C&R angling practices and images displayed on social media could potentially undermine individuals' engagement with C&R best practices (Cialdini et al, 1990). Thus, the work of organizations like Keepemwet Fishing (Danylchuk et al., 2019), which are seeking to transition the norms that govern online disclosure and the types of images promoted on social media, may be critical in shifting the preponderance of images (and handling practices) from those that conflict with scientifically-validated best practices to those that align with the science.

It is also worth re-emphasizing the relationship between individuals' personal beliefs and their beliefs about the level of agreement among other anglers. Regression analyses revealed that individuals' personal beliefs predicted their normative estimations, suggesting that individuals are prone to assume that others mutually share their beliefs. After controlling for personal beliefs, results revealed that the more anglers perceived a

practice to be prevalent (i.e., perceived descriptive norm), the higher their norm estimation (i.e., perceived injunctive norm). It should be noted that we cannot claim causality relative to what drives anglers' own opinion nor between one's own opinion and perceptions of the beliefs of others. While we suggest that individuals' own agreement with a handling or social media sharing practice predicts their norm estimations, research on social influence would suggest that beliefs about others (i.e., norm estimations) could influence individuals' personal beliefs (Cialdini, 2009). It is more than likely that these factors mutually influence one another.

Findings also revealed several meaningful differences between the two subpopulations of interest, both in terms of personal agreement with handling and social media sharing practices as well as with respect to perceptions of prevalence. Fly fishing anglers were more likely to agree with practices that kept fish at least partially submerged in water compared to conventional tackle users, whereas as conventional tackle users were more likely to agree with practices that removed fish from water (e.g., vertical hold). Although it is unclear what is driving these differences, one possibility is that anglers within these communities operate under a different set of assumed norms according to their reference group. For instance, our results also revealed that fly fishing anglers reported significantly greater interaction with social media images (and handling practices) depicting fish either partially submerged or fully submerged in water compared to conventional tacklers. Collectively, these findings suggest, if only preliminarily, that when promoting engagement with scientifically-validated capture and handling practices, practitioners and conservation managers must be mindful of differences among angling

segments and how social expectations may shift within these disparate reference groups (Hogg & Reid, 2006).

Finally, the results build upon and partly replicate findings from Chapman et al. (2018) and Guckian et al. (2018). Anglers with greater expressed concern relative to others were more likely to sanction others' inappropriate capture and handling practices, which has previously been shown in both of the aforementioned research to drive engagement. Additionally, greater perceived responsibility to sanction and identification as an activist positively predicted individuals' willingness to impose sanctions on others non-compliant angling practices. Collectively, this work highlights the capacity of anglers to indirectly impact ecological outcomes by implicitly and explicitly signaling normative information to others, either by sanctioning their peers or else, by projecting their experiences and practices to others (e.g., on social media). However, more research is needed to understand how and whether anglers can meaningfully and significantly impact the attitudes and behaviors of their peers through their intentional social interactions. Enhancing our understanding of these social processes may be critical for recreational contexts that rely extensively on voluntary compliance and behavior.

Limitations and Future directions

There are a number of important limitations to the current work. Perhaps most importantly, our study and subsequent findings are limited to our sample. The present research consisted of a single, cross-sectional correlational design, which relied extensively on angling-related social media platforms to recruit participants. Thus, demographics of our sample may vary from typical recreational and not fully represent the subpopulations (e.g., fly fishing vs. conventional tackle) of interest. However, our

113

large sample trends in favor of demographics shown to be characteristic of the angling population (88% male, $M_{age} = 44$ yrs), who are often older and male (Arlinghaus, 2006a; U.S. DOI, 2016). While we extend caution in our ability to generalize findings to the broader (North American) C&R angling community, we believe our findings offer an important contribution toward understanding how social norms are perceived in relation to common handling and social media sharing practices among a large subset of the angling community.

On a related note, the study also relied on self-report measures and thus similar limitations emerge relative to assessing anglers' intentions to sanction others and whether such communicative acts will materialize in the real-world. Another significant limitation of the study concerns the images used to depict the handling practices and social media images of interest. Specifically, the images did not control for extraneous variables, such as angler characteristics, species type, and fishing location. Although text was provided alongside the images to provide clarity and increase the salience of the handling practice depicted, these random effects (e.g., angler characteristics, species type) could have manifested to influence participants' reactions. Thus, future work examining anglers' reactions to or the impacts of visual imagery should control for these factors when able.

The present findings raise a number of important questions to be addressed by future research. Provided the way individuals publicly project their experiences may be critical in signaling normative information to others (e.g., Litt & Stock, 2011; Fournier et al., 2013), research is needed to examine whether and how repeated exposure to different types of C&R-related imagery (or handling practices) impacts anglers' attitudes towards and intentions to adopt scientifically-validated best practices. In the present research we

showed how different handling practices were perceived as more common than others, future work is needed to understand whether and how anglers' attitudes and behaviors are susceptible to descriptive norm information conveyed on social media or alongside the riverbank, (e.g., Litt & Stock, 2011).

Future work should examine how best to communicate normative information to anglers. For instance, correcting normative misperceptions or communicating about dynamic norms (Mortensen et al., 2019; Sparkman & Walton, 2017) are two potential intervention-oriented approaches that hold considerable promise in enhancing anglers' engagement with scientifically-validated best practices. Research in other topical areas, including alcohol consumption among college students, has shown how providing correct normative information (e.g., the actual distribution of opinion on a topic) can lead to changes in behavior (Schroeder and Prentice, 1998). As detailed in the present study, both overestimation and underestimation effects were evident across all types of handling practices and social media images. Most critical, however, was the large discrepancy observed between the actual percentage of anglers in the sample who disagreed with the vertical hold and the average norm estimation for the practice. Thus, future work should explore whether correcting for normative misperceptions has the potential to reduce the occurrence of this handling practice among anglers. In addition to examining the impact of correcting for normative misperceptions, it may be fruitful to explore the impact of dynamic norms. While past research has focused on the communication of static norms, nascent research has demonstrated how dynamic norms—information about how behavior is changing over time—can motivate desired change despite prevailing static norms (e.g., Mortenson et al., 2019; Sparkman & Walton, 2017). The communication of

dynamic norms could be particularly important in the C&R angling context where scientifically-validated best practices as well as advances in technology (e.g., underwater photography) have created a need for and the ability to change the norms that govern both C&R handling practices and social media engagement.

Another important area that is ripe for future work is to examine the relationship between pluralistic ignorance and self-silencing effects (Noelle-Neumann, 1974; Rios & Chen, 2014). Prior work in related domains has shown how individuals self-silence when they inaccurately perceive that the majority of others agree with a practice (or belief) that they themselves personally disagree with (e.g., Geiger & Swim, 2016). For instance, if anglers misperceive that their opinion is not mutually endorsed by the majority of other anglers, are they less willing to speak out against perceived transgressions? Although this situation arose in the present study concerning the vertical hold position, the way sanctioning intent was measured did not permit us to explore this relationship in future detail. That is, sanctioning intent was measured based on anglers' reactions to a generalized transgression rather than designed to confront a corresponding handling practice (e.g., vertical hold). Thus, future work should create sanctioning and normative perception measures that align with a specific practice in order to capture whether and how self-silencing effects materialize.

Conclusion

The widespread adoption of scientifically-validated C&R best practices will, in part, rely on anglers and angling-related companies promoting these practices by conveying strong social norm messages about what is socially approved of and commonly practiced among the angling community. Here, we highlighted not only the

importance of anglers' personal beliefs towards different handling practices, but also showed how individuals overestimated and underestimated the level of agreement among other anglers. Such normative perceptions may play an important role in determining whether and how anglers approach scientifically-validated capture and handling practices as well as whether and how they share their post-catch experiences to others on social media. The findings presented here suggest that anglers are sensitive to different types of handling practices and largely favor some practices over others, including those where fish remain at least partially submerged in water. Although this research presents preliminary results on anglers' personal and normative perceptions towards C&R handling and social media sharing practices, this work has broad implications for C&R angling from correcting existing social misperceptions to spreading critical context-dependent conservation management information and practices.

Bridge to Chapter V

Across three empirical chapters, I examined multiple drivers of interpersonal communication in two different contexts as well as explored anglers' normative (mis)perceptions with respect to handling and social media sharing practices. Chapter IV presented results showing how recreational anglers misperceive prevailing social norms with respect to handling and social media sharing practices, and also revealed differences between relevant subpopulations of the angling community. Among other important findings, results showed that despite the majority of anglers in the survey personally disagreeing with holding fish vertically post-catch, they simultaneously misperceived that the majority of other anglers are ok with the practice.

Although each empirical chapter presents a distinct aspect of interpersonal communication, this work begins to paint a picture of what factors influence individuals' willingness to communicate with others and furthermore, the norms surrounding whether and how people should communicate their experiences to others on social media. In the final chapter, Chapter V, I summarize the body of literature highlighting the potential of interpersonal communication to drive socially and environmentally beneficial outcomes. In part, I detail an organizational framework, which considers the normative nature of information exchanged during a communicative act and how such exchanges may result in change or increase the salience of an issue. Anticipated outcomes and drivers of interpersonal communication are discussed, with a particular emphasis on understanding the behavioral and situational contexts where interpersonal communication may be well-situated to drive change.

CHAPTER V

COMMUNICATING FOR CONSERVATION:
INTERPRESONAL COMMUNICATION AND COLLECTIVE ACTION

<u>Introduction</u>

Many of the pressing ecological challenges facing society—climate change, resource management, and species decline—can be characterized as paradigmatic collective action problems (Ostrom, 2010). Amidst these situations, the provision and maintenance of collective goods and resources is contingent on the majority of people consistently acting in ways that benefit collective rather than individual interests (Van Lange, Joireman, Parks, & Van Dijk, 2013). Indeed, the variation in which individuals are willing to accept, adopt, and engage in collective-benefitting actions and refrain from those that satisfy immediate self-interests presents significant challenges to maximizing long-term natural resource abundancy and the accumulation of public goods (e.g., community resilience; Adger, 2003; Tompkins & Adger, 2004; Ostrom, 2010).

Natural resource systems, including forests, watersheds, and fisheries, are often collectively managed and/or subject to use by many stakeholders, representing disparate interests, values, and motivations (Pretty, 2003). Given the interconnectedness of these systems, behaviors that are central to overcoming collective action challenges effectively necessitate universal coordination and cooperation. Actions taken by individuals produce negligible collective benefits unless they are performed by the majority of individuals (Dawes, 1980; Van Lange & Joireman, 2008). For instance, one individual's decision to engage in a collective-benefitting action, such as removing woody debris and undergrowth from their property, not only increases their own resilience to wildfire, but

can also significantly and meaningfully increase others' resilience as well (e.g., neighboring property owners).

The idea that collective action problems can only be solved with coercive top-down institutions, such as laws and regulations, has long been debunked (Ostrom, 2010; 2014). Management policies intended to mitigate environmental transgressions and/or promote socially-desirable behaviors often fail to provide individuals with the incentive to act alone. Increasingly recognized, however, is the fact that individuals can produce positive collective outcomes through the provision and maintenance of informal institutions—social norms—that promote widespread cooperation, by restraining more egoistic impulses to defect (Biel, Von Borgstede, Dahlstrand, 1999; Kerr, 1995; Ostrom, 2014). This process of social change and engagement is guided by socially transmitted norms and beliefs about what sorts of behaviors are accepted and endorsed by the majority and those which are not (Lapinski & Rimal, 2005). The role of social norms is particularly powerful when counter-normative behavior results in negative externalities for others (Kerr, 1995), a central feature of collective action problems. Because the effectiveness of collective action is dependent upon large numbers of people engaging in coordinated action, people should—out of their own self-interest—be motivated to encourage widespread cooperation among their peers. However, it is important to note that such peer encouragement may take place whether the communicator or influencer chooses to cooperate or not. That is, an individual can encourage someone to cooperate while simultaneously choosing to defect (or freeride off the efforts of others).

Although social influence approaches represent powerful mechanisms through which to manage collective action problems and achieve more collectively desirable

outcomes (Abrahamse & Steg, 2013), important questions remain about how and whether individuals will actively encourage one another to pursue collective-benefitting endeavors. Direct and indirect research suggests that social talk or interpersonal communication between relevant stakeholders has important implications on collective action and voluntary compliance (Dawes, 1980; Shank et al., 2018). Forms of peer-to-peer communication have been shown to foster situation-appropriate norms (Balliet, 2009; Kerr, 1995; Ostrom, 2014; Sally, 1995), amplify perceptions of risk (Binder et al., 2011; Kasperson et al., 1988), and support the rapid diffusion of technology (e.g., word-of-mouth, Berger, 2014b). Thus, it is important to consider the social and collective capital that individuals represent not only as core contributors of collective action, but also as civic actors in the process of information dissemination and social influence. Yet, interventions addressing collective action problems have largely failed to consider the social pressure individuals can apply—through their intentional conversations—to spread context-dependent information and enforce community norms and shared values.

In recognition of the above, this chapter highlights and summarizes the role of interpersonal communication as an underappreciated mechanism for fostering widespread collective action. Specifically, I appeal to direct and indirect evidence in support of interpersonal communication in the formation of situation-appropriate norms and explicate the potential fit of interpersonal communication as a practical intervention in promoting environmental collective action. As an organizational framework, I characterize the nature of informational exchanges likely to occur between individuals and the anticipated implications of such engagement. Finally, I suggest pathways for resource managers and others to pursue in scaffolding interpersonal interactions among

relevant stakeholders, while bringing attention to contextual and individual-level factors that can impact the likelihood of engagement as well as the efficacy of such interactions.

<div align="center">**<u>Social Networks</u>**</div>

A discussion concerning the communication and influence of social norms would be incomplete without recognizing the levels of the social system (e.g., social networks, entire society) at which they operate. Social norms emerge and derive meaning from interactions shared by members of a group, community, or entire society (Lapinski & Rimal, 2005). Thus, social norms function at different scales and vary depending on the relational make-up of the social network (Bodin & Crona, 2009; Lapinski & Rimal, 2005). Within the environmental domain, social networks (and social network analysis) have garnered increasing attention among researchers (e.g., Adger, 2003; Bodin & Crona, 2009; Bodin, Crona, & Ernstson, 2006; Tompkins & Adger, 2004). This is partly driven by the normative notion that informal governance structures (e.g., co-management) are needed to address contemporary natural resource problems, particularly when top-down policies and formal governance systems are failing or entirely absent (Adger, 2003; Ostrom, 2014). Social networks (and the norms embedded within them) have been identified as common and integral features in research focused on understanding the likelihood of collective action and effective natural resource management (Folke, Hahn, Olsson, & Norberg, 2005; Olsson, Folke, Berkes, 2004; Olsson, Folke, & Hughes, 2008; Pretty & Ward, 2001).

Defined as meaningful relations and interactions between actors, social networks serve as primary channels for the generation, acquisition, and diffusion of information (Bodin & Prell, 2011; Burt, 2009; Rogers, 2010). The fundamental component of a social

network is an actor, for example, a landowner who is considering whether to designate part of their property as a conservation easement or a government official involved in monitoring recreational fisheries. Links or ties between actors create patterns of connections and relations, which can have a significant impact on societal and ecological outcomes (Bodin & Crona, 2009). Social networks provide a useful conceptual and analytical framework for discerning the structural characteristics of a social system, including how patterns of relations between various actors enhance or inhibit the distribution of information through and between bounded communities (Bodin et al., 2006; Bodin & Crona, 2009).

It is important to note that social networks are characteristically different in terms of their structure, density of relations, degree of cohesiveness, and interconnectivity, which can affect key social processes, including the degree to which information and behaviors spread (Bodin et al., 2006; Bodin & Crona, 2009, Prell, Hubacek, & Reed, 2009). In terms of environmental collective action, several studies suggest that collective action is enhanced by higher network density or greater social ties among actors (e.g., Diani & McAdam, 2003; Harn, Olsson, Folke, & Johansson, 2006; Pretty & Ward, 2001). Thus, forging and supporting connections among actors, especially between disparate actors (e.g., individuals, community groups, government officials, etc.) can increase the possibility for communication and ultimately, joint action (Bodin & Crona, 2009). For instance, information on sustainable management practices and emerging technologies for agriculture has been shown to flow through informal social ties (e.g., Conley & Udry, 2001; Isaac, Erickson, Quashie-Sam, & Timmer, 2007). While strong, abundant social ties facilitate the diffusion of information, excessively high network density can result in

123

homophily (McPherson, Smith-Lovin, & Cook, 2001). Homophily arises when

interactions between similar individuals—as a function of race, ethnicity, gender, age,

educational attainment, etc.—occur at a higher frequency than among dissimilar people

(McPherson et al., 2001). While similar or like-minded individuals may be better able

and willing to communicate with one another, excessively dense networks can result in

the homogenization of information and knowledge, limiting the introduction and

circulation of new information and ideas (Barnes, Lynham, Kalberg, & Leung, 2016;

Friedkin, 2006; McPherson et al., 2001). This is particularly problematic in the context of

environmental collective action, as successful resource management depends on the

integration of ideas from and collaboration of diverse stakeholders (Barnes et al., 2016;

Bodin & Crona, 2009; Crona & Bodin, 2006).

Social networks provide distribution pathways that enable actors to diffuse

information, collaborate, and coordinate for environmental collective action (Bodin et al.,

2005). Just as density and strength of ties between actors can impact outcomes, the

position of actors within a network can differentially influence the extent information

circulates through a system (Crona & Bodin, 2006; Prell et al., 2009). Thus, the

identification and activation of highly connected and well-positioned actors is critical in

successfully leveraging the power and interconnectedness of an established social

network (Bodin et al., 2006; Crona & Bodin, 2006). Collectively, research on social

networks suggests that supporting the development and maintenance of communication

channels between relevant actors can enhance the propensity for joint action and other

kinds of ecologically meaningful collaboration (Bodin & Crona, 2009). Although an

entire chapter can be dedicated to the structural components and consequences of social

networks, here, I focus on the type of information actors may share, how norms are communicated, and how aspects of the communication process may manifest to influence whether and how information is relayed, attended to, and received.

Interpersonal Communication: An Organizational Framework

Although considerable variability exists relative to the definition of interpersonal communication, many characterize it as the mutual exchange of messages between individuals (Cappella, 1987; Burleson, 2010). The interdisciplinary origins of interpersonal communication emerged from work primarily concerned with the role that it plays in the exercise of social influence (Berger, 2014a), such as Lewin's (1974) seminal work examining the effect of group discussions on individuals' uptake of unattractive consumptive behaviors. Subsequent research across myriad domains has continued to examine how interpersonal communication factors into producing persuasive outcomes and the achievement of broad individual and societal goals, such as generating shared meanings about engagement (Berger, 2014). With respect to promoting collective action, interpersonal communication may amplify aspects of issue engagement by fostering situation-appropriate social norms (Kerr, 1995; Ostrom, 2014), strengthening and converging perceptions of shared risks (Binder et al., 2011; Kasperson et al., 1988), fostering solutions toward social change (Mulgan, 2006), and encouraging the diffusion of relevant technologies (Berger, 2014b).

The effects of interpersonal communication vary widely in terms of the type of information exchanged between individuals. Ranging from everyday conversations about a topic to more valanced discussions about what should or ought to be, conversations can differentially influence behavioral and/or attitudinal outcomes. Thus, for the purpose of

this organizational framework, the primary focus will be on the type of information exchanged between individuals. Drawing on principles of social influence and social norms, understanding the types of information exchanged between individuals sheds light on how and under what conditions such interactions may materialize to influence collective action outcomes. Regardless of the information being traded between communicating partners, forms of interpersonal communication share common characteristics that can be classified along two different dimensions: (1) injunctive norm salience and (2) degree of transformation.

The first dimension considers the degree to which the injunctive norm is made salient (i.e., low versus high). That is, this dimension considers whether or not information is conveyed about what is considered socially approved or disapproved of behavior (or beliefs; Cialdini, 2009). I focus here on injunctive norm salience for two reasons: (1) injunctive norms influence intentions and behavior across a wide range of social contexts (Cialdini & Goldstein, 2004) and (2) injunctive norm information must be conveyed through language-based communication rather than observed (Lapinski & Rimal, 2005). Each collective action problem differs in terms of the level of uncertainty that may exist relative to what should or ought to be done in a given situation. Situations that are masked by uncertainty tend to undermine peoples collective action tendencies (e.g., Barrett & Dannenberg, 2012; Gustafsson, Biel, & Garling, 1999; Milinski, Semmann, Krambeck, & Marotzke, 2006). This can be particularly problematic when people lack information with respect to what relevant others' expectations are about the appropriateness or inappropriateness of a particular behavior (Cialdini et al., 1990). Since individuals do not have a direct window to others' minds, the type of information

126

exchanged during an interpersonal interaction may fill an important gap in peoples'

understanding of what is regarded as socially (in)appropriate behavior in these contexts

(Lapinski & Rimal, 2005).

The second dimension considers the anticipated degree of transformation. That is,

the degree to which a communicative act will encourage the uptake of a target behavior

or belief (e.g., low versus high). High transformative communication acts provide

information that is more likely to result in a change in another person's behavior and/or

beliefs, either by articulating an injunctive norm or by providing information about how

to perform a particular behavior. This type of information can be critical in shifting

others' actions in the direction of a desired, collective-benefitting behavior.

Comparatively, interactions that are considered 'low' transformative acts reveal relatively

neutral, non-persuasive information about a topic or serve to reinforce the occurrence of a

desirable behavior. These exchanges (i.e., 'low') are not incapable of producing change,

considering any form of interpersonal communication is likely to exert a greater degree

of influence on individuals' attitudes and behaviors compared to traditional, top-down

communication (Katz & Lazarsfeld, 2017; Nisbet & Kotcher, 2009).

As seen in Table 16, the two dimensions combine to result in a number of types of

informational exchanges that are likely to occur during an interpersonal conversation. As

part of the following discussion, I highlight characteristics of these exchanges and

expound on the anticipated implications various informational exchanges may present. It

is also important to note that these types of information exchanges are not mutually

exclusive during a single conversation. In fact, it is more than likely that individuals'

conversations will intersect and touch upon the many types of information presented

here. Additionally, this typology presents a rudimentary and necessarily incomplete

universe of the types of information that can be relayed during a discussion. Thus, this

should not be considered as a comprehensive guide, but rather just one way to conceive

the nature of information exchanges that can exist during an interpersonal conversation.

Table 16. An organizational framework delineating the nature of information exchanged during interpersonal conversation. Types of informational exchanges are characterized across two dimensions: injunctive norm salience (low vs. high) and nature of transformation (low vs. high)

		INJUNCTIVE NORM SALIENCE	
		LOW (Informational)	HIGH (Persuasive)
DEGREE OF TRANSFORMATION	LOW	DECLARATIVE	PRAISE
	HIGH	DESCRIPTIVE ——————— PROCEDURAL	PRESCRIPTIVE/ PROSCRIPTIVE ——————— ADMONISHMENT

Low Injunctive Norm Exchanges

Low injunctive norm exchanges are those that appear on the left-hand column of

Table 16. These types of exchanges reveal relatively neutral, topical—often factual—

information about a particular subject, behavior, or state of being, with limited to no information conveyed about the injunctive norm.

Declarative

Declarative exchanges convey factual information or knowledge, including information about an issue, state of being, or behavior (Hines, Hungerford, & Tomera, 1987). Declarative awareness is identified as the knowledge of fact, representing concepts, states of being, ideas, and theories (Hines et al., 1987; Kaiser & Fuhrer, 2003). In the present context, declarative information can involve a number of aspects related to the collective action problem, including how it works, who or what is at risk, what the projected impacts are, and/or what individuals can do about it. For instance, how climate change affects the frequency and intensity of natural disasters (e.g., wildfires, hurricanes, spread of invasive pests) is a declarative piece of information (IPCC, 2014), whereas information about how to maintain wildfire fuel breaks on one's property is not. According to the diffusion of innovation theory, social networks play an important role in in the dissemination and acquisition of new information (Rogers, 2010), which can include spreading critical context-dependent information about the state of a natural resource and/or the actions needed to sustain it. The extent to which information spreads through a social network depends on the number and strength of social ties (Granovetter, 1973). Declarative information may also play an important role in enhancing perceptions of response efficacy, by shedding light on how a target behavior can result in a desired outcome (Ajzen, 2002; Lam, 2006; Steg & De Groot, 2010).

Although extant literature reveals that knowledge alone is insufficient in motivating changes in behavior (Bamberg & Möser, 2007; Kollmuss and Agyeman,

129

2002), information exchanged between individuals may hold considerably more weight given the social processes and meanings attached to it (Abrahamse & Steg, 2013; Lewin, 1947; Nisbet & Kotcher, 2009). Compared to mass media effects, topical—declarative—discussions between individuals can amplify perceptions of risk and generate shared risk perceptions of environmental threats, by eliciting stronger feelings of personal relevance (Binder et al., 2012; Kasperson et al., 1988; Morton and Duck, 2001). For instance, in a correlational study, Morton and Duck (2001) found that students who indicated having discussed the topic of skin cancer with others were more likely to believe that they themselves were at personal risk for it.

In addition to spreading and increasing the salience of critical conservation information, declarative exchanges can also assist in the rapid diffusion of relevant technologies (e.g., word-of-mouth; Berger, 2014b; Roger, 2010). Declarative information may be particularly important in the adoption of technologies that are not readily observable by others, and thus can't rely on descriptive cues to evoke a social contagion effect (e.g., solar panel adoption, Graziano & Gillingham, 2014). But, like most interpersonal interactions, which will be discussed in further detail latter on in this chapter, whether declarative information is received and acted upon is dependent on a number of factors, including people's prior beliefs about an issue (Binder et al., 2012). Although people can develop descriptive norm perceptions based on the prevalence of individuals conversing about a topic, declarative information reveals little to no information about the injunctive norm. Taken together, declarative information exchanges are considered 'low' transformative acts, because increases in awareness do

not typically translate to changes in behavior (Bamberg & Möser, 2007; Kollmus & Agyeman, 2002), perhaps particularly in the context of collective action problems.

Descriptive

Descriptive exchanges communicate information about what others do or believe relative to a particular behavior or issue (Cialdini et al., 1990). Akin to descriptive norms, this entails information about the number of people (pertaining to a specific referent group) who have or have not engaged in a particular act or whom endorse a certain belief (e.g., support community resilience measures). Although descriptive information can be inferred based on observing others' actions (or inactions), such information can also be conveyed through verbal and non-verbal communication (e.g., Cialdini et al., 1990; Cialdini, 2009; Goldstein et al., 2008). Descriptive information is considered a high transformative act because the presence of salient descriptive norms can trigger the uptake of a desired behavior (Cialdini et al., 1990; Schultz et al., 2008). Much research has found that the provision of descriptive norm messages (i.e., made salient in written form) can mobilize cooperative behavior by highlighting what relevant others do, including encouraging towel reuse in hotels (Goldstein et al., 2008), soliciting blood donations (Reingen, 1982), and increasing voter turnout (Gerber, Green, & Larimer, 2008; Panagopoulos, Larimer, & Condon, 2013). One example of a descriptive informational exchange is telling a non-compliant neighboring landowner that the rest of the neighborhood has taken actions on their property to increase their resilience to an environmental risk. By way of conformity and/or for fear of social ramifications, such descriptive cues can instill motivation in the non-compliant neighbor to adopt a similar course of action as the rest of their neighbors.

Although descriptive information can be a powerful motivator, conversations that present descriptive information alone or in conflict with injunctive information can produce unintended effects (Schultz et al., 2007; Smith et al., 2012). For instance, conversations that emphasize the prevalence of an undesirable behavior can be counterproductive in achieving desired change, provided people are prone to follow the majority (Cialdini, 2009). Additionally, in the complete absence of or presence of weak injunctive information about the (in)appropriateness of a given act, individuals can problematically regress to the mean or freeride off the efforts of others (Schultz et al., 2007; Smith et al., 2012). For instance, field work by Schultz et al. (2007) demonstrated that while providing descriptive information about neighbors' household energy consumption motivated above average energy consumers to reduce their consumption to the observed mean, below average energy consumers subsequently increased their consumption rates. However, when coupled with injunctive information about the appropriateness of a given action, descriptive information can limit unintended backfire effects (Schultz et al., 2007). In sum, descriptive information can play an important role in the formation and maintenance of perceived social norms and the uptake of a desired behavior, particularly when norms are associated with a revered and/or relatable reference group (Lapinski & Rimal, 2005; Rimal & Real, 2003).

Procedural

Procedural exchanges convey information about how to perform a specific behavior or action (Kaiser & Fuhrer, 2003). One of the many significant determinants of human behavior and decision-making concerns people's perceptions about their capacity to engage in a particular act (e.g., 'perceived efficacy', Bandura, 1977; Gifford &

Nilsson, 2014). Indeed, it is practically impossible to expect someone to take collective action without first instructing them on why they should do it (e.g., a form of declarative information) and how to perform the specific action (e.g., procedural information). Although people may be highly motivated to perform a certain task, they may simultaneously lack the requisite procedural knowledge to act in ways that are consistent with their underlying beliefs and attitudes (De Young, 1993). Empirical findings indicate that procedural knowledge can be an important predictor for some pro-environmental behaviors, including recycling behavior (e.g., Hornik, Cherian, Madansky, & Narayana, 1995).Thus, the exchange of procedural information between individuals can serve an important role in providing how-to insights about performing a behavior, which may be particularly useful when the target behavior is characterized by a high level of perceived or actual difficulty. Procedural exchanges may also function as the social proof that it is needed to motivate one to undertake a desirable action (Cialdini, 2009). Given the relationship between procedural knowledge and behavior, procedural information is considered a 'high' transformative act.

High Injunctive Norm Exchanges

High injunctive norm or persuasive exchanges are those that explicitly state or imply an injunctive norm (e.g., what should or ought to be) in a given context. Since injunctive information cannot be directly inferred through observation (Lapinski & Rimal, 2005), conversations that convey injunctive information are critical to the creation and maintenance of social norms. Below, high injunctive norm exchanges are classified as either interpersonal sanctions (e.g., praise, admonishment) or as antecedent exchanges (e.g., prescriptive, proscriptive).

Praise and admonishment represent forms of communication that materialize in direct response to social stimuli, such as witnessing a behavioral transgression or overhearing a anti-normative expression (e.g., observing someone watering their lawn during restricted day-time periods). Built on systems of reward and punishment, interpersonal sanctions, such as praise and admonishment, serve the function of normalizing desired behaviors (or beliefs) and marginalizing undesired ones (e.g., Ostrom et al., 1992; Nolan, 2013; Yamagishi, 1986). In both cases, the salience of the injunctive norm is high because praise or admonishment given in response to collective action behaviors provides direct situational feedback that a person is violating or conforming to an existing social norm, respectively (Ostrom et al., 1992). Indeed, forms of peer-to-peer feedback such as praise and admonishment represent a powerful mechanism for creating, enforcing, and maintaining norms in social environments (Balliet et al., 2011). Evidence that interpersonal sanctioning matters comes from decades of social dilemmas research, which consistently highlights how decentralized sanctions (e.g., praise, admonishment) between players subsequently increases cooperation and yield (for review see Balliet et al., 2011).

Related research has also demonstrated how failing to confront counter-normative behaviors or beliefs, such as anti-environmental statements, can be misconstrued as passive acceptance (Czopp, 2013; Blanchard et al., 1994). For instance, Czopp (2013) showed how witnessing an environmental activist fail to confront anti-environmental comments resulted in subjects reporting less favorable attitudes towards recycling as well as reduced intentions to recycle in the future compared to those who observed a

confrontation. Thus, if left unchecked, anti-normative actions and beliefs can permeate in society and produce negative ecological outcomes. As to be expected, confronting counter-normative actions can promote positive change. Swim and Bloodhart (2013) found that when college students were admonished for an anti-environmental behavior (e.g., taking the elevator), they subsequently engaged in more pro-environmental actions and reported elevated intentions for positive future engagement. Although praise and admonishment have been shown to similarly encourage cooperation in social dilemmas games (Balliet et al., 2011), I consider praise a low transformative act because it primarily functions to reinforce a desired action, whereas admonishment is more likely to cause a shift in another person's behavior, either by them subsequently refraining from the negative action again and/or by adopting the desired behavior (e.g., Czopp et al., 2006; Swim & Bloodhart, 2013). Regardless, each form of interpersonal sanctioning can reveal critical information about what is considered socially approved or disapproved of behavior.

Prescriptive and Proscriptive

Prescriptive and Proscriptive information strongly parallels interpersonal sanctions. Communication of prescriptive or proscriptive information entails explicitly indicating what should or should not be done in a given context, respectively (Farrow, Grolleau, & Ibanez, 2017; Janoff-Bulman, Sheikh, & Hepp, 2009; Shank et al., 2018). In contrast to interpersonal sanctions, prescriptive and proscriptive informational exchanges do not necessarily materialize in response to others' behaviors or belief expressions, but rather set the stage, so to speak, with respect to what the social expectations are about appropriate behavior in a given context (Farrow et al., 2017; Shank et al., 2018). For

135

instance, proscriptive informational exchanges may be important in dictating how individuals ought to behave in a recreational setting, including statements like 'we should refrain going off trail in a recreational area.'

Indeed, extant literature in social dilemmas research highlights that when players are given the opportunity to communicate between rounds of decision-making, cooperation and yield significantly increases (Balliet, 2009; Ostrom et al. 1992; Sally, 1995). However, such conversations are only as effective as they pertain to context-dependent issues (Bouas & Komorita, 1996). For instance, in communication-based conditions where cooperation significantly increased, content analyses revealed that players 'emphasize[d] not only the mutual gains obtained from cooperation, but also its appropriateness and normative appeal' (Bicchieri & Lev-On, 2007, p.163). Recent empirical work supports these findings, demonstrating how prescriptive and proscriptive exchanges directly impact cooperation and the facilitation of situation-appropriate norms. For instance, Shank et al. (2018) showed how cooperation immediately spiked after every norm talk opportunity, in which concrete prescriptive and proscriptive messages, such as 'we should contribute a lot to the group', were exchanged between participants. Shank et al. (2018) argue that prescriptive and proscriptive norm talk represent a more explicit form of norm talk, compared to interpersonal sanctions which only imply an injunctive norm through the act approval or disapproval. In each of these exchanges, however, the salience of the injunctive norm is considerably high and more likely to encourage the engagement with a desired behavior compared to other forms of information.

Taken together, the nature of information exchanged between individuals can differentially impact how people come to view an issue, approach collective-action

behaviors, and/or perceive social norms. Perhaps most critically, these types of exchanges differ in terms of the extent a conversation highlights what ought to be done, which people can use to construct, modify, or reinforce their perceptions of social norms in a given situation or context. Whereas low injunctive norm exchanges, such as those that convey declarative information, can spread context-dependent information, high injunctive norm exchanges play a more powerful role in creating and enforcing situation-appropriate behavior. Collectively, different forms of informational exchanges all share a common characteristic. Based on the publicly observable nature of interpersonal communication, any interaction holds the potential to bring greater attention to the issue or behavior.

Whether interpersonal conversations produce anticipated outcomes is largely contingent on how information is packaged and conveyed. Information is rarely presented in a neutral way and thus we must consider how emotionally-charged information, points of reference (e.g., referent groups), and belief expressions may impact issue engagement. During an interpersonal conversation, in particular, people are likely to—either directly or indirectly—attach their own personal beliefs to a statement, such as whether they agree or disagree with a specific idea or action. Belief expressions carry more or less weight depending on the existing relationship between the communicating partners, which may affect whether people attend to or reject the information being transferred (Moser, 2010; Wilson & Sherrell, 1993). Similarly, the point of reference (e.g., individual versus group) associated with a given statement can also influence its effect. For instance, prescriptive statements that lead with 'you' rather than 'we' may undermine people's perceptions about others' intention for reciprocal cooperation (Shank et al., 2018). Additionally, the

referent group associated with a descriptive statement will differentially impact issue engagement depending on whether the group is perceived as personally relevant or well-respected by the receiver (Hogg & Reid, 2006; Rimal & Real, 2003). Emotionally-charged expressions are may also determine how individuals attend to and respond to an interpersonal conversation (Berger, 2014a), however, less is clear about how emotions will materialize to influence conversational outcomes (Chapman, Lickel, & Markowitz, 2017).

Perhaps the most significant limitation of interpersonal communication is that although it can play an important role in diffusing topical and normative information across relevant social networks, these conversations are just as likely to backfire and produce negative outcomes. Indeed, the likelihood of everyday conversations producing positive, collective-benefitting outcomes is contingent on whether messages support or oppose collective action objectives. Just as people can spread critical context-dependent information or enforce situation-appropriate social norms, people can also encourage engagement with counter-normative behaviors, promote inaction, and/or spread inaccurate information, whether intentionally or unintentionally through their conversations with others. Thus, despite the potential of interpersonal communication to promote cooperation, conversations between stakeholders can also pose significant challenges to advancing change, particularly if counter-productive conversations are continually reinforced.

Factors Influencing Willingness and Outcomes

Individuals willingness to converse with others as well as the effectiveness of interpersonal interactions is influenced by a number of contextual and individual-level

factors. It is incorrect to assume that information presented during a conversation is equal

to the information received. Since many environmental collective action problems have

become less about scientific facts and more about what these issues mean for the values

and interests of disparate political and social groups (McCright & Dunlap, 2011), the

influence of informational exchanges may be more contingent on source characteristics

(e.g., the communicator) rather than on the content of the message (Petty & Cacioppo,

1986). The social, political, and environmental context of collective action problems may

also pose similar challenges with respect to suppressing (or motivating) individuals'

willingness to communicate with others. Although conversing with others holds

considerable promise in promoting widespread collective action, there are significant

barriers limiting engagement with and the efficacy of such interactions, including those

related to group identity, individual differences, features of the behavior, and the issue at

hand. Table 17 summarizes some of the features of interpersonal conversations that can

impact engagement and subsequent outcomes.

Table 17. Summary of interpersonal communication principles discussed throughout this chapter

Communication enhances cooperation. Forms of interpersonal communication can increase the transparency of privately expressed behaviors, facilitate situation-appropriate norms and diffuse critical context-dependent information.
Norms function when salient. Cooperation in collective action behaviors enhances when interpersonal discussions highlight what relevant others do and believe is socially accepted.
Face-to-face is the gold standard. Face-to-face interactions are more effective forms of personal influence than written or other non-verbal exchanges.
Time and people amplify benefits. The benefits of interpersonal communication amplify when occurrences accumulate over time and as the number of communicating partners increases.

Norms are attached to social identities. Normative information (e.g., injunctive and/or descriptive norms) that is associated with salient and desired referent groups (e.g., an in-group identity) will lead to greater cooperation.
Activate the right messengers. People are more likely to attend to and integrate information conveyed from messengers who share a similar social identity and/or life experience.
Issue morality influences outcomes. Collective action issues that are viewed more strongly as a moral imperative (and have normative standing as well) should generate more interpersonal discussions among relevant stakeholders.

Group Identity

Given the heterogeneity of the social environments within which we live, the implications of individuals' social identities cannot be underestimated with respect to interpersonal communication. People derive part of their self-concept based on the social groups to which they belong and social identity processes can meaningfully and significantly effect individuals' appraisal of and responses to environmental collective action problems (Kahan, Braman, Gastil, Slovic, & Mertz, 2007; Kahan, Jenkins-Smith, & Braman, 2011). Indeed, one of the most significant findings in social psychological research over the past decade identifies the role motivated social psychological processes play in determining different aspects of issue engagement, including individuals' judgement of and receptivity to new information (Kahan et al., 2007; Kahan et al., 2012; Kunda, 1990). With respect to interpersonal communication, people's ability to attend to and integrate new information is largely mediated by perceived attributions of the source (Moser, 2010; Nisbet & Kotcher, 2009; Petty & Cacioppo, 1986). People more readily accept information from trustworthy and/or similar sources, and systematically reject information from dissimilar sources (Kahan et al., 2007; Wilson & Sherrell, 1993). Thus,

messengers who share strong likenesses with the receiver (e.g., mutual identity or shared life circumstance; Malka, Krosnick, & Langer, 2009) can act as 'seals of approval' for new information that may otherwise be neglected or mistrusted when delivered by less credible and/or dissimilar sources (Corner et al., 2015; Moser, 2010).

Everyone holds multiple goals, values, or identities that can be activated in a given situation. Oftentimes these identities can be at conflict with one another or at conflict with others (in-group versus out-group dynamics). The nature of interdependence surrounding collective action problems (and solutions) may necessitate the formation of commonly held identities that encompass the values and interests of disparate groups (Buchan et al., 2011). In order for people to be influenced by social norms, they must feel some degree of affinity towards the referent group (Lede, Meleady, &Seger, 2019; Terry, Hogg, & White, 1999). This is particularly important because cooperation increases in situations where there is a strong sense of in-group identity (De Cremer, Van Knippenberg, Van Dijk, & Leeuwen, 2008; Gächter & Fehr, 1999). Conversations, such as those that highlight descriptive information about what most others do or approve of, are more powerful when anchored to meaningful referent groups (e.g., Lede et al., 2019; Hogg & Reid, 2006; Rimal & Real, 2003). Given the characteristics of a collective action problem, such as whether resources are shared between a bounded community or subject to use by many disparate users, communicators will differentially face challenges in identifying a salient, in-group identity. In the absence of strong in-group identification, it may be particularly difficult for individuals to converse with dissimilar others or for information to be effectively relayed.

Social identity processes can also determine people's willingness to engage in conversations with others, particularly when presented with the opportunity to confront others' harmful actions or beliefs (Czopp & Montieth, 2003; Kaiser & Miller, 2001; Stangor, Swim, Van Allen & Sechrist, 2002). For instance, in the context of prejudice responding, research finds that traditional targets of prejudice (e.g., women, African Americans) are less willing to register a complaint to groups composed of non-traditional targets of prejudice (e.g., men, white; Czopp & Montieth, 2003). The dynamics of social identity processes underscores one of the more significant limitations of peer-to-peer communication: the potential that people will only communicate with like-minded others. Recent social network analyses highlight this effect, demonstrating that informational exchanges on social media (e.g., Twitter) tend to be siloed within polarized 'echo chambers' rather than diffused across disparate social networks (Jasny, Waggle, & Fisher, 2015; Williams, McMurray, Kurtz & Lambert, 2015). However, such engagement should not necessarily be considered a limitation, provided amplifying issue salience and reinforcing shared beliefs within a bounded community may encourage individuals to take collective action and secure the provision of a necessary public good (e.g., community resilience).

Communication Channels

The modalities of communication can also moderate the effects of interpersonal conversations based on the degree and intimacy of personal interaction that occurs between individuals (Walther, 1992). Face-to-face interactions are considered the gold standard with respect to maximizing social influence and compliance (Abrahamse & Steg, 2013; Walther, 1992). For instance, face-to-face solicitation of pledges to

participate in a recycling program subsequently increased the number of pledges obtained as well as the frequency of recycling among participants, compared to less personable approaches (e.g., flyer; Reams & Ray, 1993). Reviews of social dilemmas research further reveals that verbal rather than written interpersonal communication leads to greater cooperation (e.g., Balliet, 2009). Thus, although sending computer-mediated exchanges offers a rapid means through which to spread information to many people at once, there are significant trades-offs that can undermine the efficacy of such interactions. Multiple explanations have been offered to explain this decay of treatment effect. Face-to-face interactions evoke and sustain attention to a greater degree that computer-mediated exchanges (Berger, 2013). This is partially because computer-mediated interactions suffer from a loss of non-verbal cues and exposure to less immediate social pressures, which can undermine the persuasiveness of an informational exchange (Berger, 2013; 2014a; Wather, 1992).

Frequency of Interaction

Like most behaviors that are continually reinforced, the benefits of interpersonal communication increase with sustained engagement (Ostrom, 2000; Ledyard, 1995; Shank et al., 2018). Much of the work examining the effect of interpersonal communication in social dilemmas research reveals that norm talk can arrest declining levels of cooperation by causing immediate spikes in cooperation, which then gradually fades between rounds of decision-making (Shank et al., 2018). Despite cooperation oscillating between rounds of decision-making, the overall strength and durability of the effect of topic-relevant discussions significantly outperforms conditions that are absent of communication (Shank et al., 2018). What this research reveals is that injunctive norms,

via interpersonal sanctioning or prescriptive/proscriptive exchanges, must be made salient periodically in order to sustain cooperation over time. Within the structure of a social dilemmas game, however, there is a greater opportunity to iteratively discuss normative information compared to real-world settings where convesations occur less frequently and/or inconsistently (Shank et al., 2018). Thus, resource managers and practitioners are faced with challenges with respect to making social norms, through interpersonal communication, more salient and accessible over prolonged periods of time. When occurrences of interpersonal communication accrue over time it may encourage many people to similarly engage, provided cooperation has been shown to increase as the number of communicating partners increases (Balliet, 2009; Kinukawa, Saijo, Une, 2000; Shank et al., 2018).

Social Costs

There are real and perceived risks associated with interpersonal communication that can weaken or at times, completely deter engagement. Given the politically and socially divisive nature of many environmental issues (e.g., McCright & Dunlap, 2011), the costs of communication, including the potential for social isolation or even physical harm, raises concerns about whether and how an individual will choose to converse with others (Steentjes et al., 2017; Geiger & Swim, 2016). Interpersonal sanctioning, in particular, can result in negative evaluations for the confronter depending on the normative status of the violated norm. For instance, Steentjes et al. (2017) identified that people distance themselves, as measured through reduced feelings of closeness and warmth, from individuals who confront statements of environmental disregard compared to statements of racial bias. Parallel to this finding, literature in moral psychology

144

suggests that confrontation (e.g., expressions of blame) carries significant social costs (e.g., loss of face, status, reactive aggression) that can defuse individuals' willingness to publicly blame others (Malle et al., 2012a). Steentjes et al. (2017) found that the social costs associated with confronting environmental disregard, were partly determined by the morality of issue, suggesting that the moral (or normative) status of the issue results in different consequences for the confronter. This finding suggests that issues perceived more strongly in terms of a moral imperative are likely to evoke greater interpersonal responses than those that are felt less strongly in terms of issue morality. Thus, collective action issues that are viewed as requiring immediate action or as a moral imperative may provide the necessary motivation for encouraging one to engage in an interpersonal conversation with another person. Whereas other scientifically complex issues underscored by long-time horizons, may have difficulty in activating the moral judgment system (i.e., climate change, Markowitz & Shariff, 2012).

Behavior Type and Visibility

The nature of the collective action problem as well as the target behavior can also impact engagement. Individuals' willingness to impose social sanctions on others' actions is not only dependent on the type of sanction (Nolan, 2013), but can also be moderated by the nature of the social dilemma (Nolan, 2013; Molenmaker, Kwaadsteniet, and van Dijk (2014). As to be expected, individuals are more likely to praise than admonish (e.g., Nolan, 2013; Molenmaker et al., 2014), but less obvious is the moderating effect played by the type of social dilemma. People are more likely to praise and to a greater extent when faced with a public goods dilemma compared to a common pool resource dilemma (Molenmaket et al., 2014). This suggests that the commission of a

145

positive contribution is viewed more favorably (or praise-worthy) than the omission of a similarly beneficial behavior, which is exercised—albeit invisibly—through resource restraint.

The public visibility of communicating with others may be particularly motivating for some, while simultaneously demotivating for others (e.g. Brick et al., 2017; Griskevicius et al., 2010; Guckian, Danylchuk, Cooke, & Markowitz, 2018; Sexton & Sexton, 2011). Engagement in forms of interpersonal communication may fulfill people's desire to signal a social identity or status that is favored in a particular social context or among relevant social groups (Anderson, Hildreth & Howland, 2015; Griskevicius et al., 2010). For instance, Guckian et al. (2018; Chapter III) found that recreational anglers who were more concerned about their reputation within their angling community reported sanctioning others' (in)appropriate angling practices to a greater degree in the past as well as elevated intentions to sanction others in the future. These and other related findings parallel costly signaling theory, which suggests that people are willing to incur costs (e.g., money, time, social) in order to signal valued social attributes (e.g., altruism, group identity; Bird & Smith, 2005).

Blamelessness

The normative or moral status of an issue may also influence individuals' willingness and ability to impose social sanctions on others' actions. Insights from the field of moral psychology highlight the social and cognitive conditions under which people arrive at judgements of blame and subsequent blame expressions (e.g., admonishment; Malle et al., 2012b). This literature suggests that individuals' judgements and subsequent expressions of blame are contingent on delineating whether (1) the

146

behavior violated a norm, (2) the individual was at fault, and (3) the action was intentional ('step model of blame'; Guglielmo et al., 2009). People blame intentional norm violations more and to a greater degree than unintentional violations (e.g., Guglielmo et al., 2009).

Thus, in order for a person to arrive at a judgement of blame, social perceivers need to maintain the belief that an environmental transgression actually violates a norm (e.g., Monroe, Dillon, Guglielmo, & Baumeister, 2018). This suggests that an injunctive norm must be established and understood for a person to decipher whether or not a violation has occurred. In the absence of well-established norms in support of collective action, it is unlikely that individuals will impose sanctions on others non-compliant behavior (Monroe et al., 2018; Nolan, 2017). For instance, Nolan (2017) found that people were more likely to express disapproval of non-cooperators in towns that had formal sanctioning systems (e.g., mandatory town recycling program) compared to unregulated townships (e.g., pay-as-you-go or voluntary). Ascertaining the cause or intentionality of others' transgressions is equally problematic. Perceived transgressors may lack the financial resources to engage in collective-benefitting behaviors, be obligated to perform certain acts (e.g., for a job), or be deprived of structural features that support positive engagement (e.g., access to public transportation). Thus, these and related factors are likely to confound people's perception of causality and intentionality with respect to transgressions, particularly given the blamelessness and shared responsibilities surrounding many environmental issues (e.g., Markowitz & Shariff, 2012).

Psychological Standing and Motivation

Since the effectiveness of collective action solutions is dependent upon large number of people engaging, relevant stakeholders should be motivated to support and encourage cooperation among their peers (Rogers et al., 2018). An individual's underlying motivation for a cause may be able to suppress the many notable barriers that render people reluctant to converse with others. In terms of interpersonal communication, individuals may derive motivation from a variety of sources (for review see Berger, 2014), including a desire to reduce situational uncertainty (Berger & Calabrese, 1974), reveal personal information to others (Kelley & Thibaut, 1978), achieve a preferred personal and societal goal (Berger, 1997), or actively manage elements uncertainty (Brashers, 2001). In terms of the latter, people can be problematically motivated to maintain levels of uncertainty as a coping mechanism to distant themselves from the reality of environmental risks, such as refraining to speak about issues with others (e.g., Norgaard, 2011).

Extant research suggests that individuals are motivated to engage in pro-environmental, health, and other domain-specific behaviors in order to satisfy or maximize their underlying interests, concerns, or values (e.g., Karp, 1996; Poortinga, Steg, & Vlek, 2004). Recent correlational research supports this, suggesting that individuals who are more concerned about the state of a natural resource (e.g., fishing population) are more likely to sanction others' (in)appropriate behaviors (Chapman et al., 2018; Guckian et al., 2018). Additionally, experimental work has demonstrated that women highly motivated by gender equity were more likely to confront a confederate's prejudice expressions (Swim & Hyers, 1999). Thus, participation in interpersonal

148

communication may rely on individuals who are highly motivated by a cause or else, feel more entitled to express their beliefs to others (Miller, Effron, & Zak, 2011; Maki & Raimi, 2017).

Psychological standing, is defined as the subjective feeling of entitlement or legitimacy to perform a particular act, such as protesting an injustice (e.g., sanctioning; Miller et al., 2011). People derive psychological standing based on the extent to which they perceive they are materially affected by or have a moral stake in an issue (Miller et al., 2011). When it comes to interpersonal communication, it is likely that people will question whether engagement is worth the trouble or cost? Responses to this question are more likely to be affirmative when individuals harbor the belief that they themselves have a vested and significant interest in the issue (Miller et al., 2011). For instance, approach motivation should be amplified when an individual fully comprehends that increasing their resilience to an environmental risk (e.g., Ratner & Miller, 2001), such as wildfire or invasive pests, is contingent on widespread action among their proximate peers (Elliot & Thrash, 2002). Thus, possessing psychological standing in the context of collective action problems requires that people perceive these issues as personally relevant, and furthermore, understand that benefits are contingent on many people engaging in the target behavior.

This may be the most critical piece in determining whether discussions among relevant stakeholders will materialize or if interpersonal communication is even a fitting intervention approach to pursue in a particular collective action issue. Situations that are marred by uncertainty, lack identifiable victims or immediate threats, may undermine people's capacity to perceive that they have a definitive material or moral stake in an

issue. However, when others' behaviors unequivocally pose direct consequences on your life—whether it be access to a resource or the provision of a public good—possessing some degree of psychological standing should support individuals' willingness to encourage cooperation via interpersonal communication.

Conceivably, the effects of psychological standing should be driven by a shared understanding about who has the right to say something in a particular context (Miller, 2001; Miller & Ratner, 1996). Although people may have immense standing relative to their experience of a social injustice (e.g., racism, sexism), research suggests that confrontational acts by non-traditional targets of prejudice are received more powerfully than confrontations expressed by traditional targets of prejudice (e.g., women, people of color; Czopp & Montieth, 2003). Thus, for certain and more divisive collective action problems, highly identifiable environmentalists (or victims) may be taken less seriously and viewed less favorably given their membership to a stigmatized group (Bashir, Lockwood, Chasteen, Nadolny, & Noyes, 2013). However, other research suggests that people are evaluated negatively for taking action on behalf of a cause in which they are perceived as having no material stake in (Ratner & Miller, 2001). To that end, it remains unclear how psychological standing will impact engagement in and outcomes of interpersonal communication in the context of collective action issues.

For instance, in some situations, such as recreational fisheries, people are similarly subjected to the same level of loss (e.g., lack of access) if a fishery were to collapse. With that said, however, the majority of environmental collective action issues tend to differentially affect disparate populations. In the case of the fisheries example, people who live near the resource and frequently use it are subjected to a greater degree

of loss than those who intermittently use it. These circumstances are more characteristic of large-scale collective action problems, where more vulnerable populations (e.g., poor, indigenous communities) are disproportionately subjected to a greater degree of harm than others (e.g., sea-level rise, air pollution; Brulle & Pellow, 2006; Morello-Frosch, Zuk, Jerrett, Shamasunder, & Kyle, 2011). Although these populations have more standing to speak up (e.g., Ratner & Miller, 2001), socially-constructed and actual differences in power and status may prevent individuals from engaging in forms of interpersonal communication (e.g., Shelton & Stewart, 2004) and whether their voices will be acknowledged (e.g., Czopp & Montieth, 2003).

Although a string of literature has begun to reveal how different individual, contextual, and social characteristics may impact individuals' willingness to communicate with others and the implications of such engagement, it is unclear how these dynamics will emerge and unfold across disparate environmental collective action problems. Environmental issues present different challenges in terms of the immediacy and overall threat of the problem, the degree of heterogeneity within the social environment, the nature of the target behavior as well as the social and political climate surrounding it. For instance, though people rarely report discussing the issue of climate change with others (Maibach et al., 2016), it may be unlikely for a similar silence to exist with respect to issues of local resilience or other environmental collective action issues. Although limited research has examined these dynamics in the environmental domain, many collective action problems and behavioral solutions share similar characteristics that position interpersonal communication as a potentially powerful mechanism for spearheading change and diffusing information.

Behavioral and Contextual Fit

Environmental collective action problems share a number of behavioral and situational characteristics that make it more or less difficult for social, cognitive, and top-down (e.g., policies) processes to foster widespread cooperation. At the same time, these characteristics, such as the invisibility of collective action, the biophysical nature of the issue, and lack of management and personnel capacities, situate interpersonal communication as a more relevant social influence approach for driving coordination and cooperation. Indeed, one of the many reasons interpersonal communication can facilitate change, is that it can intentionally reveal critical—otherwise difficult to access— information about others' behavior as well as raise the salience of psychologically distant issues (e.g., Spence et al., 2012). The purpose of the following section is to elaborate on several common behavioral and situational features of environmental collective action problems that situate interpersonal communication as a relevant approach for ushering positive change.

Uncertainty

Casting environmental issues as collective action problems reveals a lot about the way people psychologically perceive, process, and respond to resource constraint, uncertainty, competition, and environmental risks (Dawes, 1980; Van Lange et al., 2013). Some of the many possible social psychological challenges that can weaken coordination and cooperation within these situations are the absence of issue salience and lack of social proof with respect to what relevant others do and/or what is socially approved of action. Such uncertainty can derail people from engaging in collective-benefitting actions, particularly if no one else is perceived as taking action (e.g., Wit & Wilke, 1998).

This dynamic is especially important considering that the effects of social influence are in part conditional on the salience of social—injunctive and descriptive—norms, the degree to which a person's non-cooperative behavior is observed by others, and the extent to which one perceives that others comply with the norm (Cialdini, 2009; Cialdini & Goldstein, 2004). Amidst many environmental collective action challenges, however, these conditions are rarely met: injunctive and descriptive norms are often in conflict or entirely ambiguous, target behaviors are not always publicly observable, and social misperceptions exist relative to group-level compliance.

Visibility

Many collective management behaviors, such as those that take place on people's private properties (e.g., removing woody debris), are not publicly observable to others. This can be problematic because recent research distinguishing between publicly observable and non-observable behaviors suggests that visible behaviors are more susceptible to traditional social influence processes, such as modeling and observation, than are non-observable behaviors (Brick et al., 2017; Griskevicius et al., 2010; Sexton & Sexton, 2014). Although not all collective-benefitting behaviors are equally susceptible to social influence processes, there is reason to suggest that intentional social interactions can increase the occurrence of private behaviors (Geiger, Swim, & Glenna, 2019). For instance, in a recent social network analysis, Geiger et al. (2019) found that connections to opinion leaders (intentional interaction sources) predicted engagement in private-sphere behaviors, such as household energy consumption. Other related findings suggest that intentional conversations about a topic can increase the transparency and perhaps, engagement with otherwise difficult to observe behaviors (Abrahamse & Steg, 2013;

153

Hopper & Nielsen, 1991). Thus, in situations where the target behavior is not publicly observable, interpersonal communication may function by creating the social proof that is needed to foster a better understanding of prevailing social norms.

Social Misperceptions

Because social norms are seldom formally or explicitly stated (Cruz et al., 2000), people often misinterpret them and subsequently fail to accurately interpret the extent to which others hold a certain belief or engage in a specific behavior (Lapinski & Rimal, 2005). Social misperceptions can problematically lead people to act in a manner that is incongruent with their personal beliefs and/or adopt erroneous perceptions about prevailing social norms (Miller & McFarland, 1987; Prentice & Miller, 1993). For instance, although an individual privately rejects an idea or behavior, such as the excessive consumption of alcohol, they may publicly endorse it because they incorrectly assume that most others accept it ('pluralistic ignorance', Prentice & Miller, 1993; Shamir & Shamir, 1997). Unfortunately, there is fairly widespread evidence documenting social misperceptions across environmental collective action issues, including beliefs about climate change and policy support for renewable energy technologies (e.g., Leviston et al., 2013; Mildenberger & Tingley, 2017; Sokoloski et al., 2018). In a recent study, participants holding the majority opinion—that climate change is due to anthropogenic causes—greatly overestimated the percentage of climate change deniers (up to 21%), when the actual percentage was closer to 6%. Inaccurately perceiving the distribution of public opinion may suppress individuals support for collective action, especially in terms of voting for policy measures that endorse action (Leviston et al., 2013).

Although interpersonal communication may be able to defuse common misperceptions, by increasing the salience and transparency of individuals support for action, pluralistic ignorance can reduce individuals' willingness to communicate with others (Geiger & Swim, 2016; Rios & Chen, 2014). For instance, when presented with a false distribution of climate change opinion favoring the denialist viewpoint, participants most concerned about the issue (and whom held the majority opinion), were less willing to discuss the topic in a subsequent group discussion (Geiger & Swim, 2016). Problematically, Noelle-Neumann (1974; 1991) posits that normative misperceptions can create a self-perpetuating spiral-of-silence. The more people misperceive that their opinion is not held by the majority, the more the perceived majority opinion is reinforced publicly, the more reticent they will be to express their opinion (or vice versa). Thus, although interpersonal communication has the potential to correct existing social misperceptions, the prevalence of pluralistic ignorance may act as a significant behavioral barrier.

Issue Salience

Interpersonal communication may also help overcome notable cognitive barriers associated with the characteristics of the collective action problem. Why the gravity of collective action problems and the compelling body of scientific evidence surrounding them has not galvanized greater cooperation is partly due to the unique physical nature of the issues themselves (Gardiner, 2011). Climate change, in particular, is a vast, slow-moving, multifaceted problem and like many environmental collective action problems, the most damaging impacts are projected to occur in the future and impact distant places and people (IPCC, 2014). The physical and social characteristics of some environmental

collective action issues create a uniquely daunting confluence of forces that make it deeply challenging for individuals to cognitively comprehend or ascribe personal relevance to (e.g., Spence et al., 2012). This is especially the case when the immediate costs of taking action significantly overshadow the benefits that may not accrue during an individual's lifetime (e.g., Jacquet et al., 2013). Because many of these issues are not top-of-mind problems (e.g., Pew Research Center, 2014; Riffkin, 2014), interpersonal communication may play a critical role in increasing the salience of otherwise psychologically distant issues (Spence et al., 2012). Other environmental risks, such as wildfires, may not suffer from a similar lack of issue salience, provided wildfires present more immediate threats to people living in vulnerable areas (e.g., Colorado, California). Thus, peer-to-peer conversations may serve a dual function, either by bringing distant issues into the present or by amplifying the salience and need to take action for more immediate threats.

Limited Enforcement

Interpersonal communication and social influence approaches more broadly may be critically important in situations where enforcement and monitoring capabilities are limited. The physical scale of environmental collective action problems present significant challenges in terms of regulating user or stakeholder behavior, particularly when resource managers lack access to the requisite resources (e.g., money, personnel) to effectively monitor and enforce behavior (e.g., Sutinen, 1993; Stern, 2008). Many resource-based recreation areas are forced to rely on voluntary compliance among users, who likely possess different motivations, values, and outdoor ethics. Individual motivation for compliance among natural resource users may, for instance, be attenuated

in expansive areas, such as fisheries or hiking areas, where a desire to maximize one's experience with a resource significantly outweighs concerns about (and the likelihood of) being caught (Van Lange et al., 2013). For areas that lack requisite enforcement and management capabilities, relying on peer-to-peer monitoring offers a low-cost mechanism for enforcing community norms and conservation objectives (Chapman et al., 2018; Granek et al., 2008; Guckian et al., 2018). Indeed, people are more likely to comply with prevailing norms when they are led to believe that their behaviors are observable and thus open to evaluation by others (e.g., Cialdini & Goldstein, 2004; Delmas & Lessem, 2014; Yoeli, Hoffman, Rand, & Nowak, 2013). In sum, there are many features of collective action problems that make interpersonal communication a good fit for enhancing cooperation. However impactful, important questions remain about how conservation managers and practitioners can encourage productive conversations among relevant stakeholders.

Intervention Considerations for Conservation Managers and Practitioners

Forms of interpersonal communication that leverage the power of social influence offer a powerful, yet low-cost way to persuade individuals to act in ways that maximize long-term collective interests rather than satisfy immediate self-interests. However, accruing any benefits of interpersonal communication ultimately rests on individuals' willingness and ability to engage in meaningful conversations with others. Limited research has explored the efficacy of interventions that harness people's capacity to promote positive ecological outcomes through their intentional interactions with others. For resource managers and/or practitioners that rely on voluntary compliance and

cooperation, identifying and integrating approaches that increase peer-to-peer

conversations among relevant stakeholders could help foster widespread cooperation.

Drawing on direct and indirect evidence, I present several interventions and

approaches that resource managers or practitioners could employ to encourage peer-to-

peer discussions. To a varying degree, all of these approaches share one common

characteristic, which is to create and maintain intentional channels of communication.

With that said, not every approach is plausible or fitting for every collective action

problem. The conditions under which these approaches are more or less effective is likely

dependent on the characteristics of the target behavior, the situational context as well as

the make-up of the social network. Accordingly, some approaches may be uniquely

situated to evoke change in a particular situation, whereas others may be more universally

applied. For instance, publicly non-observable behaviors are less likely to be faced with

public scrutiny, thus limiting the opportunity for individuals to impose sanctions on

others' compliant or non-compliant behavior.

Approach 1: Create Opportunities for Interaction

Perhaps the most involved approach includes creating spaces, events, or

programming where relevant stakeholders can come together, interact, and discuss the

underlying issue and the potential for pursuing collective solutions. Intervention

techniques that facilitate structured interactions may be especially important when

dealing with target behaviors that are not publicly observable or in situations where

interactions between stakeholders are unlikely due to situational constraints (e.g.,

physical distance between neighbors). Under such conditions, conservation managers and

practitioners should look for ways to create and scaffold face-to-face interactions among

relevant stakeholders. Although practitioners are likely to experience additional challenges in terms of people showing up for these social arrangements, the embedded benefits of engagement could be plentiful.

The thrust of this approach stems from early research delineating the strong effects of group discussion on the uptake of unattractive consumption behaviors (e.g., cooking with glandular meats during World War II; Lewin, 1947). Although identical information was detailed in two experimental conditions, Lewin (1947) found that the effects of group discussion led to greater and sustained action over time compared to information provision (e.g., lecture format). Lewin (1947) suggested that the effects of group discussion were predicated on individuals' ability to experience group standards and freely discuss the advantages and disadvantages of engagement. Additional support for the effect of group discussion has been well-documented in social dilemmas research (for reviews see Balliet, 2009; Sally, 1995). Stemming from early research in which brief discussions prior to social dilemma games were found to increase cooperation (Deutcsh, 1958), a large body of literature has since replicated the effect of communication on cooperation (Dawes et al., 1977; Ostrom et al., 1992; Shank et al., 2018).

Despite evidence for the effects of group interaction as well as others' argument that self-sustaining pro-environmental behavior is partly conditional on a supportive social environment (De Young, 1993), interventions based on direct social interaction have rarely been implemented when promoting pro-environmental and/or collective-benefitting behaviors (Abrahamse & Steg, 2013). The EcoTeam approach is one intervention, which combines feedback, information provision, and social support to motivate individuals to adopt a range of private, household-level mitigation behaviors

(Staats, Harland and Wilke, 2004). Over a three-year period, Staats et al. (2004) examined the efficacy and durability of the EcoTeam approach, where people were encouraged to share their trials and tribulations with regard to specific household actions. Social support consisted of 6-10 person teams, who met once a month over an 8-month period to discuss assigned topics and behaviors, which ranged from waste reduction to transportation. Participants in the program significantly increased their household environmental behavior, including a 7% reduction in water consumption and 32% decrease in solid waste deposition (Staats et al., 2004). In terms of durability, behavioral gains remained two years after the completion of the program. Perhaps more interestingly, analyses revealed that social influence predicted behavioral engagement: the greater people reported experiencing social influence, the more likely they were to engage (Staats et al., 2004).

These findings suggest that providing individuals with the opportunity to interact with relevant others has the potential to promote durable change, by generating shared beliefs and meanings about what is socially approved of behavior. However, as previously detailed, the effects of group discussions are dependent on the extent to which conversations entail issue-specific information as well as on the level of group consensus that is reached (Bouas & Komorita, 1996; Dawes et al., 1977). With respect to the organizational framework presented here, conversations that convey information about the descriptive and injunctive norm are likely to lead to greater transformation, by facilitating situation-appropriate social norms (Shank et al., 2018). There are a variety of ways recreational managers and practitioners could go about facilitating formal social interactions. For resource managers, this could involve coordinating with established

social networks (e.g., community organizations) nested within socio-ecological systems. For instance, recreational angling, hunting or hiking clubs offer immediate networks where individuals could assist in the rapid diffusion of community norms and behaviors. With respect to community resilience, one approach could be to gather neighborhoods together for discussions about increasing their collective resilience to an environmental risk.

Approach 2: Promote a 'See Something, Say Something' Campaign

The creation of formal peer-to-peer monitoring programs, such as a 'see something, say something' campaign or 'neighborhood watch' program, may offer an important backdrop for encouraging peer policing and productive conversations among relevant stakeholders. Crowdsourcing enforcement has gained increasing attention in communities across the United States in response to public security threats (e.g., Reeves, 2012; Bennett, Holloway, & Farrington, 2006). Within the context of environmental collective action, such campaigns could redistribute responsibility to relevant stakeholders by activating their role in the direct monitoring and enforcement of a shared resource. The potential of these programs, and interpersonal sanctioning more broadly, depends on people's ability to detect a norm-violating action and their willingness to confront it (Guglielmo et al., 2009). Thus, clear injunctive norms must be established, endorsed, and understood by the broader community. A neighborhood watch regiment is just one example of how individuals in communities with shared interests in the use and preservation of a common resource may join together and aspire to maintain the long-term prosperity of it by monitoring and enforcing consumption patterns among the community members (Bennett et al., 2006).

When dealing with target behaviors that occur repeatedly and that are visible to others, individuals are presented with greater opportunities to impose social sanctions on others' compliant or non-compliant behavior. Apart from game theory research, however, literature suggests that individuals are generally unwilling to express approval or disapproval of others' actions (Nolan, 2013; Guckian et al., 2018). This may be attributed to the social costs associated with confrontation as well as shared beliefs that view confrontation as a non-normative communicative action (Steentjes et al., 2017). The implementation of a formal peer-to-peer enforcement campaign may help alter the norms associated with confrontation and, in turn, either reduce or remove notable barriers to engagement (Nolan, 2017). The benefits of a crowdsourced enforcement program may not only be reaped from individuals actively imposing sanctions on others behavior, but from the mere threat of increasing the visibility of non-compliance. The anticipation of negative social evaluations matters a great deal in the decision-making process and can lead people to engage in more altruistic (and pro-environmental behaviors) based on their desire for social approval (Cialdini & Goldstein, 2004). Thus, when individuals expect that their behaviors are viewed by others and that their actions are susceptible to peer enforcement, cooperation may increase. For instance, research has found that cooperation increases during 'public' versus 'anonymous' rounds of decision-making (Milinski et al., 2006).

Approach 3: Foster and Support Perceptions of Efficacy

A more universal approach recreational managers and practitioners can employ involves improving individuals' confidence in their ability to talk about collective action issues and furthermore, ensuring individuals that their voices matter in ushering change.

One of the most widely cited and studied social psychological predictors of behavior involves perceptions of efficacy (Ozer & Bandura, 1990; Witte, 1992). Bandura described self-efficacy as 'the belief in one's capabilities to organize and execute a course of action' (1977, p. 2-3). Comparatively, response efficacy is described as one's belief that engagement in a behavior will result in a desired outcome (Ajzen, 2002). Individuals tend to avoid actions they believe exceed their capabilities and similarly avoid those that they believe will not produce an anticipated outcome (Ajzen, 2002; Ozer & Bandura, 1990; Witte, 1992).

With respect to interpersonal communication, efficacy beliefs can be undermined by justified concerns about speaking to collective action problems that are embedded in political and social meanings (McCright & Dunlap, 2011; Kahan et al., 2012). For instance, impression management concerns with respect to appearing less competent (i.e., self-efficacy) have been shown to reduce college students' willingness to discuss climate change with their peers (Geiger & Swim, 2016). Correlational work supports this finding, suggesting that those with low self-efficacy about their ability to discuss climate change report talking about the issue less frequently than those with greater self-efficacy (Swim, Fraser, & Geiger, 2014). Additionally, it may be equally important to foster individuals' belief that interpersonal discussions matter in bringing about positive change (Guckian et al., 2018; Nolan, 2013: Norgaard, 2011). For instance, Guckian et al. (2018) found that recreational anglers who perceived sanctioning as an effective means to encourage the engagement with a desired behavior, were more likely to sanction than those who held such beliefs to a lesser degree. The large effect of perceived sanctioning efficacy compared to other predictors suggests that response efficacy may be critical in

determining whether an individual will impose social sanctions on another's behavior (Guckian et al., 2018).

Given that people are more likely to converse with others when they feel better equipped and that conversations will amount in some desired change, fostering efficacy beliefs is critical. Recent work has started to examine whether education-based interventions can promote interpersonal discussions of environmental issues. For instance, Geiger, Swim, and Fraser (2017) demonstrated that watching short, informational videos about climate change counteracted impression management concerns and amplified individuals' perceived ability to discuss the issue. A better understanding of how to foster efficacy beliefs could lead people to view conversing with others as a 'less insurmountable endeavor' and furthermore, empower them to believe that discussions with others can engender positive change (Geiger et al., 2017). Although much research is needed to understand how best to facilitate stronger efficacy beliefs around interpersonal discussions of collective action problems, working with and training trusted in-group messengers offers one potential outlet for getting started.

Approach 4: Train and Employ Change Agents

Because people's understanding of and beliefs about particular issues is largely mediated by the messengers individuals are exposed to (Moser, 2010; Nisbet & Kotcher, 2009), conservation managers and practitioners should work closely with trusted community leaders to disseminate information. Indeed, certain individuals are likely to play an outsized role in influencing others' attitudes, beliefs, and behaviors towards certain issues (Valente & Davis, 1999). The two-step theory of influence proposes that the diffusion of ideas and information from mass media and experts to the public is

mediated by community opinion leaders, who take in information and relay it to those with whom they interact (Nisbet & Kotcher, 2009). For instance, a recent meta-analysis of pro-environmental behavior suggests that the most effective social influence approaches are those that leverage and integrate block leaders (Abrahamse & Steg, 2013). The block leader approach involves changing behavior within existing social networks by having opinion leaders directly communicate and encourage engagement with a specific behavior (Hopper & Nielson, 1991). In one experiment, Hopper and Nielson (1991) found that people in the block leader condition reported the highest mean increase in pre-post social norm perceptions, which suggests that interpersonal interactions via block leaders can help facilitate the formation of behavior-specific norms of cooperation.

Recruiting and training local messengers to disseminate information to relevant stakeholders may be particularly important in contexts where individuals are unlikely to be reached by traditional top-down channels of communication or among more antagonistic audiences who dismiss environmental issues or distrust traditional messengers (e.g., government agencies, environmental non-profit organizations). The Massachusetts Keystone Project is one conversation-oriented program that integrates this approach, by investing resources (e.g., educational programs, reference materials) to educate and train select individuals—forest landowners, members of land trusts—on isssues pertaining to forest ecology, sustainable forest management, wildlife enhancement, and land protection (Catanzaro & Kittredge, 2019). Following formal training, these 'keystone cooperators' go on to serve as advocates and opinion leaders for forest conservation in their own communities. Provided opinion leaders are more likely to share a common social identity, programs like this and their messages may be given a

greater degree of attention (Petty & Cacioppo, 1986). As previously detailed, the identification and activation of opinion leaders could also help support the broader adoption of publicly non-observable behaviors (Geiger et al., 2019).

Approach 5: Commit People to Conversing with Others

From a practical point of view, the most important behaviors to target are those that significantly and meaningfully impact collective outcomes, either by directly contributing to a public good (e.g., maintaining fuel breaks on property) or by sustaining the long-term viability of a natural resource (e.g., restricting household watering; Dietz et al., 2009). However, in addition to encouraging high-impact target behaviors, asking stakeholders to commit to signaling or communicating with others about their actions may promote cooperation. Commitment strategies, which involve asking individuals to make a verbal or written pledge to engage in a specific behavior (Lehman & Geller, 2004), have been successful in encouraging a range of pro-environmental behaviors (e.g., Abrahamse, Steg, Vlek, & Rothengatter, 2005; Lokhorst, Werner, Staats, van Dijk, & Gale, 2013; Pardini & Katzev, 1983;). For instance, hotel guests who made a specific commitment at check-in (and wore a pin signaling their commitment), more frequently reused their towels compared to guests in the control condition (Baca-Motes, Brown, Gneezy, Keenan, & Nelson, 2012).

Commitment strategies encouraging interpersonal communication might involve making requests to relevant stakeholders whom have already engaged (or engage) with a target behavior to pledge to speak with a number of people (e.g., neighbors, friends) about the behavior. Encouraging stakeholders to commit to communicating with others may be particularly helpful when low motivation exists to engage (e.g., communicating

with others; Katzev & Wang, 1994) and/or in situations where the target behavior is not observable to others (e.g., increase norm salience; McKenzie-Mohr, 2000). Depending on the nature of the target behavior (e.g., degree of effort, difficulty) and the make-up of the social network (e.g., close or distant), such approaches could be viewed as foot-in-the-door or door-in-the-face techniques (Freedman & Fraser, 1966; for review see Burger, 1999). The former characterizes situations wherein a relatively small ask (e.g., easy or costless target behavior) is followed by a larger communication request (e.g., speaking with neighbors), whereas the latter describes situations wherein a relatively large ask (e.g., difficult or costly target behavior) is followed by a simpler communication request (e.g., talking to close friends).

The basic psychological motive underlying these effects is attributed to changes in individuals' self-perceptions, whereby people infer traits and characteristics about their identity based on the initial request (Cialdini, Trost, & Newsom, 1995; Cialdini, 2009). Consequently, commitment strategies can motivate people to act in ways consistent with their salient identity (Festinger, 1954) and/or out of fear of the potential social sanctions one might incur for defaulting (Abrahamse et al., 2005). Commitment strategies may serve a dual function. On one hand, commitments may help increase the frequency and extent of conversations taking place in a social network. On the other hand, committing to speaking with others may strengthen the likelihood that the communicator engages in the target behavior (e.g., collective-benefitting action) by internalizing the behavior as an aspect of their identity (Cialdini et al., 1995).

However, given the potential costs associated with interpersonal communication (e.g., perceived efficacy, social isolation; Steentjes et al., 2017), asking individuals to

communicate with others may be met with some reluctance (e.g., Cobern, Porter, Lemming & Dwyer, 1995). In cases where individuals are highly reticent to engage in direct forms of interpersonal communication, people may be more open to subtler, albeit still publicly visible, forms of interpersonal signaling (McKenzie-Mohr, 2000). For instance, a common approach of the community-based social marketing strategy involves using implicit social signals, such as placing a decal on a curbside recycling receptacle. The decal serves as a form of commitment as well as increases the social visibility of a publicly non-observable behavior (e.g., backyard composting; McKenzie-Mohr, 2000). Thus, other forms of interpersonal communication, including implicit signals—pins, patches, decals—could be used. While they may not explicitly signal injunctive information, they can implicitly reveal important information relative to the descriptive norm (e.g., social evidence endorsing a particular behavior). Although commitment strategies offer possible approach for increasing interpersonal communication, much research is needed to understand whether and how such strategies will impact issue engagement.

In sum, there are several well-established approaches resource managers and practitioners can employ to create and scaffold intentional channels of communication among relevant stakeholders. Whereas some of the research on social networks points to the importance of targeting influential members of a community, other insights—mostly from domains outside of environmental conservation decision-making—suggest that fostering efficacy, leveraging commitments, and peer-to-peer monitoring programs may help overcome notable barriers to engagement. Although more research is certainly needed to better understand what drives engagement as well as the implications of

interventions that attempt to activate people as communicators within their social networks, there are reasons to suggest that interpersonal communication can foster coordinated collective action.

Conclusion

The interconnectedness of the landscapes and biophysical systems within which society lives and operates pose major collective action problems. Unless concerted collective action takes place, the production of public goods (e.g., clean air, resilience) and/or long-term maintenance of common pool resources (e.g., fish stocks, fresh water) will not be achieved. In this chapter, I argue that interpersonal communication can support widespread cooperation, in part, by combatting the cacophony of noise that social, behavioral, and situational uncertainty injects into the decision-making process. Leveraging forms of interpersonal communication holds broad implications across a variety of collective action challenges from correcting existing misperceptions, fostering and maintaining social norms, to spreading critical context-dependent conservation management information and practices.

This chapter proposed a basic—yet far from conclusive—typology that details the nature of possible informational exchanges that can exist between individuals, and how such interactions may differentially influence collective outcomes. Specifically, I suggest that informational exchanges can be characterized by the degree that they impart injunctive information and the extent to which they result in the uptake of a desired behavior. Individuals' willingness to communicate with others as well as the consequences of engagement, as reviewed throughout the chapter, is contingent on a number of individual-, group- and contextual-level factors. Many real and perceived

barriers, such as the degree of similarity between the communicator and receiver, will determine whether individuals choose to communicate with others and whether information is received and acted upon or not. The recognition that individuals' decisions influence others and that collective benefits only accrue with widespread adoption may provide individuals with the psychological standing and motivation necessary to suppress notable barriers to communicating with others. Thus, interpersonal communication may serve a more meaningful role in collective action contexts where community members or resource users fully comprehend the interdependent nature of cooperation in maximizing collective outcomes.

However, just as interpersonal communication can generate shared meanings and social expectations about what should or ought to be done in a given context, such exchanges are likely to diffuse inaccurate information or beliefs that may undermine positive engagement and collective action goals. Thus, resource managers and practitioners must be mindful of their approach when activating stakeholder's voices. The approaches outlined here, such as leveraging commitment strategies and leaning on trusted (and motivated) in-group members, could help foster important conversations among relevant stakeholders and maximize the power of social influence. Such interactions could be particularly important in contexts where target behaviors are not publicly observable or for conservation managers that rely on voluntary compliance. Increasing the occurrence of interpersonal communication may fulfill a powerful need in creating and maintaining social norms that support action as well as increasing the salience of collective action problems and need for collective action in people's everyday lives. While much work remains in illuminating the potential of interpersonal

communication in these contexts, the direct and indirect evidence presented here suggests

that it could assist in driving collective action solutions forward.

CHAPTER VI

GENERAL DISCUSSION

In an ideal world people would be intrinsically motivated to act on behalf of both people and the planet. More often than not, however, people look to others for clues about how to behave and what to think (Cialdini, 2009). While these extrinsic processes can be a force for good, in the absence of salient social signals that affirm rather than deny a collective commitment to the environment, people are problematically prone to continue down the path of inaction or non-compliance. As detailed throughout this dissertation, forms of interpersonal communication may be uniquely positioned to mobilize change, in part, by increasing the salience of individuals' underlying beliefs about the need to take action. Although extant literature has revealed how interpersonal communication can buttress cooperation (Ostrom, 2015; Sally, 1995; Shank et al., 2018), relatively little work has explored what drives individuals to communicate with others and, furthermore, what the existing norms are surrounding recreational and conservation activities and how individuals present their experiences to others online. This is troublesome because we know that interpersonal interactions are critical in fostering shared beliefs about appropriate behavior and enhancing widespread cooperation (Balliet, 2009; Kerr, 1995; Ostrom, 2015). A more robust understanding of what factors shape engagement as well as how anglers perceive handling practices and imagery depicting these practices can reveal important insights for practitioners seeking to scaffold interactions among relevant stakeholders and/or promote best handling and social media sharing practices.

Core Findings and Future Considerations

The empirical work presented throughout this dissertation examines several different aspects of interpersonal communication. Across the first two empirical chapters (Chapters II and III), findings reveal that individuals' willingness to confront perceived environmental harms is driven by a number of individual-level and contextually salient factors. For instance, in Chapter II, I presented work detailing brand patrons' responses to an unexpected, personally-relevant environmental collective action problem. Drawing on the Volkswagen diesel emissions scandal, this work highlights how attributional conclusions concerning the cause of intentional corporate wrongdoing differentially impacts vehicle owners' reactions, including their intentions to badmouth the corporation to others. While those attributing blame to a corrupt corporate culture report greater intentions to sanction—negative word-of-mouth, boycott products—Volkswagen (as mediated by feelings of anger and trust), it is unclear whether differences in consumers' causal attributions—either to a handful of bad actors or else, corrupt corporate culture—consistently and reliably predicts consumers' responses to disparate corporate scandals. Thus, future work should examine how blame attributions that characterize the enduring debate between individual (i.e., 'few bad apples') versus collective (i.e., 'corrupt corporate culture') responsibility generalizes when predicting consumer responses across disparate corporate scandals (Orts & Smith, 2017).

Instead of examining how individuals indirectly punish transgressing actors, Chapter III explored individuals' willingness to directly impose social sanctions on their peers' inappropriate angling practices. Specifically, I found how efficacy beliefs as well as concerns about one's own reputation predicted anglers' past and future sanctioning

behavior and intentions, respectively. The finding that relatively few recreational anglers sanctioned others in the past starkly contrasts anglers' elevated intentions to sanction in the future. Although it is unclear what is driving this effect, possible explanations suggest that either (1) the study increased the salience of sanctioning or, (2) the conditional if-then structure of the self-report measure heightened the salience of the perceived norm and thus made clear that a norm-violation had occurred. Given the inherent difficulties and costs associated with confronting others' inappropriate actions, this finding, along with related research, suggests that formal policies or well-established social norms may reduce the barriers for confronting instances of non-compliance, likely by reducing the uncertainty of what constitutes socially approved of behavior (Nolan, 2017; Steentjes, et al., 2017). This idea warrants particular attention in the context of catch-and-release angling to the extent that the endorsement of scientifically-validated capture and handling practices is not yet well-established. Indeed, practitioners have only recently begun to promulgate best practices to recreational anglers (Danylchuk et al., 2018). Thus, we might not expect widespread endorsement and in turn, the enforcement of best practices for some time.

The findings from Chapter II and Chapter III, in concert with other research documenting how the normative status of an issue can support or hinder interpersonal communication (e.g., Steentjes et al., 2017; Czopp & Montieth, 2003), raise an important question about how disparate environmental issues may evoke more or less intentional discussions among relevant stakeholders. As detailed in the conceptual framework chapter (Chapter V), I suggest that interpersonal communication is more likely to materialize when individuals possess greater psychological standing, defined as a feeling

of entitlement derived by the extent to which individuals feel materially affected by a situation (Miller et al., 2011). Thus, issues that are perceived as presenting immediate, personally-relevant threats (e.g., climate adaptation, community resilience to environmental risks) or are viewed as a moral imperative may provide the underlying motivation needed to overcome the notable social-psychological barriers that otherwise dampen engagement with interpersonal communication. However, future work is needed to examine the relationship between psychological standing and interpersonal communication as well as whether and how interpersonal communication may be moderated by the type or nature of the collective action problem people are faced with (e.g., Molenmaker et al., 2014).

In Chapter IV, I show how recreational anglers' personal beliefs and normative perceptions are often misaligned, particularly in terms of the appropriateness of handling practices and of sharing catch-and-release imagery online. Evidence of pluralistic ignorance, in particular, suggests that correcting for existing misperceptions may play an important role in transitioning the actual and perceived norms concerning anglers' handling and social media sharing practices. Although this research was driven by intuitions about how repeated exposure to images depicting the outcome of a catch-and-release angling may convey information that conflicts with scientifically-validated best practices (e.g., extensive air exposure), it is unclear whether such images influence anglers' attitudes towards and intentions to engage with best practices. Thus, future work is needed to understand whether and how nature-based imagery shared online, including those depicting a catch-and-release angling event, impacts anglers' normative perceptions of and attitudes towards best practices. An understanding of whether and how recreation-

based imagery shared online influences others will add to the growing body of work

delineating the impacts of visual imagery on issue engagement (e.g., Chapman et al.,

2016). Since Chapter IV also revealed that perceived prevalence of both handling and

social media differed across two primary subpopulations of the angling community (e.g.,

fly vs. conventional fishing), future work—leveraging a more representative sample—is

needed to better understand whether and how differences emerge between these two

groups, which could inform how practitioners need to tailor communication and/or

intervention efforts.

Collectively, this research adds to the growing body of work aimed at

understanding the dynamics of interpersonal communication as well as the role of visual

imagery in the context of environmentally relevant decision-making. As part of Chapter

V, I attempt to provide a conceptual and practical overview of the implications and

drivers of interpersonal communication. Specifically, the conceptual framework

highlights the nature of information exchanged during a communicative act, and how

exchanges detailing declarative or descriptive information, for example, can differentially

increase the salience of the injunctive norm and/or result in a desired outcome. As noted

throughout this dissertation, the potential of interpersonal communication to produce

meaningful and significant change cannot be overlooked when seeking ways to enhance

public, stakeholder, and/or consumer engagement. Thus, along with detailing the

situational contexts that would benefit from interpersonal communication, I outlined

some rudimentary approaches practitioners and/or recreational managers could employ to

create and scaffold interactions among relevant stakeholders and users. Although I

acknowledge there are several significant limitations to this framework and outreach

approaches, including the reliance on indirect evidence, the chapter begins to paint a

picture of interpersonal communication in the environmental domain and what we might

expect if and when individuals are provided with structured opportunities to converse

with their peers or voluntarily speak up for positive change. With that said, there is

significant room and need for more intervention-oriented research concerning how group

discussions or neighborhood watch programs impact compliance and collective action

across disparate environmental issues. Although I have recommended commitment

making as a tool to encourage communication with others, it is unclear whether and how

pledges will impact individuals' future engagement in interpersonal communication.

Limitations

As discussed throughout each empirical chapter, it is important to note several

overarching limitations. First and foremost, the findings in Chapter's II, III, and IV are

derived from correlational designs that rely on self-report measures of behavior. While

such measures and assessments are adequate in determining simple associations and other

(mediating) effects, self-report measures alone do not sufficiently address or unravel the

nature, quality, or character of interpersonal conversations (Southwell & Yzer, 2007).

Additionally, although these self-report studies are useful in identifying potential drivers

of engagement, they do little in terms of generalizing how these outcomes will manifest

in real-world settings. Interpersonal communication presents a challenge in producing

generalizable findings given the socially embedded nature of engagement (and the issues

being discussed) that simply cannot be replicated in self-report surveys or laboratory

settings. Amidst valid concerns relative to the ecological validity of the findings in this

dissertation, future field work is needed to ascertain whether and how forms of interpersonal communication will materialize in real-world settings.

Additionally, this work, particularly Chapter's III and IV, is limited by the sampling frame used to recruit participants. While the recruitment approach, which relied heavily on social media promotions, provided access to a greater number of participants in the recreational fishing domain, the sampling frame possibly and likely did reach a pool of participants already concerned about, or in the very least aware of, the consequences their angling behavior has on the biological fitness of angled and released fish. For instance, the Patagonia Fly Fishing social media accounts, which regularly promote responsible and ethical handling practices (and corresponding imagery of fish predominantly submerged in water), are likely to attract a characteristically different subset of the angling community compared to the social media platforms of less ethically-driven and responsibility-forward angling organizations. Thus, it is critical to note that the findings here, particularly in Chapter IV, may be more representative of a highly motivated and knowledgeable subset of recreational anglers who have previously been exposed to handling and sharing guidelines, rather than your typical, everyday angler.

Concluding Remarks

As environmental issues become increasingly embedded in social meanings, it is hard to imagine how progress will be made without consideration of the social processes that can support or hinder engagement. Here, I argue that interpersonal communication represents a potentially powerful, albeit underutilized social influence approach for driving positive social and ecological change. The research presented in this dissertation

adds to the growing body of literature in understanding the dynamics of interpersonal communication, including what shapes individuals' intentions to converse with others, confront their peers' inappropriate practices, and how recreation-based imagery is perceived among users. Perhaps most importantly, this body of literature recognizes that tackling the pressing environmental issues facing society will require tapping into the capacity of individuals to promote change through their everyday interactions with others. Since creating a culture of conservation may be partly contingent upon individuals signaling their beliefs and commitments to others, it is my hope that the work presented here adds to our understanding of how we can best facilitate meaningful and civilly appropriate social interactions moving forward.

APPENDIX A

PUBLICATION INFORMATION

Chapter II Reference

Guckian, M. L., Chapman, D. A., Lickel, B., & Markowitz, E. M. (2018). "A few bad apples" or "rotten to the core": Perceptions of corporate culture drive brand engagement after corporate scandal. *Journal of Consumer Behaviour*, *17*(1), 29-41.

The main text, figures, tables, and supplementary information (Appendix B) of Chapter II are reproduced exactly as they appeared in the print version of the published article.

Chapter III Reference

Guckian, M. L., Danylchuk, A. J., Cooke, S. J., & Markowitz, E. M. (2018). Peer pressure on the riverbank: Assessing catch-and-release anglers' willingness to sanction others'(bad) behavior. *Journal of environmental management*, *219*, 252-259.

The main text, figures, tables, and supplementary information (Appendix C) of Chapter III are reproduced exactly as they appeared in the print version of the published article.

APPENDIX B

SUPPLEMENTARY INFORMATION ACCOMPANYING CHAPTER II

Participant vehicle-related information:

Participants also reported on specific vehicle-related information. The majority of our sample consisted of primary vehicle drivers ($n = 573$). The most common TDI model year was 2013 ($n = 54$), while most non-TDI owners reported owning vehicles made in 2012 and 2013 (n's $= 33$, *Minimum* $= 1971$, *Maximum* $= 2016$). For the majority of TDI owners, this was their first TDI vehicle ($n = 189$), while 24 non-TDI owners reported previously owning a TDI vehicle. Most TDI participants reported owning a Jetta TDI ($n = 111$) vehicle model, while the majority of non-TDI participants owned a non-TDI Jetta ($n = 110$). Of the participants owning TDI vehicles, 168 had applied for and received the Goodwill Compensation package from Volkswagen (Not Received: $n = 81$, Unsure: $n = 8$).

Study and participant screening information:

The measures described and analyzed here appeared as part of a larger study on the Volkswagen emissions scandal, which was answered by existing VW owners (i.e. TDI and non-TDI) and members of the general public and included measures for other hypotheses unrelated to the present paper. As the focus of this research is on how patrons affected by a corporate scandal intend to engage with the brand in the future, data from non-VW owners were not analyzed to test these specific hypotheses. However, these data can be provided upon request to the authors.

Additionally, the original recruited sample size for TDI owners included 319 participants. However, due to several errors in the survey eligibility screening, data from

62 participants in the TDI group had to be eliminated prior to analysis due to not meeting

the appropriate eligibility for the study. Participants in this group who responded 'none of

the above' to owning an affected diesel engine vehicle ($n = 56$) or else reported owning a

TDI vehicle model prior to the affected model year range (i.e., prior to 2009; $n = 9$) were

dropped prior to data analysis. Thus, a total of 257 participants were included in the final

analyses for TDI owners. No data points were excluded from the VW non-TDI group.

Description of Bayes Factors Analysis:

Bayes factors (BF; Jeffreys, 1961; Kass and Raftery, 1995; Morey et al., 2016;

Rouder et al., 2016) are derived from Bayes' theorem using a Bayesian model

comparison method to quantify the extent to which the observed data are in favor of one

hypothesis over another (for brief introductions to Bayesian hypothesis testing, see

Andraszewicz et al., 2015 and Wagenmakers et al., 2016). In the case of Bayesian data

analysis, one must formalize "prior" beliefs about the models being tested (see

Wagenmakers et al. 2016). Bayes factors greater than 1 provide evidence in favor of the

alternative, with larger values providing stronger evidence. For example, a Bayes factor

of 10 can be interpreted as indicating that the data are ten times more likely under the

alternative than the null hypothesis. Bayes factors less than 1 provide evidence in favor of

the null. In the case of our Bayesian independent samples t-tests, BF_{10} provides evidence

for how likely the observed data are under the alternative hypothesis (i.e., that the true

effect size is > 0) relative to the null hypothesis (i.e., that the true effect size $= 0$). Bayes

factors reported throughout the paper were calculated with the BayesFactor package for R

(Morey, Rouder, & Jamil, 2015, version 0.9.12-2). For Bayesian t-tests and regression

models, default Jeffrey-Zellner-Siow priors were used (Rouder and Morey, 2012; Rouder

et al., 2009). The Bayesian χ^2 test reported derives from Gunel and Dickey (1974), with the prior of an expected deviation of 1 from the null to the alternative hypothesis, which is considered a 'default' prior for Bayesian χ^2 (Jamil et al., 2016).

Credibility intervals are a Bayesian estimate somewhat similar to confidence intervals. Whereas confidence intervals treat a point estimate as fixed and the interval bounds as variable (i.e., over infinite replications, 95% of the confidence intervals will contain the "true" parameter estimate), credibility intervals calculate fixed bounds, while the parameter is considered to be variable (Morey, Hoekstra, Rouder, Lee, & Wagenmakers, 2016). Therefore, under the model tested, 95% credible intervals can be interpreted as indicating that there is a 95% chance that the true parameter estimate lies within the interval.

Table B1. Effects of corporate culture beliefs on individual items from the patronage composite

	'Rotten' Corporate Culture ($n = 172$)		'A Few Bad Apples' ($n = 419$)				
	M	SD	M	SD	t (df)	Cohen's d [95% CIs]	BF_{10}
Future Vehicle	3.913	2.063	5.277	1.657	-7.711*** (265.961)	-.764 [-.948, -.581]	2.030e+13
Recommend VW	2.785	1.824	4.146	1.913	-8.120*** (332.561)	-.721 [-.904, -.538]	6.185e+11
Encourage Others to Avoid VW (Reverse Coded)	4.988	2.035	6.308	1.244	-7.919*** (225.367)	-.870 [-1.055, -.686]	1.814e+17

Note. *** $p < .001$.

Table B2. Regression analyses predicting future car purchasing intentions from corporate culture beliefs, future expectations of ethical action, and anger

Predictor	b	SE	P	lmg	95% Confidence Intervals of b	
					LCI	UCI
Corporate Culture Beliefs (0 = rotten culture)	.155	.156	.319	.111	-.151	.462

Predictor	b	SE	p	lmg	LCI	UCI
Expectations of Future Ethical Action	.578	.043	< .001	.702	.493	.662
Anger	-.105	.037	.005	.187	-.177	-.032

Note. Adjusted R-squared = .3785.

Table B3. Regression analyses predicting motives to recommend vw in the future from corporate culture beliefs, future expectations of ethical action, and anger

Predictor	b	SE	p	lmg	95% Confidence Intervals of b	
					LCI	UCI
Corporate Culture Beliefs (0 = rotten culture)	.041	.161	.797	.093	-.276	.359
Expectations of Future Ethical Action	.658	.044	< .001	.742	.570	.745
Anger	-.087	.038	.022	.165	-.162	-.013

Note. Adjusted R-squared = .3979.

Table B4. Regression analyses predicting motives to encourage others to purchase vw vehicles in the future from corporate culture beliefs, future expectations of ethical action, and anger

Predictor	b	SE	p	lmg	95% Confidence Intervals of b	
					LCI	UCI
Corporate Culture Beliefs (0 = rotten culture)	.670	.149	< .001	.283	.377	.962
Expectations of Future Ethical Action	.126	.041	.002	.256	.045	.206
Anger	-.237	.035	< .001	.461	-.306	-.168

Note. Adjusted R-squared = .2408.

Table B5. Indirect effects of corporate culture on each item from patronage composite

	Mediator	b	se (bootstrapped)	95% Bootstrapped Confidence Intervals	
				LCI	UCI
Future Car Purchasing Intentions					
	Trust	1.020	.121	.797	1.270
	Anger	.189	.068	.062	.331
Recommend VW					
	Trust	1.161	.131	.915	1.435
	Anger	.158	.077	.014	.318
Encourage Others to Purchase from VW					
	Trust	.222	.090	.057	.411

Anger	.428	.078	.284	.595

Table B6. Indirect effects of corporate culture on each item from patronage composite while controlling for proximity

				95% Bootstrapped Confidence Intervals	
	Mediator	b	se (bootstrapped)	LCI	UCI
Future Car Purchasing Intentions					
	Trust	1.022	.120	.805	1.277
	Anger	.147	.066	.024	.283
Recommend VW					
	Trust	1.158	.132	.923	1.444
	Anger	.133	.075	-.006	.285
Encourage Others to Purchase from VW					
	Trust	.241	.088	.076	.421
	Anger	.342	.072	.212	.497

Table B7. Effects of proximity on individual items from the patronage composite

	TDI Owners (n = 257)		Non-TDI Owners (n = 335)		t (df)	Cohen's d [95% CIs]	BF₁₀
	M	SD	M	SD			
Future Vehicle	4.591	1.959	5.090	1.814	-3.166* (528.431)	-.266 [-.429, -.102]	13.091
Recommend VW	3.537	1.966	3.916	1.985	-2.318* (553.418)	-.192 [-.355, -.028]	1.249
Encourage Others to Avoid VW (Reverse Coded)	5.506	1.833	6.248	1.372	-5.427*** (458.348)	-.467 [-.632, -.302]	343928

Note. * p < .05, *** p < .001.

Table B8. Regression analyses predicting future car purchasing intentions from proximity, future expectations of ethical action, and anger

					95% Confidence Intervals of b	
Predictor	b	SE	p	lmg	LCI	UCI

	b	SE	p	lmg	LCI	UCI
Proximity to the Scandal (0 = TDI Owner)	.208	.130	.110	.019	-.047	.462
Expectations of Future Ethical Action	.597	.041	< .001	.770	.517	.677
Anger	-.095	.037	.011	.211	-.169	-.022

Note. Adjusted R-squared = .3802.

Table B9. Regression analyses predicting motives to recommend vw in the future from proximity, future expectations of ethical action, and anger

Predictor	b	SE	p	lmg	95% Confidence Intervals of b	
					LCI	UCI
Proximity to the Scandal (0 = TDI Owner)	.108	.134	.422	..009	-.156	.372
Expectations of Future Ethical Action	.664	.042	< .001	.801	.581	.748
Anger	-.080	.039	.039	.189	-.157	-.004

Note. Adjusted R-squared = .3985.

Table B10. Regression analyses predicting motives to encourage others to purchase vw vehicles in the future from proximity, future expectations of ethical action, and anger

Predictor	b	SE	p	lmg	95% Confidence Intervals of b	
					LCI	UCI
Proximity to the Scandal (0 = TDI Owner)	.409	.125	.001	.130	.164	.655
Expectations of Future Ethical Action	.196	.039	< .001	.351	.119	.274
Anger	-.238	.036	< .001	.519	-.309	-.167

Note. Adjusted R-squared = .2287.

Table B11. Indirect effects of proximity on each item from patronage composite

	Mediator	b	se (bootstrapped)	95% Bootstrapped Confidence Intervals	
				LCI	UCI
Future Car Purchasing Intentions					
	Trust	.163	.087	-.010	.335
	Anger	.114	.045	.032	.213
Recommend VW					
	Trust	.181	.096	-.007	.370
	Anger	.096	.049	-.004	.201

Encourage Others to Purchase from VW					
	Trust	.053	.033	.000	.132
	Anger	.285	.062	.178	.423

Table B12. Indirect effects of proximity on each item from patronage composite while controlling for corporate culture beliefs

				95% Bootstrapped Confidence Intervals	
	Mediator	*b*	*se (bootstrapped)*	*LCI*	*UCI*
Future Car Purchasing Intentions					
	Trust	.078	.075	-.069	.225
	Anger	.092	.041	.017	.180
Recommend VW					
	Trust	.088	.085	-.079	.249
	Anger	.083	.046	-.001	.182
Encourage Others to Purchase from VW					
	Trust	.018	.020	-.012	.068
	Anger	.213	.051	.129	.330

We also tested for the presence of interactions between corporate culture and proximity on each of the dependent items independently (note, as reported in the main text, there was no significant interaction for the composite measure).There was not a significant interaction on future car purchasing intentions: $F(1,587) = .891$, $p = .346$. There was also not a significant interaction on motivations to recommend VW to others, $F(1, 587) = .187$, $p = .665$. There was however a small but significant interaction effect on motivations to encourage others to purchase from VW, $F(1, 587) = 4.447$, $p = .035$. However, comparison of bayes factors for a regression model including the interaction versus only the main effects indicates the interaction model was only 1.016 times better than the model without the interaction, suggesting that this interaction effect is not a

substantial improvement over only considering the main effects. As our originally hypothesized interaction effects were all not statistically significant (i.e., interaction effects on future expectations of ethical action, anger, and the full patronage composite), and was only statistically significant for one of the three patronage items independently, this interaction effect was not investigated further.

Map of study site:
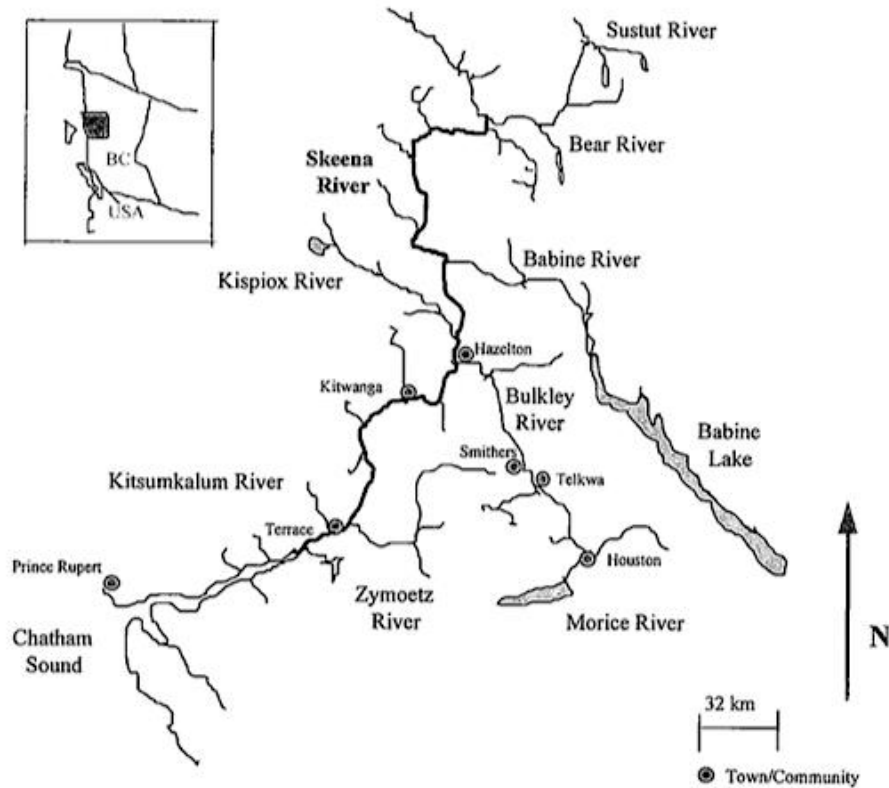
Figure C1. The Skeena River watershed, including the Bulkley River (Morten, 1999).

Item descriptions for past sanctioning behavior:

Over the course of the past fishing season, how often, if at all, did you engage in each of the following (1 = *never*; 7 = *all the time*):

[Past_socialmedia] Made a comment on social media (e.g., Facebook, Twitter, Instagram) addressing an individual's inappropriate post-catch handling practices

[Past_educate] Educated an angler about catch-and-release best practices

[Past_disapproval] In person, verbally expressed your disapproval of an angler's inappropriate post-catch handling practices

[Past_praise] Applauded or praised an angler for their post-catch handling practices

Item descriptions for future sanctioning intentions:

[Fut_bestpractice] If researchers were able to develop species-specific catch-and-release best practices for Bulkley River Steelhead based on solid scientific research, would this make you more or less likely to approach and educate others who do not adopt Steelhead specific catch-and-release best practices? (1 = *much less likely*; 4 = *neither less nor more likely*, 7 = *much more likely*)

[Fut_airtime] If exposing a Steelhead to air for more than 5 seconds was found to be harmful to Steelhead survival, how likely or unlikely would you be to approach and educate an angler who you saw holding a Steelhead out of water for more than 5 seconds? (1 = *not at all likely*; 7 = *extremely likely*)

[Fut_handle] If using a fishing net were found to be more harmful to Steelhead than tail grabbing, how likely or unlikely would you be to express your disapproval to an angler who you saw using a fish net to land a Steelhead? (1 = *not at all likely*; 7 = *extremely likely*)

[Fut_socialmedia] If you saw an image of an angler on social media holding a Steelhead high above the water, how likely or unlikely would you be to leave a comment suggesting your disapproval of their action? (1 = not at all likely; 7 = extremely likely)

Table C1. Factor loadings and descriptive statistics for sanctioning items

Items	F1 Past Sanctioning	F2 Future Sanctioning	M	SD
Past_socialmedia	0.46		2.09	1.55
Past_educate	0.79		3.77	1.85
Past_disapproval	0.69		3.14	1.78
Past_praise	0.73		3.81	1.91
Fut_bestpractice		0.54	5.62	1.17
Fut_airtime		0.60	5.61	1.39
Fut_handle		0.80	4.88	1.72
Fut_socialmedia		0.65	3.69	1.95

Note. The proportion of variance explained by the two factors was 24% and 23%, respectively.

T-test comparing past and future sanctioning: t (182) = -17.75, p < .001.

Kaiser-Meyer-Olkin overall MSA = .80.
Bartlett's test of sphericity: $\chi^2(7) = 76.35$, p < .001

Item descriptions for perception of threat items:

When thinking about the Bulkley River Steelhead population, to what extent do you think each of the following poses a threat to the Bulkley River Steelhead population (e.g., population size)? (1 = *not at all*; 7 = *extremely*):

[Threat_handling] Inappropriate angling and handling practices (e.g., extended air exposure, illegal gear use)

[Threat_bycatch] Overharvesting (e.g., bycatch from commercial salmon fishing)

[Threat_climatechange] Impacts of climate change (e.g., water temperature increases)

[Threat_illegal] Illegal river harvesting

[Threat_overfish] Overfishing from recreational anglers

[Threat_habitat] Habitat degradation and pollution from industrial activities (e.g., mining, resource extraction)

[Threat_gillnet] Gillnetting practices

Table C2. Factor loadings and descriptive statistics for perceptions of threat items

Items	F1 Angler threat	F2 Other catch threat	F3 Environ. threat	M	SD
Threat_handling	0.79			5.09	1.42
Threat_overfish	0.74			4.03	1.72
Threat_bycatch		0.72		6.47	0.88
Threat_gillnet		0.80		6.51	0.99
Threat_climatechange			0.66	5.32	1.57
Threat_habitat			0.66	5.79	1.5
Threat_illegal	0.35			4.73	1.62

Note. The proportion of variance explained by the three factors was 19%, 19%, and 13% respectively.

Kaiser-Meyer-Olkin overall MSA = .67
Bartlett's test of sphericity: $\chi^2(6) = 132.94$, p < .001

Table C3. Pearson's R correlation coefficients between independent and dependent study variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Age (1)													
Perceived concern (2)	.192												
Angler threat (3)	.078	.223											
Management familiarity (4)	-.086	.075	.011										
Years fishing Bulkley (5)	.282	.158	.042	.278									
Country of residence (6)	-.152	-.084	.054	.159	.191								
Club membership (7)	.115	.200	.073	.136	-.007	-.079							
Sanction efficacy (8)	.082	.271	.262	.058	-.022	-.036	.203						
Belief in science (9)	.197	.174	.396	-.190	.013	-.051	.187	.277					
Norm perception (10)	-.097	-.244	-.336	.038	.047	.090	.010	-.177	-.119				
Reputational concern (11)	.013	.123	.179	.020	.035	.144	.178	.273	.266	-.028			
Past sanction behavior (12)	-.203	.261	.231	.152	.120	.197	.070	.373	.163	.019	.324		
Future sanction intent (13)	.011	.269	.343	.041	.084	.095	.133	.597	.305	-.155	.342	.464	

Note. Country of residence referent (1 = Canada; 0 = non-Canadian); Club membership referent (1 = Yes; 0 = No).

Table C4. Results of linear regression predicting past sanctioning behavior and future sanctioning intentions, including the predictors 'environmental threat' and 'other threat'

Model	Predictor	Past Sanctioning Behavior				Future Sanctioning Intentions			
		b	t	p	*lmg*	b	t	p	*lmg*
1	Age	-0.029	-3.66	.000	.064	-0.006	-0.86	.393	.002
	Perceived concern	0.287	2.76	.007	.052	0.194	2.06	.041	.041
	Angler threat	0.182	2.21	.029	.033	0.320	4.30	.000	.121
	Environ. threat	-0.084	-1.00	.321	.004	-0.041	-0.54	.589	.005
	Other catch threat	0.235	1.77	.079	.034	0.081	0.68	.498	.015
	Management familiarity	0.070	1.03	.303	.020	0.000	0.00	.999	.001
	Yrs Bulkley	0.012	1.08	.280	.010	0.005	0.49	.628	.002
	Country of residence	0.300	1.39	.166	.023	0.129	0.66	.508	.005
	Club membership	0.080	0.39	.699	.002	0.210	1.13	.259	.012
		$R^2 = .24$; Adj. $R^2 = .20$				$R^2 = .21$; Adj. $R^2 = .16$			
		df (9,148)				df (9,148)			
2	Age	-0.032	-4.46	.000	.075	-0.009	-1.51	.134	.006
	Perceived concern	0.203	2.10	.037	.036	0.057	0.71	.481	.022
	Angler threat	0.030	0.37	.714	.014	0.133	1.93	.056	.059
	Environ. threats	-0.151	-1.97	.051	.011	-0.071	-1.11	.267	.004
	Other catch threat	0.218	1.85	.066	.028	0.059	0.60	.547	.011
	Management familiarity	0.111	1.84	.067	.025	0.035	0.69	.493	.004
	Yrs Bulkley	0.013	1.36	.175	.011	0.008	0.99	.324	.004
	Country of residence	0.219	1.14	.256	.02	0.067	0.42	.675	.004
	Club membership	-0.169	-0.91	.367	.002	0.012	0.08	.940	.005
	Sanction efficacy	0.296	4.43	.000	.114	0.403	7.21	.000	.252
	Belief in science	0.151	2.10	.038	.028	0.077	1.28	.204	.042
	Norm perception	0.002	0.46	.649	.002	-0.004	-1.04	.298	.014
	Reputation concern	0.160	3.04	.003	.063	0.136	3.11	.002	.062
		$R^2 = .43$; Adj. $R^2 = .38$				$R^2 = .49$; Adj. $R^2 = .44$			
		df (13,144)				df (13, 144)			

Note. Regression analysis was completed on complete pairwise observations (n = 158). Country of residence referent (1= Canada; 0 = non-Canadian); Club membership referent (1=Yes; 0 = No).

Lasso regression analyses:

Least absolute shrinkage and selection operator (LASSO; Tibshirani, 1996) linear

regression was also performed to address potential overfitting given the large number of

predictors in the models. Lasso is a conservative regression technique, which maximizes

model fit by minimizing the usual sum of square and imposing a constraint on the sum of

the absolute values of the model parameters. This results in some parameter coefficients

being pulled to zero (McNeish, 2015; Tibshirani, 1996). All analyses were performed in

R version 3.3.1 (R Core Team, 2016), including the 'glmnet' (Friedman, Hastie, &

Tibshirani, 2010) and 'relaimpo' packages (Grömping, 2006). Given the number of

predictors (k = 13), lasso regression was performed on Model 2 for to predict past and

future sanctioning propensity.

     Results from the lasso regressions revealed a similar predictive structure for both

past sanctioning behavior and future sanctioning intentions. Table 4C presents the

LASSO regression results for both past sanctioning behavior and future sanctioning

intentions. Figures 2C and 3C depict a visualization of the LASSO regression coefficients

for both past and future sanctioning, respectively. Taken together, the results of the

LASSO analyses mirror the findings of ordinary least squares regression results. For past

sanctioning behavior, age, management familiarity, country of residence, sanctioning

efficacy and reputation concern emerged as significant predictors, while angler threat,

sanctioning efficacy and reputation concern predicted future sanctioning intentions.

Table C5. Results of LASSO regression predicting past sanctioning behavior and future sanctioning intentions

Predictor	Past Sanctioning Behavior		Future Sanctioning Intentions	
	B	% B > 0	B	% B > 0
Age	-.143	100.00	.000	0.00
Perceived Concern	.083	100.00	.000	0.00
Angler threat	.000	0.00	.054	99.78
Management familiarity	.077	100.00	.000	0.00
Years on Bulkley	.001	15.02	.000	0.00
Country of residence	.035	99.88	.000	0.00
Club membership	.000	0.00	.000	0.00

Sanction efficacy	.262	100.00	.375	100.00
Belief in science	.007	58.54	.000	1.72
Norm perception	.000	0.00	.000	0.00
Reputation concern	.152	100.00	.057	99.78

Note. Coefficients (Bs) represent the mean standardized regression coefficients drawn from 5,000 resamples of the regression model. '% of B's > 0' indicates the percent of regression coefficients in the 5,000 resamples which were greater than 0.
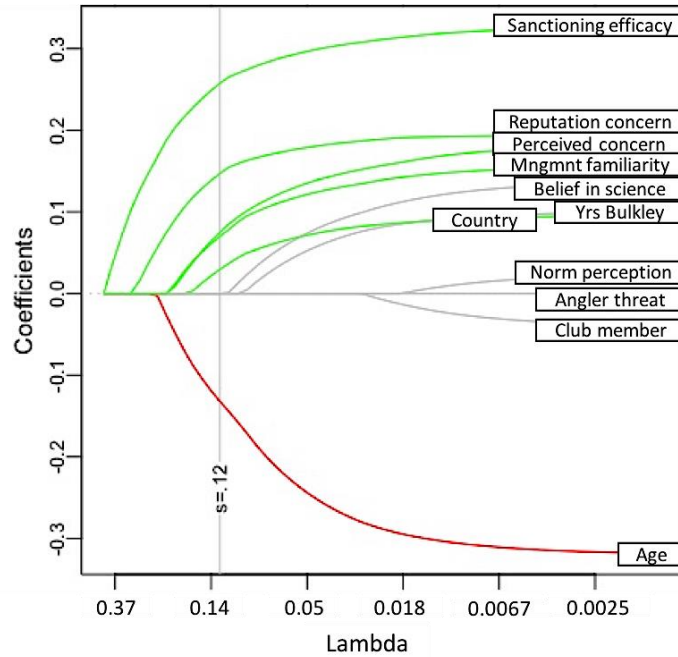
Figure C2. A visualization of the LASSO regression coefficients predicting past sanctioning behavior. Each curve corresponds to a variable. Green curves indicate positive coefficients, whereas red curves indicate negative coefficients. The vertical gray line at lambda .12 represents the penalization cut off for one run that minimizes cross validated error plus one standard error. Coefficients loading to the right of the vertical line are pulled to zero (e.g., gray curved lines). This process was resampled 5,000 times.
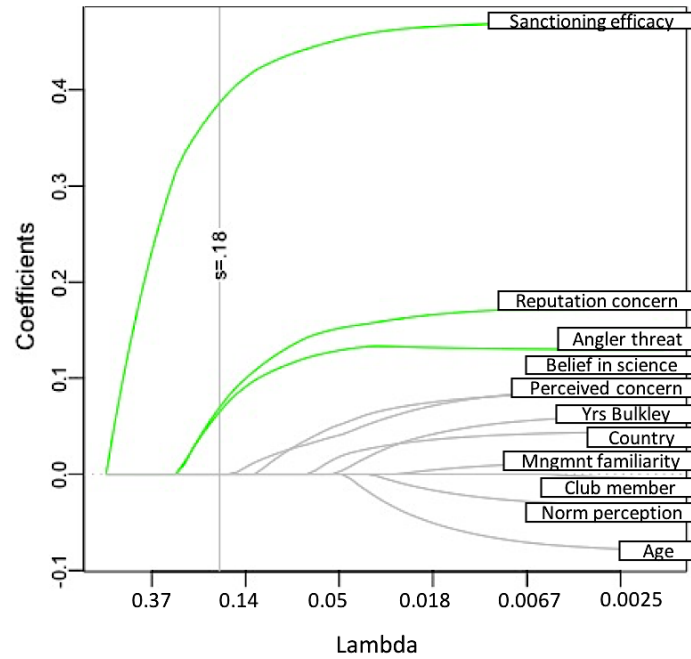
Figure C3. A visualization of the LASSO regression coefficients predicting future sanctioning intentions. Green curves indicate positive coefficients. The vertical gray line at lambda .18 represents the penalization cut off for one run that minimizes cross validated error plus one standard error. Coefficients loading to the right of the vertical line are pulled to zero (e.g., gray curved lines). This process was resampled 5,000 times.

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212

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