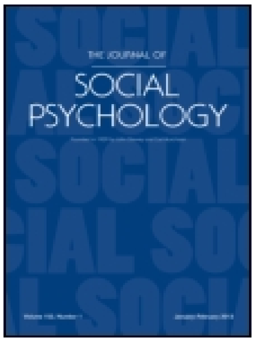

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Pro-Environmental Values Matter in Competitive but Not Cooperative Commons Dilemmas

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ABSTRACT. The choice to conserve or be greedy in a commons dilemma may be influenced by the behavior of others and by pro-environmental values. Participants completed a measure of pro-environmental values one week before taking part in an Internet-based commons dilemma microworld consisting of a shared fishery with three computer-controlled virtual fishers whom participants believed to be real people. The three virtual fishers either behaved greedily (taking an unsustainable number of fish each season) or sustainably. In the sustainable scenario, virtual fishers left abundant numbers of fish for the participant and, thus, pro-environmental values were not related to harvesting decisions. However, in the greedy scenario, participants' pro-environmental values significantly predicted sustainable behavior, demonstrating that the influence of others' greediness may be overridden by pro-environmental values.

Keywords: commons dilemma, environmental psychology, social context, sustainability, values

THE OVEREXPLOITATION AND EXHAUSTION of natural resources has resulted in harmful environmental, economic, and health impacts around the world (Ponting, 1993). Fishing practices, as one example, have led to the extinction of many species and serious damage to the coastal ecosystems that harbor them (Jackson et al., 2001). The collapse of fisheries not only poses a threat to the larger ocean ecosystem, but also to job and food security in coastal communities. Such examples of natural resource depletion are partly the result of individuals choosing to maximize their own gain at the risk of the collective good—the well-known commons dilemma (Hardin, 1968). The crux of all social dilemmas, including commons dilemmas, is that individuals must choose to balance the individual and the collective good when making decisions.

The characteristics of individuals involved in social dilemmas may influence their behaviors. For example, individuals with intrinsic or prosocial value orientations behave more sustainably

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in commons dilemmas than those with extrinsic or proself orientations (Sheldon & McGregor, 2000; Van Vugt, 2009). Environmentalists are more likely to hold these values and, thus, generally behave more cooperatively in a simulated commons dilemma (Kaiser & Byrka, 2011). In addition, prosocials may actually put themselves at a disadvantage in *N*-person prisoners' dilemmas by being too cooperative (Sheldon, Sheldon, & Osbaldiston, 2000). In some cases, such as with recycling, a sense of responsible action or a link to immediate personal concerns is also associated with pro-environmental behavior (Simmons & Widmar, 1990; Wall, 1995). However, personality is not always useful in predicting behavior in the prisoner's dilemma (Pincus & Bixenstine, 1979; Gómez, González, & Cardona, 1976), and pro-environmental concern is not always linked with sustainable harvest decisions in commons dilemmas (Smith & Bell, 1992). The question of whether pro-environmental values can, under the right circumstances, predict behavior in commons dilemmas needs further investigation.

Harvesting rates in simulated commons dilemmas are also affected by contextual factors. Scarcity is one such factor. If a resource is scarce, harvesters tend to consume less than if it is abundant (Rutte, Wilke, & Messick, 1987). Scarcity may lead to a perception of unequal distribution of resources, which may then result in unsustainable harvesting practices (Edney, 1981). Only with effective communication and equal access to the resource can conditions of abundance also be associated with increased levels of cooperation (Aquino & Reed, 1998). Evidently, resource scarcity is related to the behavior of others (overconsumption leads to fewer resources) and individuals' perceptions of others' behavior (e.g., perception of others as cooperative or competitive).

The behavior of others is important for decision making in commons dilemma simulations that include a monetary reward for harvesting (Birjulin, Smith, & Bell, 1993). Participants in these scenarios tend to follow group norms (Brucks, Reips, & Ryf, 2007) and hold self-serving biases about the behavior of themselves and others (Dawes, McTavish, & Shaklee, 1977; Gifford & Hine, 1997a). Similarly, when taking from a publicly shared resource, individuals are likely to behave as others do (Fleishman, 1988). Values can predict behavior, but this relation is often moderated by social norms (Bardi & Schwartz, 2003). Therefore, sharing a commons with competitive others may lead to scarcity and a competitive orientation—both of which tend to result in unsustainable harvesting strategies.

Sometimes, harvester characteristics can abate the effects of the situation. For example, resource uncertainty is a situational factor that interacts with personal values to predict behavior. When a commons holds an uncertain amount of resources, harvesters tend to take more than they would otherwise (Budescu, Rapoport, & Suleiman, 1990; Hine & Gifford, 1996). That is, they prefer to believe that the resource is more plentiful than it is and, therefore, they increase their consumption. However, social value orientation has the potential to partially abate this tendency. In uncertain resource conditions, individuals with a prosocial value orientation consume less than those with a proself value orientation (de Kwaadsteniet, van Dijk, Wit, & de Cremer, 2006), unless the consequences of harvester actions are unclear (Brucks & Van Lange, 2007).

Two studies examined the *combined* effects of individual differences and the competitiveness of others in resource dilemmas. Kramer, McClintock, and Messick (1986) found that individuals who did not value cooperation were less likely to cooperate in a competitive resource dilemma (in which others were taking more than their fair share), but their harvesting did not differ from that of those who valued cooperation in a cooperative resource dilemma (in which others only took their fair share). The study was limited, however, because Kramer et al. did not use a standardized measure of participants' values to determine their interest in cooperation. Instead, participants were categorized as "cooperators" based on a median split of their actual conservation decisions rather than by questionnaire or interview. Averaged (then categorized) behavior was used to predict behavior (within the same task). Thus, one cannot be certain that participants' *values*, per se, predicted their behavior.

The second study examined the role of personality in cooperative versus competitive resource dilemmas (Koole, Jager, Van Den Berg, Vlek, & Hofstee, 2001). In this study, personality played a significant role in harvesting decisions only in a *competitive resource dilemma*. Participants who were more extraverted and less agreeable behaved more competitively than those who were more introverted and agreeable. However, extraversion and agreeableness were not significant predictors of behavior in a *cooperative resource dilemma*.

Both studies presented the commons dilemma as a "points game," which would be acceptable for studying "cooperation" (e.g., Kramer et al., 1986) or "personality" (e.g., Koole et al., 2001), but is problematic when studying pro-environmental values because pro-environmental values would only be activated if the participants perceived the scenario as environmentally relevant.[1] A more recent study of environmentalists' behavior in a commons dilemma simulation suggests that environmental values do indeed affect behavior and that these values have a greater effect when the resource is presented as environmentally relevant rather than "points" required to win a game (Kaiser & Byrka, 2011).

However, an important question remains. Can pro-environmental values abate the effects of a competitive scenario? To date, the mitigating effects of pro-environmental values (as opposed to personality or attitudes) have not been investigated. To that end, the objective of the current study was to determine whether pro-environmental values can subdue the effects of competitive others in a commons dilemma. Our hypothesis is that in situations in which others are behaving cooperatively (and resources are more abundant), participants' harvesting rates will not be affected by their pro-environmental values. However, in competitive scenarios (in which resources are more scarce), participants' harvesting rates will be influenced by their pro-environmental values, such that those with stronger pro-environmental values will make more sustainable harvest decisions.

METHOD

Participants

Undergraduate university students (87 females, 19 males, 1 transmale) in their late teens and early 20s ($M_{age} = 20$, $SD = 3.09$) from a western Canadian university ($n = 107$) participated in the study in return for course credit and a nominal amount of money.

Procedure

Participants were recruited for the study through classroom visits and a web-based research participant pool system (SONA). The study had three components, all of which were completed online: (1) a pretest questionnaire including the Schwartz (1992) value survey to assess environmental values and two distracter measures assessing political beliefs, (2) a fishing commons dilemma microworld (FISH 4.0; Gifford & Aranda, 2013), and (3) a posttest questionnaire with open-ended questions asking participants about their strategy in the fishing simulation, any confusion about the study, and any suspicion associated with the experimental manipulation or virtual group members.

After completing the pretest questionnaire, participants could sign up for a time to complete the fishing simulation. They had up to one month to complete all components of the study. The fishing simulation was described as a computer-based group behavior study investigating the ways in which people use shared resources over time. Participants were informed that they would be harvesting fish for money from a virtual ocean, and that they would be sharing the ocean with three other people from the psychology research participant pool. They were told that the identities of all group members would remain anonymous. The three other fishers were virtual fishers preprogrammed either to over-harvest the resource (over-use condition) or to harvest the resource sustainably (sustainable-use condition).

The participants were randomly assigned to the two conditions. The morning they were scheduled to engage in the fishing microworld, they received an e-mail with complete instructions. Participants first completed a practice session with the microworld (up to four fishing seasons) and then the experimental microworld. At the end of the microworld, they were directed to a website to complete the posttest questionnaire and were e-mailed a written debriefing.

Environmental values measure. The Schwartz Value Survey (Schwartz, 1992), part of the pretest questionnaire, includes 56 value items, each followed by a short definition in parentheses. Participants rated the extent to which each value serves as "a guiding principle" in their life, on a 9-point scale from −1 (*opposed to my principles*), 0 (*not important*) to 7 (*of supreme importance*). Studies with samples from many countries have established that value scores are not contaminated by social desirability (Schwartz, Verkasalo, Antonovsky, & Sagiv, 1997). To remove the effect of individual differences in the use of response scales (e.g., some participants provided high or low scores on nearly every item), participants' value scores were centered on their mean responses (Schwartz, 1992). Consistent with Schwartz's (2009) instructions, participants who provided a scale response of *7* (i.e., extremely important) for more than 20 values, or provided the same "anchor" response for more than 34 values, were dropped due to insufficient discrimination among the different values. Four participants did not discriminate sufficiently among the values and were thus dropped from the analyses; three of these also exhibited problems with the fishing microworld, confirming that they were not sufficiently attending to instructions. The two items assessing environmental values, *protecting the environment* (preserving nature) and *unity with nature* (fitting into nature), were significantly correlated, $r(86) = .60$, 95% CI [.44, .72],[2] and were combined to provide the index of environmental values.

Fishing commons dilemma experimental conditions. We used a real-time computer microworld (FISH 4.0) that mimics an ocean fishery and simulates the challenges a fisher would face in trying to make a living by fishing. On the computer screen, each participant sees a visual representation of the entire fish population swimming in the shared ocean (80 fish in our scenarios). During each fishing season, fishers may "go out to sea" and catch as many fish as they would like. As the simulation proceeds, participants see individual fish disappearing as they, and the other three (virtual) group members, go to sea and begin to harvest. At the end of each fishing season (when all fishers "return to port"), the following information is displayed: the remaining number of fish in the ocean, each fisher's harvest and profits that season, and each fisher's cumulative harvest (across all seasons thus far). The fish remaining in the ocean at the end of each season double to start the next season ("respawning").

The fishers were free to harvest as many fish as they chose and were encouraged to do so by a small monetary incentive. However, if the participant and three virtual fishers together only harvested a *sustainable* number of fish (no more than 40 fish per season or 10 fish per person), then the stock would always be fully replenished to the maximum 80 fish at the end of each season. The participants were told that the microworld would end if all the fish in the ocean were caught.

The main fishing session began after four practice seasons. Participants were told that the main session would have an undisclosed number of seasons, but (unbeknownst to them) if the resource was not depleted, the microworld ended after 10 fishing seasons. In both the over-use and the sustainable-use conditions, the programmed virtual fishers left enough fish in the pool for the participant to sustain the fishery over the 10 fishing seasons, but in the over-use condition participants would need to take significantly less than the virtual fishers in order to sustain the resource.

Participants were told that fish remaining in the ocean after their group completed the microworld would be *the number allocated to the next group* of participants and, conversely, that they inherited the ocean from the previous group of fishers. Thus, participants believed that the ocean could start with zero to 80 fish when, in fact, all participants started with an ocean containing 80 fish. This feature increased the realism of the microworld, communicated a social norm of conservation and made salient participants' pro-environmental values.

Harvesting behavior measures. A variety of harvest measures might be calculated. The simplest measures are the total number of fish caught by the participant, the average number of fish harvested per fishing season, and the number of fishing seasons the participant was able to fish before depleting the stock. These measures are limited, however, because they do not take into consideration the number of fish remaining in the pool after each season. For example, four people harvesting 10 fish each from a pool of 80 is sustainable where the spawn rate is double, as it was in this study, but if they harvested 10 each from a pool of 40 it would immediately extinguish the resource.

One FISH 4.0 measure that takes the remaining size of the fish population into account is called *Individual Restraint*. This is calculated as the total number of fish caught by the participant relative to the total number he or she could have sustainably caught if all group members selected the equitable sustainable harvest rate. When a harvester takes no fish, *Individual Restraint* equals 1—the maximum preservationist strategy. *Individual Restraint* decreases when an individual harvester takes any amount of the resource. An *Individual Restraint* score of .50 indicates that the harvester has taken a share of the resource that, if all harvesters followed suit, would allow the resource to regenerate to the level at the start of the fishing season (0.5 = fair share). Thus, if the ocean had 70 fish remaining, and all fishers harvested such that their IR scores were .50, the resource would replenish to 70 for the start of the next fishing season. Therefore, individual restraint scores from 1 to 0.5 represent conservation. If a resource is somewhat depleted, however, a fisher would need to show more restraint than the 0.5 level to allow a fish stock to recover from earlier over fishing. See Gifford and Hine (1997b) for more details about calculating harvest measures in FISH 4.0.

Manipulation of group resource consumption behavior. The harvesting rates of the virtual fishers can be set in FISH 4.0. In the over-use condition, each of the three virtual fishers' harvesting rates were set to be unsustainable (i.e., their individual restraint levels were 0.35, 0.40, and 0.50, respectively).[3] Therefore, each virtual fisher took more than his or her "fair share" of fish each season, which resulted in a steady decline of fish stocks over time if the real participant did not compensate by harvesting *less* than his or her fair share. Unless the real participant adopts this strong conservation orientation, the fish supply would decline until the end of the microworld.

In the sustainable-use condition, the harvesting rates of the three virtual fishers were considerably more conservative (i.e., individual restraint levels were 0.55, 0.52, and 0.49, respectively). Thus each of the virtual fishers took less than their fair share of fish each season, and the real participant could safely harvest more than his or her fair share without depleting the stocks.

In previous experience with FISH 4.0, participants typically found the sustainable-use scenario unbelievable and were skeptical about the behavior of others (taking less than their fair share *and* always the same amount). Therefore, to add some variability and credibility to the harvesting of each virtual fisher in this scenario, a function was used to randomly select a harvest rate within plus or minus .12 of the set harvest rates (an option provided in FISH 4.0).

Posttest questionnaire. To determine whether participants understood the microworld and developed their own harvesting strategies, participants were asked (1) to describe the strategy they were using to make their harvesting decisions, (2) to guess at the strategy that the other group members were using, and (3) to describe whether any procedures or instructions were unclear. To assess whether participants had guessed the purpose of the study or guessed that the other fishers were computer generated, we asked whether participants experienced anything odd about the study and whether they thought there was more to the study than "meets the eye."

RESULTS

We first examined the sample for suspicious or confused participants, then conducted analyses for outliers, and finally examined the relations between pro-environmental values and harvesting behavior in the two experimental conditions.

Excluded Participants and Outlier Analysis

Seventeen participants were excluded because they were confused about the task, suspicious about the authenticity of the task or other fishers, or finished too quickly to experience the influence of the situation (i.e., finished in the first season).[4] One additional participant behaved normally and consistently for nine seasons before taking all the remaining fish in the 10th season because he suspected that the simulation would end after the 10th season. This participant's harvest score for Season 10 was converted to an average of his harvest across seasons one through nine. In the final sample ($N = 86$), 42 participants remained in the sustainable-use condition and 44 remained in the over-use condition.

The individual restraint (IR) scores of participants were averaged across all 10 seasons and three participants' average IR scores were outliers. Thus, these three participants' scores were adjusted to Z-scores of 2.5 to reduce their influence on the data set.[5]

Pro-Environmental Values

Environmental values for the entire sample fell in the mid-point of the importance range indicating that they were "important as a guiding principle" for the average participant (protecting the environment, $M = 4.01$; unity with nature, $M = 3.21$, on the -1 to 7 scale). The centered scores for the two environmental values were combined to form an index of environmental values, $r(86) = .60$, 95% CI [.44, .72].

Fishery Harvests

As expected, fish scarcity was greater in the over-use scenario (in which virtual fishers caught a larger proportion of fish). In the sustainable-use scenario, the number of fish available each season dropped slightly until season five and then remained approximately constant at 70 fish per season. However, the number of fish available each season in the over-use condition continued to decrease until the end of the simulation when it reached an average of 26 fish. This pattern can be seen in Figure 1. Thus, the average number of fish in the ocean for participants in the sustainable-use scenario declined slightly, but the average number of fish in the over-use scenario declined drastically.

Notably, the mean level of conservation was slightly, but significantly, higher in the over-use condition ($M = 0.53$, $SD = 0.11$) than the sustainable-use condition ($M = 0.46$, $SD = 0.12$), $t(84) = 2.82$, 95% CI [.02, .12].

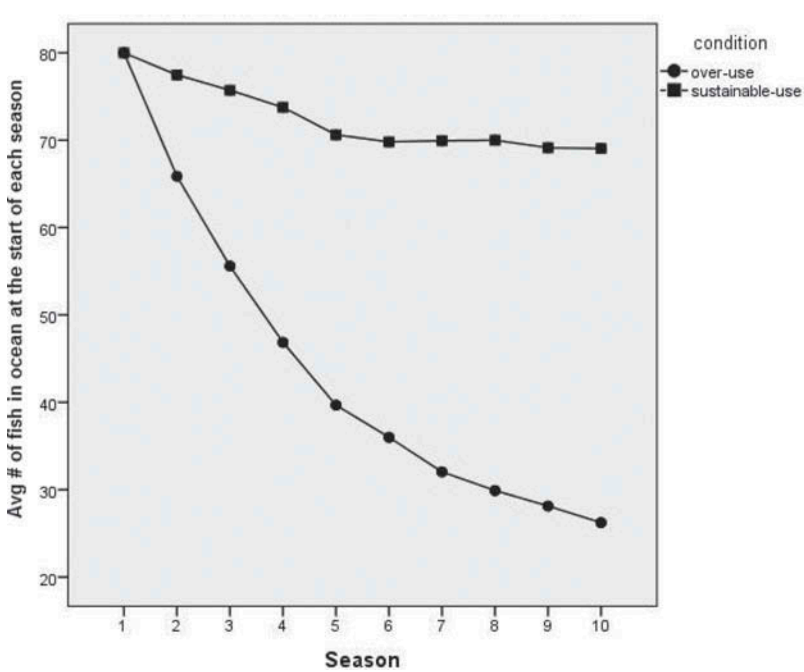

FIGURE 1 Average number of fish available in the shared ocean at the start of each fishing season in the over-use and sustainable-use conditions. In both conditions, the initial population was 80 fish.

Environmental Values as a Predictor of Resource Harvesting Behavior

We hypothesized that participants' harvesting decisions would be motivated by pro-environmental values in the over-use condition but not in the sustainable-use condition. To test these hypotheses, pro-environmental values were correlated with the behavioral measures separately for people in the over-use and sustainable-use conditions. Consistent with our hypotheses, in the over-use condition, values were significantly correlated with individual restraint, r $(44) = .35$, 95% CI [.06, .58] but in the sustainable-use condition, they were not, r $(42) = .20$, 95% CI [−.12, .47].[6] Thus, when faced with a steadily declining resource, participants with stronger pro-environmental values exhibited more individual restraint than participants with weaker pro-environmental values. Conversely, in situations with abundant resources and cooperative others, pro-environmental values were not associated with harvesting decisions.

DISCUSSION

This study is the first to demonstrate that, in a commons dilemma in which others were competitive (and resources were, therefore, scarce), individual restraint significantly increased in tandem with pro-environmental values. However, in situations where others were cooperative, individuals' pro-environmental values did not significantly affect behavior. In competitive social situations, those with strong pro-environmental values "rose to the occasion" and displayed more restraint than those with weak pro-environmental values.

Pro-Environmental Values and Behavior

As predicted, values were correlated with behavior in the competitive, but not cooperative, scenarios. This may have occurred if pro-environmental values exerted an influence only when barriers to pro-environmental behavior existed. For example, if a behavior is relatively easy to perform, such as commuting a short distance by bicycle rather than car, even people with moderately pro-environmental values might be as likely to engage in the behavior as those with strong convictions about the environment. When variability in the behavior is small, the correlation between values and behavior will be small; however, for longer commutes, where the behavior is more difficult or costly to perform, variability in the behavior will be greater and pro-environmental values will have a stronger influence on behavior. Indeed, pro-environmental values are more likely to motivate difficult, as opposed to easy, pro-environmental behaviors (Steg, Bolderdijk, Keizer, & Perlaviciute, 2014).

Inconvenience is one barrier to pro-environmental behavior, but many others exist as well (Gifford, 2011). Commons dilemmas appear to be particularly affected by perceptions of freedom and equality (Edney & Bell, 1987), reward or punishment (Martichuski & Bell, 1991), and possibly social norms (Brucks et al., 2007). Thus, teaching and activating strong pro-environmental values, which can then take precedence over feelings of inequality, competitive social norms and monetary reward, may be one way to encourage sustainability in commons dilemmas. People are indeed able to see past their narrow economic interests and make decisions based on broader implications to sustainable common resource management (Van Vugt, 2009).

Given that strong pro-environmental values can affect behavior, encouraging these values may be an effective means for preserving real-world commons. Positive values may develop as a result of strong moral convictions (Skitka, Bauman, & Sargis, 2005), but can also be encouraged using social psychological processes such as elaboration (e.g., Petty, Haugtvedt, & Smith, 1995).

Schwartz's norm activation model (1973) also suggests that personal moral norms (values) may influence prosocial behavior. This, however, is only likely to occur if individuals become aware of the consequences of their behavior and feel some ability to control their actions and the associated outcomes. According to Schwartz's theory, then, the influence of the situation may have "activated" pro-environmental values when resources were scarce and thus influenced behavior in those who held strong pro-environmental values.

The value-belief-norm theory (Stern, Dietz, & Kalof, 1993) also postulates that internally held values influence behavior under the right conditions. It suggests that values (biospheric, altruistic, or egoistic) influence beliefs (ecological worldview, awareness of consequences, and assumption of responsibility), which consequently influence personal norms (a sense of responsibility to act), and ultimately affect one's enactment (or not) of pro-environmental behavior. Without this chain of influence, pro-environmental behavior is unlikely to result from pro-environmental values. Thus, according to this theory, pro-environmental values may only have led to conservation in the over-use condition because participants became aware of negative consequences of overfishing and *assumed responsibility* for the preservation of the commons. In the sustainable-use condition, in which resources were abundant, the consequences of overfishing were possibly less salient and, hence, values did not affect behavior.

Sample-Wide Changes in Restraint

In addition to the correlation between restraint and environmental values in the over-use condition, we also observed a general increase in restraint across all participants from the sustainable-use to the over-use conditions. On average, participants displayed slightly unsustainable strategies in the condition with more abundant resources and more sustainable strategies in the scarce resource condition. This indicates that most participants generally prefer to harvest more fish when they believe that there are "plenty of fish in the sea" but are capable of regulating their behavior when they are in a scenario in which they are facing an extinction of the resource. Nevertheless, this slight change in conservation ethic might be motivated by profits rather than altruism (maintaining the microworld for many seasons may be the most profitable strategy over time).

Value importance seems to influence pro-environmental behavior in competitive situations, but individuals with weak pro-environmental values still displayed somewhat sustainable behavior when resources were scarce. Conversely, individuals with strong pro-environmental values also behaved somewhat unsustainably when resources were abundant. Thus, although values play a role in conservation, situational effects remain important drivers of behavior as well.

Limitations and Future Directions

The findings from this study may be somewhat limited in their generalizability, based on whether simulated commons dilemmas can represent real-world commons (Jorgenson, Jenks, & Reaney,

1980) and the use of university students as participants. Nevertheless, simulated commons dilemmas do reflect some degree of realism—participants often become emotional about the decisions of others and may even threaten defectors (Bonacich, 1976; Dawes et al., 1977).

Future research in this area may expand on these findings by applying them in real-world commons dilemma situations. For example, large-scale international surveys of coastal communities may be used to determine if pro-environmental values are actually related to real fishing practices. In particular, we would expect this relation to be stronger in areas of the world with threatened fish populations than in areas with abundant fish stocks. This could be the basis for the design and evaluation of programs to (1) increase the salience of declining fish stocks and (2) foster the development of pro-environmental values.

CONCLUSION

The effectiveness of strong pro-environmental values in encouraging sustainable resource management was observed in competitive scenarios. Therefore, attempting to instill, elicit, or encourage pro-environmental values when resources are scarce may be effective for promoting cooperative action and conservation.

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NOTES

1. Referring to it as a game suggests that participants may have treated it as a fun challenge or math puzzle rather than a real-world simulation.
2. Confidence intervals for correlations were calculated using the *!rhoCI* macro for SPSS (Weaver & Koopman, 2014).
3. In Fish 4.0, the researcher sets the virtual fishers greediness level rather than the individual restraint level. Greediness is simply Individual Restraint subtracted from 1.
4. Three participants expressed some suspicion about the nature of their fellow group members in the posttest questionnaire and changed fishing strategies based on these suspicions, nine lacked an understanding of the task, three believed the microworld would end after season four (similar to the practice session), one depleted the resource in the first season (and thus could not be influenced by the behavior of the group), and one had taken a conservation psychology course taught by one of the researchers.
5. In the sustainable-use scenario, the average harvests of two participants (who depleted the resource before the end of the simulation) were univariate outliers. In the over-use scenario, three participants depleted the resource before season 10, and the behavior of one of these was also a univariate outlier. Based on Mahalanobis Distance, two of the three participants whose IR scores were univariate outliers also emerged as multivariate outliers.
6. Due to the paradigm that was used for this study, 17 participants were excluded and three outlier scores were slightly adjusted. Excluding suspicious or confused participants and those who did not fit the response criteria for Schwartz's value survey as well as taking measures to reduce the influence of outliers were critical steps in data cleaning. Without these steps, the analyses would be strongly affected by a minority of outliers who were not paying attention, answered without thinking carefully, or finished too quickly. Outliers and data non-normality violated assumptions required to

carry out many inferential statistical analyses. Without excluding or adjusting these participants' scores, data analysis would be flawed and the correlations between values and behavior would have changed (sustainable-use condition, $r = .24$, 95% CI [−.04, .48]; over-use condition, $r = .17$, 95% CI [−.11, .42]). Thus, by excluding and adjusting the scores of problem participants, required data analysis assumptions were met and results became interpretable.

AUTHOR NOTES

Reuven Sussman is affiliated with the University of Victoria. **Loraine F. Lavallee** is affiliated with the University of Northern British Columbia. **Robert Gifford** is affiliated with the University of Victoria.

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