

# COVID-19 Pandemic and Pollution of the Environment – Threat Perception, Willingness to Incur Economic Costs, Psychological Resources, and Behaviors<sup>1</sup>

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## Abstract

**Objectives:** 1. Comparison of COVID-19 and environmental pollution threats perception, willingness to incur costs to protect against these threats, and perceptions of competence to counteract these threats. 2. Comparison of the pattern of relationships in the context of each of the threats between (a) threat perception and willingness to incur economic costs versus protective/preventive behaviors against the threat; (b) threat perception and willingness to incur costs versus protective/preventive behaviors; (c) psychological resources (life aspirations, perceived competence, and stress coping strategies) versus the willingness to incur costs and adopt protective/preventive behaviors.

**Method:** Three hundred people, 50% women and 50% men aged from 19 to 59 years ( $M = 39,79$ ,  $SD = 11$ ) participated in the online study. The following scales were used: COVID-19 threat perception (Cypryńska & Nezlek, 2020) and willingness to incur costs of acting against COVID-19 (Cypryńska & Nezlek, 2020), both applied also in the context of environmental pollution threat; Coping strategies inventory (Addison et al., 2007); Life aspirations index-23 (Grouzet et al., 2005), and scales of perceived competence of protection against COVID-19 and changing consumption behavior (inspired by Williams et al., 1998). The predicted variables were protective behaviors against COVID-19 and preventive behaviors that reduce environmental pollution.

**Results:** The perceived threat of environmental pollution, willingness to incur economic costs, and competence were all rated higher than the COVID-19 threat. The relationship

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patterns in models of threats showed similarities as well as differences. The perception of threats to the individual and the world, community contributions as a life goal, perceived competence, and stress-coping strategies were associated with behavior change.

**Conclusion:** Each threat has its specificity that should be considered when searching for predictors of various aspects of individuals' functioning and developing communication strategies to change behaviors.

**Keywords:** COVID-19, economic costs, environmental pollution, psychological resources, stress, threat

The outbreak of the COVID-19 pandemic has provoked many researchers worldwide to study the behaviors of individuals, groups, and entire social systems that faced the threat of infection and its effects. Within the psychological approach, the mental state of individuals and its fluctuations, as well as the degree of behavioral adaptation (change) to governmental recommendations, were analyzed. Researchers have been searching for predictors of behavior displayed during the pandemic (see the Report from the conference, this volume). Few studies have focused on the effects of the pandemic on consumption behavior (Grunert et al., 2020; Hepburn et al., 2020; Waśowicz, 2022). The findings showed that consumers were more likely to make shopping lists and throw away less food during COVID-19 (Waśowicz, 2022). They expressed greater readiness to change consumption behaviors, such as eating less meat, giving up driving and flying, and buying unnecessary clothes (Cypryńska & Wójcik, 2022). However, not all respondents changed their behavior. Depending on the behavior, anywhere from 50% of respondents (throwing away food, buying clothes) to over 80% (eating meat) did not change their behavior under threat conditions (Cypryńska & Wójcik, 2022; Waśowicz, 2022).

The behaviors indicated above can be considered desirable when facing environmental pollution threats. Increasing awareness of the occurrence of these threats led to questions about whether there is a universal set of predictors of response to threats or a unique set that would require individually defined protective or preventing actions. Another important question raised was why some individuals react by changing their behavior while others maintain their habits in a threatening situation.

A meta-analysis of studies conducted following e.g. swine flu pandemic showed the relationships between the perception of risk and severity of the disease (including the degree of threat to life) and undertaking various protective behaviors, such as washing hands, wearing face masks, and strengthening immunity through diet and exercise (Bish & Michie, 2010). The review also revealed that threat perception and the beliefs associated with it influence the individuals' readiness to adopt recommended behaviors (Bish & Michie, 2010). Individuals are more willing to follow recommendations when they believe the probability of being infected is high, and the government is perceived as competent with respect to control and spread of the virus (Rubin et al., 2009). Therefore, these works analyze individuals' perceptions of the threat and their association

with the changed behavior. Extending this approach, Cypryńska and Nezlek (2020) proposed at the beginning of the COVID-19 pandemic to analyze individuals' perceptions of the threat to not only themselves but also to the world and the country (in this case, Poland). They showed that the perception of threat to the person assessing it was the strongest predictor of the frequency of engaging in protective behaviors. In the same work, Cypryńska and Nezlek (2020) introduced the concept of *economic sacrifice*, i.e., the willingness to incur economic costs to stop the pandemic. Based on the results of their research, they found that the intensity of the fear related to the threat was the predictor of willingness, but they did not study whether this willingness increased the likelihood of behavior change.

Behavior change researchers often base their empirical work on the self-determination theory. According to the self-determination theory, the effectiveness of behavior change depends on the degree to which psychological needs are met, including the need for competence (Deci & Ryan, 2000), which was the focus of the study described in this article. The need for competence motivates people to develop their skills, which helps them adapt to complex, changing environments (Deci & Ryan, 2000). Perception of personal competence to change behavior predicts successful behavior change (Williams et al., 1998). Failure to meet the need for competence or limited support for the empowerment of an individual's competence need can lead to amotivation (Deci & Vansteenkiste, 2004). Although motivation and its types constitute the core of the self-determination theory, in the sub-theory of self-determination of values, its authors (Deci & Ryan, 2000) point out that individuals' behavior – apart from motivation – depends on many factors, including the goals the individual strives to achieve by engaging in behavior (Kasser & Ryan, 1996; Zawadzka et al., 2015). These goals may be internal or external. Internal goals related to satisfying basic psychological needs include self-acceptance, affiliation, health, and community contribution (the importance of the common good and readiness to act on it). At the same time, extrinsic goals involve seeking rewards, like striving for financial success (money) and valuing popularity and self-image (Kasser & Ryan, 2001; Zawadzka et al., 2015). It can be expected that in a threat situation, individuals focused on achieving internal goals will be more ready to incur the costs of behavior change and to change behavior itself. In particular, the focus on maintaining health and community contribution (addressed in messages encouraging compliance with recommendations) should be potentially linked to behavior change. Although life goals direct human action and are related to its effectiveness, studies on the relationship between these goals and behaviors undertaken in a threat situation are limited.

Numerous studies conducted during the pandemic and their meta-analyses have shown that COVID-19 was a stressful experience for individuals (Cheng et al., 2023; Dragioti et al., 2022). Literature on the relationship between environmental pollution, climate change, and the experience of stress is less common (WHO, 2022). Climate change is perceived as an environmental stressor (APS), which, unlike the threat of a disease (e.g., COVID-19), is perceived as more universal than personal experience, chronic and less tangible than a threat

of a disease (APS; Waśowicz & Poleszczuk, 2021). The level of stress experienced affects the individual's mental state and behavior (Latkin et al., 2022). Dealing with stress caused by new (external and internal) demands includes cognitive and behavioral responses, which form coping strategies (Lazarus & Folkman, 1984). Lazarus and Folkman (1984) distinguished problem and emotion-oriented coping strategies in terms of strategies based on pursuit and avoidance (Carver et al., 1989). When facing a stressful situation, an individual may actively cope with it by confronting the stressor, which leads to long-term elimination of the stressor from one's environment, or by avoiding the stressor, which brings short-term relief but may lead to negative consequences in the long term (Addison et al., 2007). Within each of these strategies, an individual can confront the problem by taking steps to manage a stressful situation or focus on emotions, which involves regulating one's affective reaction to a stressful situation. Therefore, this approach involves four main strategies: problem-engagement (e.g., reducing health risks or engaging in environmentally friendly behaviors), emotion-engagement (taking action aimed at reducing the negative emotional consequences of the threat, e.g., releasing emotions in conversations with friends), problem-disengagement (ignoring the problem), and emotion-disengagement (not taking activities to relieve emotions) (APS; Johnston & Johnston, 1998).

Various theoretical concepts indicate that individual resources, which include environmental characteristics and internal individual characteristics, underlie explanation, promotion, and health maintenance (Życińska & Heszen, 2009). The environmental characteristics include, for example, help from the social environment (Życińska & Heszen, 2009). Internal resources include, for example, positive beliefs and attitudes as well as competence. Life goals that are consistent with the subject of the threats (health, well-being of oneself and other people), perceived competence to cope with threats, and a preference for engaging coping strategies can be treated as psychological resources related to behaviors undertaken to protect against threats. Considering primarily research on reactions to the COVID-19 threat, this study's first objective was to compare: (a) the threat perceptions of COVID-19 and environmental pollution, (b) the willingness to incur costs to protect against these threats, and (c) the perception of competence to counteract these threats. The second goal was to compare the relationship patterns in models for both threats and to explore possible similarities and differences. The second objective was achieved by searching for answers to the following research questions:

1. Is the threat perception (COVID-19 pandemic and environmental pollution) related to the willingness to incur the economic costs of counteraction threats and readiness to engage in protective behaviors against the threat (COVID-19) or prevent its occurrence (environmental pollution)?
2. Do the perception of threat and the willingness to incur economic costs determine behavior?
3. Which individual psychological resources contribute to a greater willingness to incur costs of fighting the threat and take appropriate actions to protect against a threat or prevent its occurrence?

## Method

### Subjects

The participants comprised 300 people, 150 women and men aged 19 to 59 years ( $M = 39.79$ ,  $SD = 11.56$ ) living in villages (32.7%), cities with less than 100 thousand inhabitants (33.7%), and cities with over 100,000 inhabitants (33.7%).

### Measuring Tools

The study used tools to measure (a) threat perception, (b) willingness to incur economic costs for containment of the threats, (c) life aspirations, (d) perceived competence to cope with threats, (e) preferences for stress coping strategies and (f) protective behaviors against the COVID-19 threat and consumption behavior to prevent environmental pollution.

Threat perception was measured with the scale that originally referred to the risk of COVID-19 infection (Cypryńska & Nezlek, 2020). The respondents answered the question: "How big of a threat do you think Covid is, if at all, to...: a given person, to Poland and the world?". The same question was also applied to the threat of environmental pollution. In both cases, the response option 'the threat to other people' was also added. Accordingly, the respondents received eight questions measured on a scale from 1 – *not at all* to 7 – *maximum threat/critical condition*.

The second tool concerned the willingness to incur economic costs. It was also originally developed in the context of the COVID-19 threat (Cypryńska & Nezlek, 2020). The respondents assessed how well the statements that everything should be done to stop the spread of the virus regardless of the cost, even if it means an economic slowdown and giving up various things ( $\alpha = 0.87$ ), matched their beliefs. This tool was also used in the context of the willingness to incur necessary economic costs to stop environmental pollution ( $\alpha = 0.86$ ).

The 23-item life aspirations index (Kasser & Ryan, 1996; Zawadzka et al., 2015; adapted by Jach & Górnik-Durose – unpublished) was used to assess the importance of seven life aspirations, self-acceptance ( $\alpha = 0.83$ ), affiliation ( $\alpha = 0.81$ ), health ( $\alpha = 0.81$ ), money ( $\alpha = 0.80$ ), image – popularity ( $\alpha = 0.85$ ), spirituality ( $\alpha = 0.88$ ), and community contribution ( $\alpha = 0.83$ ).

The level of perceived competence to protect against the threat was also measured for the COVID-19 threat and the environmental pollution threat. A scale was created for the purpose of this study, inspired by the scale of perceived competence derived from the self-determination theory (Williams et al., 1998). In the case of the perceived competence to protect against coronavirus ( $\alpha = 0.75$ ), statements were: "I am confident that I can protect myself against coronavirus," "I am able to cope with this pandemic situation," "I am able to achieve the goals I set for myself during the pandemic," and "I feel like I am able to meet the challenge of protecting myself against coronavirus infection." The perceived competence to change behavior towards sustainable consumption

( $\alpha = 0.91$ ) was measured using the following items: “I am confident that I can manage my consumption in an environmentally friendly way,” “I am able to manage my consuming in an environmentally friendly way,” “I am able to achieve my goals in managing my consumption in an environmentally friendly way,” and “I feel I am up to the challenge of controlling my consumption to be environmentally friendly.”

Coping strategies inventory-short form (Addison et al., 2007) assessed general preferences. It contains four subscales (four items each): problem engagement ( $\alpha = 0.71$ ), problem disengagement ( $\alpha = 0.77$ ), emotion engagement ( $\alpha = 0.73$ ), and emotion disengagement ( $\alpha = 0.66$ ) strategies. The scale (author’s translation with back translation procedure) was used in a general context (without indicating the context of the COVID-19 or the environmental pollution threats) and asked the participants to “think about how you usually dealt with difficult situations and answer the questions presented.”

In the case of protective behaviors against COVID-19, questions were asked about their frequency during the last week. Questions referred to washing hands, using disinfectants, avoiding contact with sick people, avoiding touching face, wearing a protective face mask, and limiting leaving home ( $\alpha = 0.90$ ). The response scale ranged from 1 = *no* to 6 = *extremely more often than usual*.

Behaviors undertaken to prevent environmental pollution were measured with the scale developed for this study. It included items that refer to 10 behaviors: “Buying environmentally friendly products,” “Buying products in reusable packaging,” “Reusing products to avoid waste,” “Taking proper care of belongings,” “Repairing/servicing things to use them longer,” “Giving a ‘second life’ to the own things,” “Giving away, selling or exchanging no longer needed things,” “Sorting household waste,” “Saving water,” and “Saving energy” ( $\alpha = 0.91$ ). Respondents answered on a scale from 0 = *not at all no* to 5 = *to a very large extent*.

The willingness to incur economic costs, life aspirations, perceived competence, and behaviors undertaken for the benefit of environmental protection were measured on a scale from 0 = *a given statement doesn’t fit me at all* to 5 = *this statement fits me very strongly*. The variable indicator was the sum of answers to questions on a given scale.

## Procedure

A specialized research agency that recruited the respondents according to the sample criteria collected the data online in January and February 2021.

The respondents completed the questionnaires in the following order: declarations of protective behavior against COVID-19, willingness to incur economic costs to protect against the pandemic, threat perception of COVID-19, perceived competence to protect against the threat of COVID-19, willingness to incur economic costs to prevent environmental pollution, perception of the threat of environmental pollution, life goals, behaviors undertaken to stop environmental pollution and perceived competence to engage in behavior preventing environmental pollution.

## Data Analysis Method

The SPSS v.29 package was used to analyze the data. Student's t-test for dependent samples was used for comparisons of threat perception, willingness to incur economic costs and perceived competence. Multivariate linear regression analysis using the introduction method and hierarchical regression analysis with interactions were used to answer research questions (Darlington & Hayes, 2017). Due to the failure to meet the assumptions about the normality of the distribution regression analyses were bootstrapped to obtain a 95% confidence interval (Hayes, 2012). In the hierarchical regression analysis, life goals were introduced as predictors of willingness to incur costs and to engage in behavior (in separate analyses) in the first block and perceived competence and preferences for stress coping strategies were added in subsequent steps. All interactions (life aspirations \* competence, stress coping strategies \* competence) were statistically non-significant. The final models are presented in the results section.

## Results

### Perception of Threats and Willingness to Incur Economic Costs

A comparison of descriptive statistics for COVID-19 and environmental pollution threat perceptions showed that the latter was perceived as more threatening across all four response categories (Table 1, p. 178). Student's t-test indicated statistically significant differences, and these effects are the strongest for the perception of threat to the person making the assessment and the perception of threat to the world (Rosenthal, 1996). Furthermore, the willingness to incur economic costs to counteract the threat was stronger in the case of environmental pollution. This effect exists, however it is weak (Table 2, p. 178).

Regression analysis showed that COVID-19 threat perceptions to different entities (you, other people, Poland, and the world) explained a total of 55% of the variance in the willingness to incur costs for protection against COVID-19, but the perception of the threat to Poland was not a statistically significant predictor (Table 3, p. 178). Of the remaining three variables, the perception of a threat to the world was the strongest predictor, and the threat to the person assessing the danger was the weakest. The model without this one variable (a threat to Poland) also explained 55% of the variance.

In the case of the willingness to incur costs to prevent environmental pollution, the perception of threat to Poland also was not a statistically significant predictor. A model with all four variables explained 34% of the variance (and after excluding threat to Poland, it was 35%). The strongest predictor of the willingness to incur costs was the perception of threat to other people (Table 4, p. 179).

**Table 1***Perception of the threat of COVID-19 and environmental pollution*

Perception of the threat	<i>M</i>	<i>SD</i>	Min.	Max.	<i>t</i>	df	<i>t</i> 95%	Cohen's <i>D</i>
COVID-19: for you	4.40	1.37	1	7	-7.41	299	[-0.805; -0.454]	-0.43
Environmental pollution: for you	5.02	1.16	1	7				
COVID-19: for others	4.80	1.23	1	7	-4.53	299	[-0.498; -0.192]	-0.26
Environmental pollution: for others	5.15	1.17	1	7				
COVID-19: for Poland	4.90	1.33	1	7	-3.82	299	[-0.483; -0.158]	-0.22
Environmental pollution: for Poland	5.21	1.20	1	7				
COVID-19: for the world	4.89	1.30	1	7	-6.59	299	[-0.725; -0.384]	-0.38
Environmental pollution: for the world	5.44	1.22	1	7				

**Table 2***Willingness to incur economic costs to counteract threats*

Economic costs	<i>M</i>	<i>SD</i>	Min.	Max.	<i>t</i>	df	<i>t</i> 95%	Cohen's <i>D</i>
Protection against COVID-19	9.67	3.65	0	15	-3.42	299	[-1.086; -0.277]	-0.20
Preventing environmental pollution	10.36	2.90	0	15				

**Table 3***Predicting the willingness to incur economic costs based on the perception of the COVID-19 threat*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Costs – COVID-19 <i>R</i> <sup>2</sup> <i>adj</i> = 0.55 <i>F</i> (299) = 93.18 <i>p</i> < .001, <i>D-W</i> = 2.21	threat for you	[-0.002; 0.756]	.051
	threat for others	[0.058; 1.122]	.037
	threat for Poland	[-0.091; 0.744]	.133
	threat for the world	[0.499; 1.590]	< .001

D-W: Durbin-Watson test

**Table 4**

*Predicting the willingness to incur economic costs based on the perception of the environmental pollution threat*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Costs – environment $R^2_{adj} = 0.34$ $F(299) = 39.12$ $p < .001, D-W = 2.12$	threat for you	[0.057; 0.877]	.031
	threat for others	[0.160; 1.115]	.002
	threat for Poland	[-0.464; 0.380]	1.000
	threat for the world	[0.092; 0.917]	.020

D-W: Durbin-Watson test

**Threat Perception and Behavior**

The perceived threat to other people explained protective behaviors related to COVID-19 (Table 5 – 25% of explained variance), but the perception of a threat to the world predicted preventive behavior in the case of environmental pollution (Table 6 – 18% of variance explained).

**Table 5**

*Predicting protective behavior based on COVID-19 threat perception*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Behavior – COVID-19 $R^2_{adj} = 0.25$ $F(299) = 25.48$ $p < .001, D-W = 1.97$	threat for you	[-0.231; 1.855]	.144
	threat for others	[0.151; 2.676]	.026
	threat for Poland	[-0.523; 1.576]	.311
	threat for the world	[-0.170; 2.182]	.077

D-W: Durbin-Watson test

**Table 6**

*Predicting consumption behavior based on the perception of the threat of environmental pollution*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Behavior – environment $R^2_{adj} = 0.18$ $F(299) = 17.57$ $p < .001, D-W = 2.22$	threat for you	[-1.446; 0.981]	.671
	threat for others	[-0.411; 2.319]	.127
	threat for Poland	[-0.809; 1.688]	.461
	threat for the world	[0.588; 2.922]	.003

D-W: Durbin-Watson test

In the second part of the analysis, the importance of life goals, perceived competence, and coping strategies for willingness to incur costs and behavior was tested. Descriptive statistics for these variables are included in the appendix. A comparison of perceived competence in protecting oneself against COVID-19 and counteracting environmental pollution has shown that the perceived competence was higher in the case of contamination environmental pollution, although this effect was medium (Table 1 in the appendix).

## Psychological Resources and Willingness to Incur Economic Costs

The tested set of variables explained the variation in the willingness to incur costs related to protection against COVID-19 to a lesser extent (Table 7). Perceived competence in adopting measures to protect oneself against COVID-19 and two coping strategies, problem engagement, and emotional disengagement, explained only 9% of the variance. The problem-engagement strategy was the strongest predictor. This strategy and perceived competence also predicted the willingness to incur costs to prevent environmental pollution (Table 8). Together with the importance of community contribution life goal, they explained 33%.

**Table 7**

*Predicting willingness to incur the costs of protection against COVID-19 based on life aspirations, perceived competencies, and coping strategies*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Costs – COVID-19 $R^2_{adj} = 0.09$ $F(299) = 11.40$ $p < .001, D-W = 2.05$	competence	[0.115; 0.317]	.048
	problem engagement	[0.059; 0.379]	.006
	emotion disengagement	[-0.007; 0.284]	.052

D-W: Durbin-Watson test

**Table 8**

*Predicting willingness to incur the costs of preventing environmental pollution based on life aspirations, perceived competencies, and coping strategies*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Costs – environment $R^2_{adj} = 0.33$ $F(299) = 50.03$ $p < .001, D-W = 2.09$	community contribution	[0.021; 0.309]	.034
	competence	[0.080; 0.367]	< .001
	problem engagement	[0.173; 0.420]	< .001

D-W: Durbin-Watson test

### Psychological Resources and Behavior

Community contribution also predicted protective (COVID-19) and preventive (environment) behaviors. It was the strongest predictor of protective behaviors against COVID-19, however (together with emotion-focused stress coping strategies) it explained only small portion of variance (Table 9 – 13%). A model for behavior adopted to prevent environmental pollution also included perceived competence to take actions for sustainable consumption besides the community contribution life goal. These two predictors, along with a problem-disengagement coping strategy (weak negative relationship), explained 55% of the preventive behaviors variance, with perceived competence as the strongest predictor (Table 10).

**Table 9**

*Predicting protective behaviors against COVID-19 based on life aspirations, perceived competencies, and stress-coping strategies*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Behavior – COVID-19 <i>R</i> <sup>2</sup> <i>adj</i> = 0.13 <i>F</i> (299) = 15.41 <i>p</i> < .001, <i>D-W</i> = 2.02	community contribution	[0.326; 0.972]	< .001
	emotion engagement	[0.014; 0.600]	.034
	emotion disengagement	[0.161; 0.747]	.005

D-W: Durbin-Watson test

**Table 10**

*Predicting consumption behavior based on life aspirations, perceived competencies, and coping strategies.*

Predicted variable	Predictors	$\beta$ 95%	<i>p</i>
Behavior – environment <i>R</i> <sup>2</sup> <i>adj</i> = 0.55 <i>F</i> (299) = 120.25 <i>p</i> < .001, <i>D-W</i> = 2.26	community contribution	[0.163; 0.648]	.003
	competence	[1.318; 1.654]	< .001
	problem disengagement	[-0.295; -0.026]	.026

D-W: Durbin-Watson test

## Summary and Discussion of Results

### Perception of Threats, Willingness to Incur Economic Costs, and Perceived Competence to Engage in Behavior in the Context of the Covid-19 Threat and the Threat of Environmental Pollution

The first aim of the study was to compare threat perception, willingness to incur economic costs, and the perceived competence to engage in behavior in

the context of COVID-19 and environmental pollution threats. It was shown that environmental pollution was perceived as more threatening (the strongest effect was found for threats to the individual and the world), which is somewhat surprising, considering the amount of media information on the effects of the pandemic. It was also found that the willingness to incur economic costs was greater and perceived competence stronger in the case of environmental pollution threat. The differences in results can be justified to some extent by the specificity of both threats. The common feature is that their occurrence triggers cognitive and behavioral reactions. However, the threat of COVID-19 is more personal and theoretically may exert immediate effects on the individual, whereas the threat of environmental pollution is less personal and may have more distant consequences. The optimistic illusion (Tversky & Kahneman, 1974) may lead to underestimating the threat of COVID-19, but it does not work in the case of a less tangible threat. Optimistic cognitive bias reduces the perception of personal risk for contracting COVID-19 and leads to the belief that even if an infection occurs, the course of the disease will continue to be mild. The difference in threat perception may also result from the fact that individuals tend to downplay the risk of negative experiences for themselves compared to the risk to other people (Stach, 2006). COVID-19 is present, whereas the effects of environmental pollution will affect subsequent generations, hence the weaker threat assessments of COVID-19. Smaller willingness to incur costs to prevent COVID-19 (weak effect) may result from the belief that the threat is temporary and will soon pass, unlike environmental pollution threat. Stronger perceived competence to act against environmental pollution may be related to the sense of control over the threat. According to the theory of planned behavior (Ajzen, 1991), the intention to engage in behavior (behavior change) and the behavior itself depend on beliefs about resource control (whether they are sufficient to take behavior) and perceived behavioral control – the individual's sense of being able to undertake the behavior. In the case of coronavirus, the level of control is much weaker than the control of one's consumption behavior, which may translate into a sense of greater competence. These suppositions require further research.

### **Predictors of Willingness to Incur Economic Costs in Counteracting the Threats of COVID-19 and Environmental Pollution**

The interpretation of the results regarding the perception of both threats was partly based on the analysis of the predictors of willingness to incur costs. The first part of the analysis showed that the perception of threat to the world was the strongest predictor of the willingness to incur costs in the fight against COVID-19, whereas the perception of threat to other people was the strongest predictor of the willingness to incur cost in the fight against environmental pollution.

Only the latter result is consistent with reports from other studies, which indicate that the threat to an individual allows one to predict the willingness to incur costs (Searle & Gow, 2010). The belief that COVID-19 is a greater threat to the world decreases the risk for a given person and – as follows from the second part of the analysis – contributes to the ability to adopt problem-engagement

and emotion-disengagement coping strategies, as well as a positive assessment of one's competence to act.

In the case of environmental pollution threat – apart from perceived competence and problem engagement coping strategy – the importance of community contribution as a life goal is also a predictor of the willingness to incur costs. This last result is not surprising because of the relationship between this willingness and the perception of threat to other people.

### **Predictors of Protective Behaviors Against COVID-19 and Preventive Behaviors Against Environmental Pollution**

The results of subsequent analyses showed that the importance of threat perceptions differs depending on predicted variable. The perception of threat to the world is the strongest predictor of willingness to incur costs in the case of COVID-19, and the perception of threat to other people is the strongest predictor in the case of environmental pollution. However, when behavior is to be predicted, the relationship is opposite. The perception of the threat to others is the strongest predictor of protective behaviors against COVID-19, and the perception of the threat to the world is the strongest predictor of consumption behaviors aimed at preventing the threat of environmental pollution. A slightly different pattern of relationships was also found for predictors of behaviors among psychological resources. The perceived competence and two coping strategies, problem engagement and emotional disengagement, explained the willingness to incur the costs of protection against COVID-19. However emotional engagement and emotional disengagement, as well as community contribution as a life goal predict adopted protective behaviors against COVID-19. Moreover, when comparing consumption behaviors aimed at reducing the threat of environmental pollution, the two predictors were the same as in the case of the willingness to incur costs (community contribution and competence). Indifference towards problem disengagement strategies to cope with stress facilitated these behaviors.

It is also notable that community contribution explained both categories of behavior, while perceived competence explained only behaviors related to the prevention of environmental pollution. It should be emphasized that none of the analyses revealed the importance of health as a life goal. This is a surprising result, as both threats may have health consequences.

An important observation concerns stress-coping strategies as predictors of willingness to incur costs and to adopt behavior. Each analysis included a different strategy in the regression equation (except for the willingness to incur the costs of protection against COVID-19 and protective behaviors against COVID-19, which were positively predicted by the emotional disengagement strategy). This result is consistent with previous observations. It is believed that the effectiveness of individual stress coping strategies is not universal. It depends on the context and the adaptation of the strategy to the specificity of the stressor (Bonneville-Roussy et al., 2017; Lazarus & Folkman, 1984). Effective strategies have numerous positive effects, both in terms of the implementation

of a given activity (consistency, commitment to the activity, positive emotional and cognitive reactions) and in terms of general indicators of physical and mental health and well-being (Aldwin, 2000; Ntoumanis et al., 2009).

In conclusion, each threat has its specificity, which should be considered when looking for predictors of various aspects of individuals' functioning. Due to the relatively small sample, the presented results should be treated as preliminary and should be replicated. In addition to increasing the sample size, future research should consider emotional aspects of an individual's functioning in the context of a threat, which may enhance the perception of this threat (Searle & Gow, 2010) and mediate the relationship between perception of a threat and the undertaken behaviors (Cypryńska & Nezlek, 2020). It would also be worth monitoring media coverage of the threat during data collection.

## References

- Addison, C. C., Campbell-Jenkins, B. W., Sarpong, D. F., Kibler, J., Singh, M., Dubbert, P., Wilson, G., Payne, T., & Taylor, H. (2007). Psychometric evaluation of a Coping Strategies Inventory Short-Form (CSI-SF) in the Jackson Heart Study cohort. *International Journal of Environmental Research and Public Health*, 4(4), 289–295. <https://doi.org/10.3390/ijerph200704040004>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Aldwin, C. A. (2000). *Stress, coping and development: An integrative perspective*. Guildford Press.
- APS (Australian Psychological Society). (n.d.). Coping and adapting to climate change. Retrieved August 10, 2023, from <https://psychology.org.au/community/advocacy-social-issues/environment-climate-change-psychology/resources-for-psychologists-and-others-advocating/coping-and-adapting-to-climate-change>
- Bish, A., & Michie, S. (2010). Demographic and attitudinal determinants of protective behaviours during a pandemic: A review. *British Journal of Health Psychology*, 15, 797–824. <https://doi.org/10.1348/135910710X485826>
- Bonneville-Roussy, A., Evans, P., Verner-Filion, J., Vallerand, R. J., & Bouffard, T. (2017). Motivation and coping with the stress of assessment: Gender differences in outcomes for university students. *Contemporary Educational Psychology*, 48, 28–42. <https://doi.org/10.1016/j.cedpsych.2016.08.003>
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56(2), 267–283. <https://doi.org/10.1037/0022-3514.56.2.267>
- Cheng, C., Ying, W., Ebrahimi, O. V., & Wong, K. F. E. (2023). Coping style and mental health amid the first wave of the COVID-19 pandemic: A culture-moderated meta-analysis of 44 nations. *Health Psychology Review*, 1–24. <https://doi.org/10.1080/17437199.2023.2175015>

- Cypriańska, M., & Nezlek, J. B. (2020). Anxiety as a mediator of relationships between perceptions of the threat of COVID-19 and coping behaviors during the onset of the pandemic in Poland. *PLOS ONE*, *15*(10), Article e0241464. <https://doi.org/10.1371/journal.pone.0241464>
- Cypriańska, M., & Wójcik, A. (2022, April 11). *Pandemia COVID-19 – szanse i wyzwania dla przemian społecznych w stronę zielonej transformacji [COVID-19 pandemic – opportunities and challenges for social changes towards green transformation]* [lecture]. Zagrożenie COVID-19 oraz zagrożenie zmianą klimatu w świetle wyników badań psychologicznych, Warszawa, Polska [The threat of COVID-19 and the threat of climate change in the light of the results of psychological research, Warsaw, Poland].
- Darlington, R., & Hayes, A. F. (2017). *Regression analysis and linear models: concepts, application, and implementation*. Guilford Press.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268. [https://doi.org/10.1207/S15327965PLI1104\\_01](https://doi.org/10.1207/S15327965PLI1104_01)
- Deci, E. L., & Vansteenkiste, M. (2004). Self-determination theory and basic need satisfaction: Understanding human development in positive psychology. *Ricerche di Psicologia*, *27*(1), 23–40.
- Dragioti, E., Li, H., Tsitsas, G., Lee, K. H., Choi, J., Kim, J., Choi, Y. J., Tsamakidis, K., Estradé, A., Agorastos, A., Vancampfort, D., Tsiptsios, D., Thompson, T., Mosina, A., Vakadaris, G., Fusar-Poli, P., Carvalho, A. F., Correll, C. U., Han, Y. J., Park, S., Il Shin, J., & Solmi, M. (2022). A large-scale meta-analytic atlas of mental health problems prevalence during the COVID-19 early pandemic. *Journal of Medical Virology*, *94*(5), 1935–1949. <https://doi.org/10.1002/jmv.27549>
- Grouzet, F. M., Kasser, T., Ahuvia, A., Dols, J. M., Kim, Y., Lau, S., Ryan, R. M., Saunders, S., Schmuck, P., & Sheldon, K. M. (2005). The structure of goal contents across 15 cultures. *Journal of Personality and Social Psychology*, *89*(5), 800–816. <https://doi.org/10.1037/0022-3514.89.5.800>
- Grunert, K. G., Janssen, M., Christensen, R. N., Teunissen, L., Cuykx, I., Decorte, P., & Reisch, L. A. (2022). “Corona cooking:” The interrelation between emotional response to the first lockdown during the COVID-19 pandemic and cooking attitudes and behaviour in Denmark. *Food Quality and Preference*, *96*, Article 104425. <https://doi.org/10.1016/j.foodqual.2021.104425>
- Hayes, A. F. (2012). *Process: A versatile computational tool for observed variable mediation, moderation, and conditional process modelling* (White paper). Retrieved June 20, 2023, from <http://www.afhayes.com/public/process.pdf>. <https://www.processmacro.org/index.html>
- Hepburn, C., O’Callaghan, B., Stern, N., Stiglitz, J., & Zenghelis, D. (2020). Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? *Oxford Review of Economic Policy*, *36*, Issue Supplement\_1, 359–381. <https://doi.org/10.1093/oxrep/graa015>
- Johnston, M., & Johnston, D. (1998). Assessment and measurement issues. In A. S. Bellack & M. Hersen (Eds.), *Comprehensive Clinical Psychology*, Vol. 8 (pp. 113–135). Pergamon.
- Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin*, *22*, 280–287.

- Kasser, T., & Ryan, R. M. (2001). Be careful what you wish for: Optimal functioning and the relative attainment of intrinsic and extrinsic goals. In P. Schmuck & K. M. Sheldon (Eds.), *Life goals and well-being: Towards a positive psychology of human striving* (pp. 116–131). Hogrefe & Huber Publishers.
- Latkin, C., Dayton, L., Scherkoske, M., Countess, K., & Thrul, J. (2022). What predicts climate change activism? An examination of how depressive symptoms, climate change distress, and social norms are associated with climate change activism. *The Journal of Climate Change and Health*, 8, Article 100146. <https://doi.org/10.1016/j.joclim.2022.100146>
- Lazarus, R., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
- Ntoumanis, N., Edmunds, J., & Duda, J. L. (2009). Understanding the coping process from a self-determination theory perspective. *British Journal of Health Psychology*, 14, 249–260. <https://doi.org/10.1348/135910708X349352>
- Rosenthal, J. A. (1996). Qualitative descriptors of strength of association and effect size. *Journal of Social Service Research*, 21(4), 37–59.
- Rubin, G. J., Amlôt, R., Page, L., & Wessely, S. (2009). Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: Cross sectional telephone survey. *BMJ*, 339, Article b2651. <https://doi.org/10.1136/bmj.b2651>
- Searle, K., & Gow, K. (2010). Do concerns about climate change lead to distress? *International Journal of Climate Change Strategies and Management*, 2(4), 362–379. <https://doi.org/10.1108/17568691011089891>
- Stach, R. (2006). *Optymizm. Badania nad optyimizmem jako mechanizmem adaptacyjnym [Optimism. Research on optimism as an adaptation mechanism]*. Wydawnictwo Uniwersytetu Jagiellońskiego.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124–1130.
- Wąsowicz, G. (2022, April 11). *Pandemia COVID-19 i zanieczyszczenie środowiska. Percepcja zagrożeń, gotowość ponoszenia kosztów ekonomicznych w walce z nimi, zachowania i potrzebne zasoby psychologiczne [The COVID-19 pandemic and environmental pollution. Perception of threats, readiness to bear economic costs in the fight against them, behaviors and necessary psychological resources]* [lecture]. Zagrożenie COVID-19 oraz zagrożenie zmianą klimatu w świetle wyników badań psychologicznych, Warszawa, Polska [The threat of COVID-19 and the threat of climate change in the light of the results of psychological research, Warsaw, Poland].
- Wąsowicz, G., & Poleszczuk, J. (2021). Sociological and psychological view on selected determinants of behaviour change and non-change in Covid Times. In *International Panel on Behavior Change. COVID-19: Introduction to IPBC Issues*, online (pp. 53–63). <https://www.ipbc.science/about-us/reports/thematic-report-1-covid/>
- WHO. (2022). <https://www.who.int/news/item/03-06-2022-why-mental-health-is-a-priority-for-action-on-climate-change>
- Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, 70(4), 767–779. <https://doi.org/10.1037/0022-3514.70.4.767>

- Williams, G. C., Freedman, Z.R., & Deci, E. L. (1998). Supporting autonomy to motivate glucose control in patients with diabetes. *Diabetes Care*, *21*, 1644–1651.
- Zawadzka, A. M., Duda, J., Rymkiewicz, R., & Kondratowicz, B. (2015). Siedmiowymiarowy model aspiracji życiowych Kassera i Ryana. Analiza trafności i rzetelności narzędzia [Seven-dimensional model of life aspirations by Kasser and Ryan: analysis of validity and reliability of the instrument]. *Psychologia Społeczna [Social Psychological Bulletin]*, *10*(1), 100–111. <https://doi.org/10.7366/1896180020153207>
- Życińska, J., & Heszen, I. (2009). Resources, coping with stress, positive emotions, and health. Introduction. *Polish Psychological Bulletin*, *40*(1), 1–5. <https://doi.org/10.2478/s10059-009-0001-7>

## Appendix

**Table 1**

*Descriptive statistics for the perceived competence and results of the Student's t-test for dependent samples*

Variable	<i>M</i>	<i>SD</i>	Min.	Max.	<i>t</i>	df	<i>t</i> 95%	Cohen's <i>D</i>
Competence: COVID-19	12.71	3.26	2	20	-7.56	299	[-2.187; -1.273]	-0.44
Competence: environmental pollution	14.44	3.44	0	20				

**Table 2**

*Descriptive statistics for life aspirations and coping strategies*

Variable	<i>M</i>	<i>SD</i>	Min.	Max.
Self-acceptance	15.87	3.09	2	20
Affiliation	15.80	3.49	2	20
Health	7.67	1.82	0	10
Money	10.64	2.84	2	15
Image	8.31	3.53	0	15
Spirituality	11.88	5.07	0	20
Community contribution	10.60	2.86	0	15
Problem engagement	13.51	3.08	1	20
Emotion engagement	12.02	3.65	1	20
Problem disengagement	9.12	4.46	0	20
Emotion disengagement	12.12	3.51	0	20

**Table 3**

*Descriptive statistics for protective behaviors against COVID-19 and against the threat of environmental pollution*

<b>Variable</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b>Min.</b>	<b>Max.</b>
Protective behaviors: COVID-19	25.41	8.59	7	42
Preventive behavior: environment	38.85	3.49	10	50