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Kluin, M.H.A.; Ansems, L.F.M.; Brands, J.

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On bad intentions and harmful consequences: understanding public perceptions of environmental crime seriousness

Marieke Kluin¹ · Lisa Ansems¹ · Jelle Brands¹

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Abstract

The public has grown increasingly concerned about environmental issues. However, few studies examine the perceived seriousness of environmental crimes. Those that do tend to focus on US citizens and compare crime seriousness ratings among different types of crimes, rather than examining the factors that shape perceptions of environmental crime seriousness. By employing a vignette survey among Dutch citizens ($N=261$), the current paper seeks to address this knowledge gap. It focuses on two such factors: (1) whether or not the environmental crime is committed intentionally, and (2) whether or not the environmental crime causes considerable harm. The results show that environmental crimes were perceived as more serious when committed intentionally and when they caused considerable harm. Furthermore, intentions affected perceived seriousness less in case of harm and harm affected perceived seriousness less in case the crime was committed intentionally. Together, these findings enhance our understanding of the factors that shape the perceived seriousness of environmental crimes.

Keywords Perceived crime seriousness · Environmental crime · Wrongfulness · Harmfulness · Green criminology

✉ Marieke Kluin
m.h.a.kluin@law.leidenuniv.nl

Lisa Ansems
l.f.m.ansems@law.leidenuniv.nl

Jelle Brands
j.brands@law.leidenuniv.nl

¹ Leiden University, Steenschuur 25, Leiden 2311 ES, The Netherlands

Introduction

We don't have to look far to find examples of a growing concern about environmental issues among the general public in the Netherlands, the country in which our study was situated. For instance, in 2018, Milieudefensie (a Dutch environmental organization) started a lawsuit against Shell. They demanded that Shell aligns its business plans with the goals of the Paris climate agreement. In the following year, 17,379 co-plaintiffs and six environmental organizations joined the lawsuit. On May 26, 2021, the District Court of The Hague ruled against Shell, ordering Shell to reduce its worldwide aggregate carbon emissions by net 45% by 2030 compared to 2019 levels. The court stated that corporations affiliated with Shell have the same obligations that Shell has (Rechtbank Den Haag, 2021). Shell appealed the District Court's ruling, and the case is currently awaiting judgment by the court of appeal. Another example of public concern about environmental issues are the worries and complaints expressed by local residents in the north of the Netherlands about pollution caused by Tata Steel, a large steel company. In February 2021, particulate matter (PM10) emitted by Tata Steel caused the snow in the wider area to turn black, making the level of pollution very visible (NOS, 2021). In response to these and other events, in May 2021 several hundreds of local residents and (environmental) interest organizations filed charges against Tata Steel for intentionally and unlawfully bringing substances into the air, surface waters and soil, thereby causing a danger to public health and people's lives. The Dutch Public Prosecution Service is currently conducting criminal investigations into the company. To us, these examples illustrate that the public has both grown increasingly concerned about environmental issues (in these examples, emissions of CO₂ and PM10), and they suggest increasing public awareness that criminal acts may have a stake in these environmental issues.

Looking at these examples of public concern about environmental issues, it strikes us that only a relatively limited number of studies in (green) criminology examine the extent to which the general public (indeed) considers the pollution and harms caused as a (serious) form of crime (Shelley et al., 2011). To be sure, various studies are available that show that the public often considers corporate and white-collar crime as serious. This is relevant to the current paper, since many forms of environmental crime are committed in corporate settings (Shelley et al., 2011). While research in the 70s found that people viewed white-collar crime as less serious than victimless crimes (Rossi et al., 1974), over time the results of public perception research into white-collar crime seriousness appear to have shifted towards the public viewing these offenses as more serious. For instance, Miller et al. (1986) found that participants in their large scale vignette study viewed crimes by large nationwide corporations as more serious and responded more punitively to these crimes compared to crimes committed by smaller corporations or individuals. Simpson et al. (2023) concluded that crimes in which corporations are seen as taking advantage of the public are more likely to be rated as serious when compared with burglary, which constituted the reference crime in their vignette study, even when the absolute financial loss associated with individual offenders is the same. Other studies, too, support previously observed patterns indicating that the general population regards white-collar crime as a serious societal problem (e.g., Dodge et al., 2013; Piquero et al., 2008). In line with these

findings, it is well possible that the general public considers environmental crimes as serious too. Yet, more research is needed to establish whether this is indeed the case.

Better understanding public perceptions of (environmental) crime is crucially important because these perceptions can play an important role in decisions about whether or not to allocate resources to the criminalization, investigation, prosecution and/or punishment of a particular type of behavior (Adriaenssen et al., 2020; Cullen et al., 1983; Simpson et al., 2023). More insight into how the public thinks about certain forms of crime therefore not only enhances our scientific understanding of these perceptions but has societal value as well. One could argue that this is particularly true when it comes to environmental crime, given the increased levels of attention to environmental issues among both the general public and policymakers. We see this reflected in recent European Union (EU) decisions. In Spring 2024, the EU's Environmental Crime Directive was revised (Directive of the European Parliament and of the Council on the protection of the environment through criminal law and replacing Directive 2008/99/EC). The new directive entails a considerable expansion of the list of environmental crimes and aimed to better align and increase penalties for these types of offenses in the EU countries (Council of the EU, 2023).

The above considered, it strikes us that little is known about the extent to which citizens' concerns about the environment actually reflect a willingness to view environmental crime as a serious form of crime (Shelley et al., 2011). The few studies that are available on perceived seriousness of environmental crime tend to focus on United States citizens and tend to compare seriousness ratings among different types of crimes. Even less work is available that examines which factors contribute to perceptions of environmental crime seriousness (Shelley et al., 2011), meaning we also have very limited understanding about how these perceptions take shape.

To address these issues, we manipulated two such possible factors in a vignette survey among Dutch citizens: (1) whether or not the environmental crime was committed intentionally, and (2) whether or not the environmental crime caused considerable harm. To our knowledge, our study is the first to examine the effects of these factors in the context of environmental crime. Our study extends current insights on the role of these two factors to the environmental domain. We also included a number of background variables that have been found to affect crime seriousness perceptions in previous work. In these ways, the current research enhances our understanding of perceived environmental crime seriousness and the factors contributing to it.

Below, we situate our study in the existing literature by offering a short overview of how the conceptualization and measurement of perceived crime seriousness has evolved. After that we discuss the few studies that have applied the concept of perceived crime seriousness to the specific context of environmental crime, and identify gaps in the literature that our study aims to address.

Perceptions of crime seriousness

The perception of crime seriousness has fascinated scholars for numerous years. The *Measurement of Delinquency* by Sellin and Wolfgang (1964) provided one of the first standards for assessments of perceived crime seriousness. These authors developed 'a subjective measuring stick for assessing the severity of delinquent acts based on

the judgments of juvenile court judges, police officers and college students' (Figlio, 1975: 189; see also Stylianou, 2003: 38). Sellin and Wolfgang (1964), supported by follow-up research (Rossi et al., 1974; Stylianou, 2003), conclude that there is considerable consensus on the perceived seriousness of crimes regardless of gender, age and ethnicity. For instance, violent crimes are perceived as more serious than property crimes, and both types of crimes are perceived as more serious than victimless crimes.

The ways in which perceptions of crime seriousness are conceptualized and measured have been subject to substantial debate and change since the landmark publication by Sellin and Wolfgang (1964). Early studies tended to simply ask respondents "how 'serious' they thought a certain crime was" (Adriaenssen et al., 2020:29), thereby relying on the assumption that seriousness does not require operationalization and that research participants know how to interpret it correctly on their own (Stylianou, 2003). Yet, research by Warr (1989) triggered an important development in the conceptualization and measurement of perceived crime seriousness. He argued and showed that perceptions of crime seriousness are organized around two central dimensions (Warr, 1989; Stylianou, 2003): the perceived wrongfulness of the act as well as its consequences or harmfulness (consisting of physical or economic harm).

Wrongfulness refers to normative judgments regarding the moral blameworthiness of an act. This is partly connected to whether the act has been committed intentionally (e.g. Adriaenssen et al., 2020; Alter et al., 2007; also see Warr, 1989: 797). For instance, Warr (1989) connects wrongfulness to the concept of *mens rea*. This is not to say that intent is the only way in which wrongfulness can be conceptualized and operationalized. We reflect on this matter in other sections of the paper.

Harmfulness, in turn, refers to factual judgments regarding the severity of the consequences or damage caused by the act (Stylianou, 2003; Warr, 1989). While it is generally agreed upon that wrongfulness and harmfulness tap into distinct dimensions, there is "no consensus in the literature on which dimension, if any, dominates perceptions of seriousness" (Adriaenssen et al., 2020:130; see also Alter et al., 2007; Eisner et al., 2017; O'Connell & Whelan, 1996; Rosenmerkel, 2001).

A recent contribution by Adriaenssen and colleagues (2020) further extends the debate about conceptualization and measurement of perceived wrongfulness, harmfulness and therefore seriousness by expanding on the dimensions identified by Warr. Especially relevant to our current contribution is their differentiation between different 'bearers' of harm: individuals, private sector entities, government and society (Adriaenssen et al., 2020:132). A central idea in this line of work is that perceived harmfulness is differentiated according to whom it affects. From a green criminological lens, we would argue that a variety of other and additional bearers of harm could (and arguably should) be considered, including non-human animals, plants, and ecosystems more generally.

Perceived seriousness of Environmental Crime

Moving on to the perceived seriousness of environmental crime in particular, an important first observation (as we mentioned earlier) is that only a handful of studies have examined this topic (Shelley et al., 2011; Wagner et al., 2015, 2019; Wolfgang et

al., 1985; Warr, 1989). Below, we offer a review of earlier empirical research that we are currently aware of, including studies on white-collar crime offenses that contain elements of environmental crime.

The first study that we mention here is the one by Wolfgang et al. (1985), whose results were based on a variety of questions about crime seriousness which were incorporated in the National Crime Survey, in which 60,000 respondents participated. With regard to environmental crime, the seventh highest severity score was assigned to a white-collar offence with environmental crime elements: “A factory knowingly gets rid of its waste in a way that pollutes the water supply of a city. As a result, 20 people die” (Wolfgang et al., 1985: vii). Changing consequences into “one person dies” and “20 people become ill but none require medical attention” (Wolfgang et al., 1985: vii) resulted in lower perceived seriousness among the respondents. The authors also included a scenario in which they did not explicitly describe harm (just pollution of the water supply), which was rated as more serious than the same scenario that resulted in one person dying. Hence, this study is an early and first indication harmfulness affects public perceptions of environmental crime seriousness.

Warr (1989) assessed environmental crime seriousness by asking respondents to rate the seriousness of “polluting a river used for drinking water” (p. 801). Respondents ranked this offence as the eleventh most serious crime out of 31 crimes in total. Wagner et al. (2015, 2019) explored the perceived seriousness of environmental crimes more specific, such as unlicensed hunting or fishing and abuse and neglect, committed against nonhuman animals in their studies. The results of the study in 2015 indicated that crimes against animals were ranked as more serious than property offenses but less serious than crimes against persons. Their most recent study (2019) showed that wildlife offenses as illegal or unlicensed hunting or fishing were ranked as less serious, harmful, and wrong than those against persons and property, and also less than those against companion animals and animals on farms.

The most extensive research into (factors explaining) perceived seriousness of environmental crime that we are aware of is a study by Shelley et al. (2011). In their household survey, administered by telephone, they included three environmental crime scenarios and five non-environmental crime scenarios. They used a 10-point scale (zero being not serious and ten being most serious) with car theft as a comparison offense with a score of five. The environmental crime scenarios were: “A factory knowingly gets rid of its waste in a way that pollutes the water supply of a city; as a result 20 people die”, “A local dry cleaner dumps hazardous chemicals behind their facility to avoid paying costly disposal fees” and “A person dumps car batteries, tires, and used motor oil into the woods” (p. 314). The first scenario was replicated from Wolfgang et al. (1985) and the others were specifically designed for their research to explore various types of environmental crimes committed by different types of offenders. Some of the other scenarios of the non-environmental crimes were again replicated from Wolfgang et al. (1985). A first conclusion drawn by Shelley and colleagues (2011) was that environmental crimes were ranked as more serious than the comparison offence of car theft. Especially relevant to the current study was that the offense with the most harmful consequence (water pollution resulting in 20 deaths) received the highest severity score. Even though their study did not specifically address the effects of wrongfulness and harmfulness, we take this to indicate

that harmfulness affects public perceptions of environmental crime seriousness, even though they also mention that they were unable to address the potentially conflating role of the size of the organization committing the criminal act (Simpson et al., 2023; Huff et al., 2010).

Interestingly, Shelley et al. (2011) also examined whether a variety of background variables are related to perceived seriousness of environmental crime. Contrary to evidence drawn from the general perceived seriousness literature (which tends to report null effects for gender, age and ethnicity, see above), Shelley et al. (2011) report that “females, those who were employed, and older respondents were all significantly more likely to perceive environmental crimes more seriously while Whites, those with higher income, and the college educated were significantly less likely to view environmental crimes as serious offenses” (p. 319). Thus, the research by Shelley and colleagues provided important insights into the role of demographic variables in shaping people’s perceptions of the seriousness of environmental crime.

All in all then, while wrongfulness and harmfulness have been found to be central dimensions of crime seriousness perceptions more generally (as we explained earlier), to the best of our knowledge, wrongfulness has not explicitly been included in research on the perceived seriousness of environmental crime in particular. We do find some indications that harmfulness can play a role in shaping perceived seriousness of environmental crime, but this research base can be broadened, also using other methods better capable of isolating effects. To us, this amounts to an important gap in the literature, since environmental crime differs from traditional crime in various ways, for instance because its harmful consequences may only manifest themselves in the future and may impact both humans and non-human species. The current research aims to fill this gap by examining the role of wrongfulness and harmfulness as well as various background variables in shaping public perceptions of environmental crime seriousness.

Taken together, despite recent societal developments that clearly indicate growing public concern for the environment, little is known about how serious the public perceives environmental crimes to be and especially, which factors contribute to these seriousness perceptions. Only a handful of studies examine perceived environmental crime seriousness, and those that do tend to focus on US citizens and compare seriousness ratings among different types of crimes rather than examining the factors that shape the extent to which people view environmental crimes as serious. To address these issues, the current paper examines how harmfulness, wrongfulness and several background variables affect public perceptions of environmental crime seriousness. By doing so, we aim to provide a better understanding of the perceived seriousness of environmental crimes and the factors contributing to it. These insights may not only inform theoretical debates on perceived crime seriousness, but can also be of interest to public officials who aim to include public views on crime seriousness in their policy making.

Method

Research participants

In total, 352 individuals took part in our vignette study. We filtered out individuals who dropped out of the study before finishing the questionnaire ($n=64$) or who failed the manipulation check that examined whether participants had correctly understood the scenario they had read ($n=26$, see below). Of the remaining participants, also those who did not deliver a response on our dependent variable ($n=1$) were kept out of the analysis. This left us with a usable response of 261 participants. Of those research participants, 110 (42.5% of the sample) identified themselves as men and 149 (57.5%) identified themselves as women¹. They were between 21 and 84 years old with a mean age of 47.93 years ($SD=17.61$). Their monthly individual net income varied between less than 1,000 Euros ($n=29$, 13.3%), 1,000–2,500 Euros ($n=94$, 43.1%), 2,500–5,000 Euros ($n=80$, 36.7%) and 5,000 Euros or more ($n=15$, 6.9%). Most of them were employed, either fulltime or parttime ($n=149$, 58.0%), while others were unemployed ($n=9$, 3.6%), retired ($n=51$, 19.8%), students ($n=32$, 12.5%) or had a different employment status ($n=12$, 4.7%) or did not want to indicate their employment status ($n=4$, 1.6%).

Participants' highest completed level of education ranged from primary school or high school ($n=27$, 10.7%) to secondary vocational education ($n=18$, 7.1%), higher professional education ($n=82$, 32.5%) to university ($n=125$, 49.6%), which indicates that our sample was relatively highly educated. They were also relatively progressive and left-wing in their voting behavior: 186 participants (79.8%) had voted for a progressive party during the then most recent national elections (versus 47 participants (20.2%) who had voted for a conservative party), and 115 participants (49.4%) had voted on a left-wing party (versus 71 participants (30.5%) who had voted on one of the parties in the political center and 47 participants (20.2%) who had voted on a right-wing party). Most participants had a Dutch ethnic-cultural background ($n=222$, 86.0%), but some had a Western ($n=14$, 5.4%) or non-Western migration background ($n=11$, 4.3%) or a different background ($n=8$, 3.1%) or did not want to indicate their background ($n=3$, 1.2%).

Experimental procedure and design

Between 27 May and 6 June 2021, a student research intern collected data via an online Qualtrics questionnaire. Participants were recruited using various social media channels, including Facebook, LinkedIn and WhatsApp. At the start of the questionnaire, participants were informed about the research aim, the fact that their data

¹ Note that we had missing values on the background variables, meaning that the numbers do not add up to the 261 research participants that delivered a response to our dependent variable. There were missing values for perceived environmental crime seriousness ($n=1$), gender ($n=2$), age ($n=5$), highest completed level of education ($n=9$), employment status ($n=8$), voting behavior ($n=28$), monthly net individual income ($n=43$), and ethnic-cultural background ($n=6$).

would be processed anonymously, the voluntary nature of participation, and the possibility of receiving a reward (i.e., a gift card that would be randomly assigned to one of the participants). They were also asked to indicate their informed consent.

Next, participants were told that they would now be presented with a vignette, which they were asked to read carefully. For all participants, the vignette started in the same way:

The textile processing industry traditionally uses all kinds of different chemicals, including chemicals for washing and processing fabrics. The use of these chemicals creates residual chemical waste that can damage the environment if it is not disposed of and processed in a safe manner.

For one group of participants ($n=70$, 26.8%), the vignette continued as follows:

A textile manufacturer wants to avoid the costs of disposing of chemical residual waste, and therefore decides to dump the chemicals in the environment. This causes contamination of the soil and groundwater. *The concentration of the contamination is considerable, causing the cows of a nearby cattle farmer to fall ill.*

Another group of participants ($n=67$, 25.7%) read the following instead:

A textile manufacturer wants to avoid the costs of disposing of chemical residual waste, and therefore decides to dump the chemicals in the environment. This causes contamination of the soil and groundwater. *The concentration of the contamination is low, plants and animals in the area do not suffer any significant damage.*

The third group of participants ($n=64$, 24.5%) read the following:

A textile manufacturer uses storage tanks to store chemical residual waste until it is disposed of. When a leak occurs in one of these tanks, the waste accidentally ends up in the environment. This causes contamination of the soil and groundwater. *The concentration of the contamination is considerable, causing the cows of a nearby cattle farmer to fall ill.*

Finally, a fourth group of participants ($n=60$, 23.0%) were presented with the following information:

A textile manufacturer uses storage tanks to store chemical residual waste until it is disposed of. When a leak occurs in one of these tanks, the waste accidentally ends up in the environment. This causes contamination of the soil and groundwater. *The concentration of the contamination is low, plants and animals in the area do not suffer any significant damage.*

Thus, we adopted a 2×2 between-subjects factorial design in which we manipulated whether the behavior resulted in considerable damage (harmful consequences versus no harmful consequences) and whether the behavior occurred intentionally (intentional versus not intentional). Participants were randomly assigned to one of the four conditions. Our operationalization of wrongfulness as the presence or absence of intent is in line with previous research (e.g. Adriaenssen et al., 2020; Alter et al., 2007; Warr, 1989), and intent is a key factor in both judgments of morality (Ames & Fiske, 2013) and crime seriousness (Sebba, 1984). That said, we note that the two concepts are not identical. In the Discussion, we further reflect on the strengths and limitations of the way in which we operationalized wrongfulness and on how future studies may go about this.

After reading the vignette, participants indicated to what extent they considered the situation they had just read about in the vignette as serious, on a scale from 1 (*not serious at all*) to 7 (*very serious*). This is how we measured perceived environmental crime seriousness, the dependent variable in our study. Next, we checked whether our manipulations had worked by asking participants what had caused the contamination (i.e., a leak or the manufacturer's decision to dump waste) and what the consequences were (i.e., no considerable harm or illness among cows of a nearby cattle farmer). Participants then indicated their gender, year of birth, highest completed level of education, employment status, on which political party they had voted during the then most recent national elections, monthly individual net income, and ethnic-cultural background. This marked the end of the questionnaire.²

Analytical approach

All analyses were performed in SPSS (Version 27). The analytical approach consisted of two steps. First, in order to estimate the (interaction) effects of intentions and consequences on perceived environmental crime seriousness, a two-way ANOVA was performed. Second, we used a series of three-way ANOVAs to explore whether effects found under our first step were dependent on group membership. Hence, our background variables were separately added in a model with intentions and consequences as our other independent variables and perceived environmental crime seriousness as our dependent variable.

Before performing these analyses, we checked for assumption violations and found that the assumption of normality and homogeneity of variances were not met. Since *F* tests are quite robust against assumption violations, provided that groups are sufficiently large and participants are sufficiently equally distributed among groups (De Vocht, 2007; Field, 2013; Winer et al., 1991), we only conducted three-way ANOVAs

² Because we report all measures used in our study, we note that in addition to our dependent and background variables we asked respondents to what extent they regularly heard or read about environmental crime in the media, considered the environment important, were sometimes afraid of becoming a victim of environmental crime, had faith in the Dutch governments' approach to environmental crime, and thought the Dutch government should do more to address environmental crime. We also measured a few background variables which in the end we did not use for our sample description and/or analyses (i.e., province of residence and whether they had ever encountered environmental crime in either their professional or personal lives). The full questionnaire is available on request from the authors.

involving the background variables that met these criteria: gender (male or female), age (split based on participants' average age, i.e., <48 or >48), and monthly individual net income (split between $<2,500$ Euros and $>2,500$ Euros). We note that results regarding this last variable should be interpreted with caution, given the acceptable yet less than ideal group sizes and distribution of participants across experimental conditions for monthly individual net income.

Results

Interaction between intentions and consequences

We performed a two-way ANOVA with intentions and consequences as our independent variables and perceived environmental crime seriousness as our dependent variable. This analysis yielded a significant main effect of intentions, $F(1, 257)=77.33$, $p<.001$, $\eta p^2=0.23$, a significant main effect of consequences, $F(1, 257)=70.71$, $p<.001$, $\eta p^2=0.22$, and a significant interaction effect between intentions and consequences, $F(1, 257)=6.05$, $p=.015$, $\eta p^2=0.02$. In total, this model explained 36.2% of the variance in perceived environmental crime seriousness.³

Because our analysis revealed a statistically significant interaction effect, we interpret the interaction rather than interpreting the main effects of intentions and consequences. After all, the main effect of intentions was qualified by consequences and vice versa. Probing the interaction revealed a significant effect of intentions when there were no harmful consequences, $F(1, 257)=61.64$, $p<.001$, $\eta p^2=0.19$. In other words: when there were no harmful consequences, participants reported higher perceptions of environmental crime seriousness when the behavior was intentional ($M=5.91$, $SD=1.04$) than when the behavior was not intentional ($M=4.42$, $SD=1.47$). When there were harmful consequences, participants still reported higher perceptions of environmental crime seriousness when the behavior was intentional ($M=6.70$, $SD=0.55$) than when the behavior was not intentional ($M=5.86$, $SD=1.10$). Thus, when there were harmful consequences the effect of intentions was still significant, but smaller, $F(1, 257)=20.62$, $p<.001$, $\eta p^2=0.07$.

Figure 1 visualizes the interaction effect. Focusing on intention (X-axis), we see that the effect of intention is greater in case of absence of harmful consequences (as indicated by the difference in Y-values of the dots on the bottom line), compared to when harmful consequences are present (as indicated by the difference in Y-values of the dots on the top line).

Vice versa, whether or not there were harmful consequences had a significant effect on perceived environmental crime seriousness when the behavior was intentional, $F(1, 257)=18.63$, $p<.001$, $\eta p^2=0.07$, and this effect was even stronger when the behavior was not intentional, $F(1, 257)=56.25$, $p<.001$, $\eta p^2=0.18$. More specifically: when the behavior was not intentional, participants reported higher perceptions of environmental crime seriousness when there were harmful consequences ($M=5.86$, $SD=1.10$) than when there were no harmful consequences ($M=4.42$,

³ Based on adjusted R^2 .

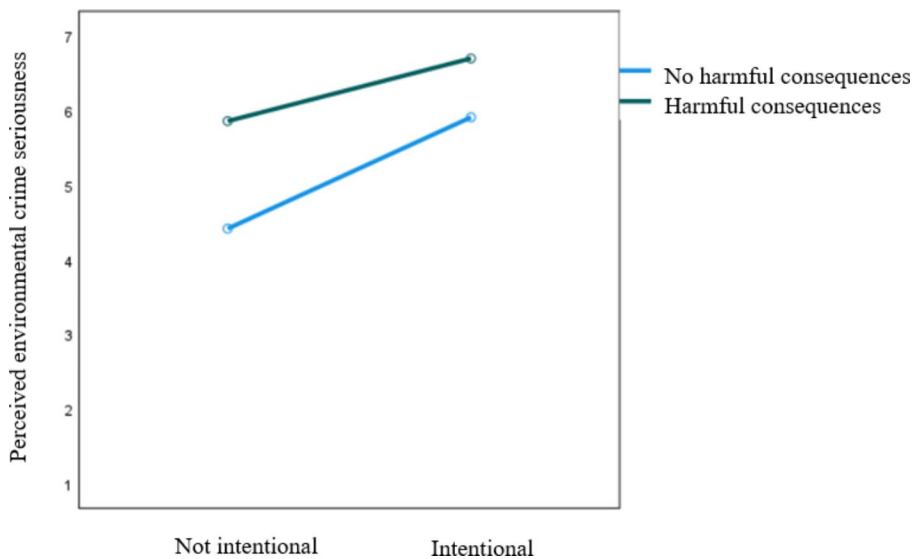


Fig. 1 Interaction effect of intentions and consequences on perceived seriousness. *Note.* Ratings of perceived environmental crime seriousness, displayed on the Y axis, ranged from 1 (*not serious at all*) to 7 (*very serious*)

$SD=1.47$). When the behavior was intentional, participants still reported higher perceptions of environmental crime seriousness when there were harmful consequences ($M=6.70$, $SD=0.55$) than when there were no harmful consequences ($M=5.91$, $SD=1.04$). Hence, in case of intentional behavior the effect of consequences was still significant, but smaller.

This, too, is shown in Fig. 1: Focusing on consequences (top and bottom lines), we see that the effect of consequences is greater in case of absence of intention (as indicated by the difference in Y-values of the left hand– top and bottom– dots), compared to when the act was committed intentionally (as indicated by the difference in Y-values of the right hand– top and bottom– dots).

Finally, Table 1 summarizes the mean scores on perceived environmental crime seriousness for each of the four experimental conditions:

Taken together, we found an interaction between intentions and consequences, indicating that the effect of intentions on perceived seriousness was stronger when there were no harmful consequences, and that the effect of consequences was stronger when the behavior was not intentional. We reflect on this finding in the Discussion of this paper, after assessing the potential effects of background variables.

Adding the background variables

To explore if the effects that intentions and consequences have on perceived environmental crime seriousness might be different for the various background variables introduced earlier, we performed a series of three-way ANOVAs with intentions, consequences, and the background variables as our independent variables and perceived environmental crime seriousness as our dependent variable.

Table 1 Mean scores on Perceived Environmental Crime Seriousness for each of the four conditions

	Condition			
	Intentional		Not intentional	
	Harmful consequences (<i>n</i> = 70)	No harmful consequences (<i>n</i> = 67)	Harmful consequences (<i>n</i> = 64)	No harmful consequences (<i>n</i> = 60)
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Perceived crime seriousness	6.70 (0.55)	5.91 (1.04)	5.86 (1.10)	4.42 (1.47)

Note. *M*=mean, *SD*=standard deviation, *n*=number of research participants. Participants indicated their perceptions of environmental crime seriousness on a scale from 1 (*not serious at all*) to 7 (*very serious*)

The three-way ANOVA involving intentions, consequences, and gender revealed a significant main effect of intentions, $F(1, 251) = 76.96$, $p < .001$, $\eta^2 = 0.24$, a significant main effect of consequences, $F(1, 251) = 75.46$, $p < .001$, $\eta^2 = 0.23$, a significant main effect of gender, $F(1, 251) = 6.22$, $p = .013$, $\eta^2 = 0.02$, and a significant interaction between intentions and consequences, $F(1, 251) = 5.65$, $p = .018$, $\eta^2 = 0.002$. The interaction between intentions and gender was not statistically significant, $F(1, 251) = 1.73$, $p = .190$, $\eta^2 = 0.01$, nor was the interaction between consequences and gender, $F(1, 251) = 1.75$, $p = .187$, $\eta^2 = 0.01$, nor the three-way interaction between intentions, consequences, and gender, $F(1, 251) = 0.31$, $p = .578$, $\eta^2 = 0.00$. In other words, gender did not moderate the two-way interaction between intentions and consequences reported earlier. The significant main effect of gender indicated that women perceived environmental crime as more serious ($M = 5.95$, $SD = 1.23$) than men ($M = 5.54$, $SD = 1.44$). In total, this model explained 37.5% of the variance in perceived environmental crime seriousness.

Furthermore, the three-way ANOVA involving intentions, consequences, and age indicated a significant main effect of intentions, $F(1, 248) = 68.80$, $p < .001$, $\eta^2 = 0.22$, a significant main effect of consequences, $F(1, 248) = 65.44$, $p < .001$, $\eta^2 = 0.21$, a significant main effect of age, $F(1, 248) = 8.57$, $p = .004$, $\eta^2 = 0.03$, and a significant interaction between intentions and consequences, $F(1, 248) = 7.26$, $p = .008$, $\eta^2 = 0.03$. We did not find a significant interaction between intentions and age, $F(1, 248) = 0.02$, $p = .889$, $\eta^2 = 0.00$, nor a significant interaction between consequences and age, $F(1, 248) = 0.21$, $p = .647$, $\eta^2 = 0.00$, nor a significant three-way interaction between intentions, consequences, and age, $F(1, 248) = 0.01$, $p = .931$, $\eta^2 = 0.00$. In other words, age did not moderate the two-way interaction between intentions and consequences. The main effect of age indicated that older participants perceived environmental crime as more serious ($M = 6.01$, $SD = 1.36$) than younger participants ($M = 5.51$, $SD = 1.25$). In total, this model explained 36.3% of the variance in perceived environmental crime seriousness.

Finally, the three-way ANOVA involving intentions, consequences, and monthly individual net income yielded a significant main effect of intentions, $F(1, 210) = 59.05$, $p < .001$, $\eta^2 = 0.22$, a significant main effect of consequences, $F(1, 210) = 59.19$, $p < .001$, $\eta^2 = 0.22$, and a significant interaction between intentions

and consequences, $F(1, 210)=4.51, p=.035, \eta^2=0.02$. We did not find a significant main effect of monthly individual net income, $F(1, 210)=0.17, p=.678, \eta^2=0.00$, nor a significant interaction between intentions and monthly individual net income, $F(1, 210)=0.84, p=.360, \eta^2=0.00$, between consequences and monthly individual net income, $F(1, 210)=0.60, p=.440, \eta^2=0.00$, and between intentions, consequences, and monthly individual net income, $F(1, 210)=2.75, p=.099, \eta^2=0.01$. In other words, monthly individual net income neither had a main effect on perceived environmental crime seriousness nor moderated the two-way interaction between intentions and consequences. In total, this model explained 36.1% of the variance in perceived environmental crime seriousness.

In sum, we found a main effect of gender, a main effect of age, and no main effect of monthly individual net income. None of the three-way interactions were statistically significant, which indicates that the two-way interaction between intentions and consequences remained intact regardless of these background variables. In this way, we explored the possible role of background variables in shaping perceived seriousness of environmental crime.

Discussion and conclusion

Recognizing growing concerns among the general public about environmental issues, the current study set out to examine perceived seriousness of environmental crimes. Despite a substantial body of research on public perceptions of crime seriousness, little headway has been made to apply lessons learned to environmental crime. That is, only few studies examine the perceived seriousness of environmental crime, and those that do tend to focus on United States citizens and compare crime seriousness ratings among different types of crimes, rather than examining the factors that shape perceptions of environmental crime seriousness. By employing a vignette survey among Dutch citizens ($N=261$), the current paper aimed to address this knowledge gap. In particular, we examined if perceived crime seriousness changes with (1) whether or not the environmental crime is committed intentionally, and (2) whether or not the environmental crime causes significant harm. We also extended previous work that examined the relationship between background variables and perceived environmental crime seriousness, by assessing the possible influence of gender, age and level of income.

Looking at our results, we would first argue that these indicate that the specific type of environmental crime on which our vignette focused is perceived as a serious form of crime by Dutch citizens, at least among the participants in our sample. Although we did not compare perceived seriousness of this crime with other (environmental and non-environmental) crimes, it can be stated that the average perceived seriousness is high in absolute terms. As Table 1 shows, even in the scenario in which the crime was not committed intentionally and in which there was no significant harm, these perceptions were still above the middle of the 7-point scale ($M=4.42, SD=1.47$). Our participants thus considered the events described in the vignette as serious, even when there were no bad intentions and no harmful consequences. This finding can be relevant to policymakers, especially if corroborated by follow-up

research. After all, we were unable to control for external factors that might have preceded our data collection and might have contributed to these high ratings of perceived seriousness. Thus, further studies conducted at different points in time can show whether these high seriousness ratings persist.

While such external factors are potentially important to the mean seriousness ratings we report in our study, they probably have less impact on the effects we report due to our experimental design. We would therefore argue that our results also show that general theories on the factors affecting crime seriousness perceptions are applicable to environmental crime - at least the specific environmental crime that we studied - even though environmental crimes differ from traditional crimes in important ways. As explained earlier, harmful consequences of environmental crimes may only manifest themselves in the future and may impact both humans and non-human species. In the general literature on the perceived seriousness of crime, the degree of (perceived) wrongfulness (Rossi et al., 1974; Sellin & Wolfgang, 1964; Stylianou, 2003; Warr, 1989) and (perceived) harmfulness (Cullen et al., 1982; Rossi et al., 1974; Sellin & Wolfgang, 1984; Warr, 1989) emerge as predictors of perceived seriousness. This is consistent with the finding of the present study that both intentions and consequences contribute to higher perceived seriousness. Our study thus lends support to the importance of wrongfulness and harmfulness as factors shaping perceptions of crime seriousness in the context of environmental crime.

Importantly, our study also found a two-way interaction between intentions and consequences, such that intentions affected perceived seriousness less in case of harm and harm affected perceived seriousness less in case the crime was committed intentionally. This interaction effect yields another perspective on the lack of consensus within the literature regarding the question “which dimension, if any, dominates perceptions of seriousness” (Adriaenssen et al., 2020: 130). Our results suggest that their combined effect matters, rather than one of these variables being more important compared to the other. Warr (1989) seems to arrive at a similar conclusion, but in a different context. Our study thus extends this conclusion to the domain of environmental crime. In particular, the interaction effect that our study revealed seems to suggest that people already consider the type of environmental crime we inquired about as serious if it is only harmful or only intentional. Thus, intent does not add much to perceived seriousness when the act is harmful, and vice versa. Indeed, our statistics seem to show a ceiling effect, such that people already score close to the maximum of the perceived seriousness scale when the act is harmful but not intentional, and the other way around.

Finally, some of the background variables included in our study seem to be related to environmental crime seriousness, although the amount of explained variance by these background variables was relatively low. Our finding that women rated environmental crime as more serious than men is consistent with the findings by Shelley and others (2011) who found that women have been found to rate seriousness higher than men. The present study also shows that older people rated environmental crimes as more serious than younger people, which is in line with research by Shelley et al. (2011). It should be noted however, that consensus is lacking about the potential association between age and perceived seriousness in the general literature. In our study, we did not find a significant relationship between income and seriousness per-

ceptions, although this finding needs to be interpreted with caution due to the violation of statistical assumptions as described earlier. Moreover, we note that none of our background variables affected the interaction effect between intentions and consequences. This indicates that the two-way interaction was robust across participants regardless of demographic factors.

Limitations and directions for further research

A few important caveats must be taken into account when interpreting the results of our study. First, the generalizability from our sample to the population as well as from our vignette to real-life contexts is limited. That is, there has likely been a selection effect in recruiting participants, as participants with higher levels of education and with relatively progressive and left-wing voting behavior were overrepresented in our sample. Future research can address these limitations by using a random sample or by safeguarding representativeness in a different way. Furthermore, although our vignette survey yielded relatively high levels of internal validity, future studies might also use different methods to increase external validity. Such studies would do well to incorporate different types of environmental crimes into their designs, as the current study investigated only one environmental crime in the specific context of a textile manufacturer discharging chemical waste. Thus, follow-up research that uses a more representative sample, adopts methods that are better at achieving ecological validity, and focuses on different types of environmental crimes can contribute to the generalizability of our study findings.

A second limitation of the current research pertains to the way we operationalized wrongfulness. As mentioned earlier, our operationalization of wrongfulness as intent aligns with previous work (e.g. Adriaenssen et al., 2020; Alter et al., 2007; Warr, 1989), and intent is a core aspect of blame and moral judgment (Ames & Fiske, 2013) as well as a key predictor of seriousness ratings (Sebba, 1984). Hence, we consider intent as a valid way of measuring perceived wrongfulness. Yet, it is important to note that the mere presence or absence of intent does not fully cover the construct of wrongfulness. For example, Sebba (1980) differentiated between situations in which (1) the offender intended worse harm than the harm that ensued, (2) the intended harm ensued, (3) the harm was a result of recklessness, and (4) the harm was the result of negligence. Furthermore, Alter et al. (2007) mention different kinds of factors that are related to wrongfulness beyond the level of intent, such as the brutality of the act and whether or not the offender is remorseful. Thus, we propose that our operationalization of wrongfulness is valid, yet somewhat limited, and that future research may focus on other aspects of wrongfulness as well.

This is even more important, since studies have found that ‘people are likely to see intentional acts as more harmful than unintentional ones’ (Ames & Fiske, 2013: 1760; see also Ames & Fiske, 2015; Gray et al., 2014). This means that, although we independently manipulated wrongfulness and harmfulness in our study, we cannot rule out the possibility that participants in the intentional scenario viewed the consequences as more harmful than in the unintentional scenario (even if both scenarios described that there was no significant harm). Future studies may incorporate

a manipulation check measuring wrongfulness and harmfulness to check whether this is the case.⁴

Conclusion

By examining the role of intentions, consequences, and a number of relevant background variables, the current research enhances our understanding of the perceived seriousness of environmental crime and the factors that shape these perceptions. This paper thus fills a gap in the literature by extending research on perceived crime seriousness and the factors contributing to it to the domain of environmental crime. In addition, our study may be of interest to policy makers. After all, our finding that the specific environmental crime we studied is perceived as a serious form of crime by Dutch citizens – at least by the ones included in our sample – may contribute to keeping these problems on the policy agenda.

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Data availability Vignette study available on request.

Declarations

Competing interests All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Ethical approval No ethical approval was needed.

Informed consent The research team took an overt approach to this project, discussing with participants the aims and objectives of the study. All research participants were provided with a participant information sheet and signed an informed consent form prior to the vignette study being conducted.

Statement Regarding Research Involving Human Participants and/or Animals: The research involved human participation, but no harm or direct benefit should be expected, since we only analyzed their vignette scenarios.

⁴ For instance, future vignette studies may check participants' perceptions of wrongfulness by asking them to indicate (for instance, on a scale from 1 to 7) how 'morally wrong' or how 'blameworthy' they consider an act to be. Participants' perceptions of harmfulness could be checked by asking them to what extent they agree with a statement such as 'The act described in the scenario caused considerable harm' (1 = *completely disagree*, 7 = *completely agree*) and/or by asking them to estimate the financial damage associated with the consequences described in the scenario. By incorporating such manipulation checks one can assess whether the manipulation of wrongfulness (e.g., by varying the extent to which the act was committed intentionally) impacts participants' ratings of harmfulness, and vice versa.

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