


## Article

# Habit Transformation in Times of Crisis: How Green Values Promote Sustainable Mobility

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**Abstract:** Going on holiday is often associated with taking the car or plane. Even for short distances, and where alternative, sustainable transportation modes would be available, we frequently choose the more unsustainable options. Affordability, comfortability, and time savings led to an increase in transportation, which in turn, negatively contributed to greenhouse gas emissions. The reduction in those emissions can be achieved by choosing public transportation. However, since transportation choices are often made unconsciously and habitually, it is crucial to transform those unsustainable habits into more sustainable ones. Contextual changes can serve as a catalyst. This research investigates whether pre-COVID-19 and pre-inflation unsustainable travel habits can be broken through the perceived impact of COVID-19, financial hardship, and green consumption values, increasing the intention for sustainable transportation modes using a survey design. We found that the context change, as such, does not predict future intentions to travel sustainably, but existing green consumption values do. Building on the self-activation theory, the results show that habits and the perceived impact of COVID-19 and financial hardship activate a person's green consumption values. Consumers' green values mediate the relationship between unsustainable habits and the intentions to use sustainable transportation modes, combining the habit discontinuity and self-activation hypotheses.

**Keywords:** habit discontinuity hypothesis; self-activation; sustainability; COVID-19; inflation; mobility



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## 1. Introduction

We often associate air travel with going on vacation. Not surprisingly, many vacations, even short ones, are taken by air. This transportation mode is comfortable, affordable, and time-saving [1]. However, traveling by plane habitually for leisure, e.g., within Europe, has contributed negatively to climate change [2].

Transportation accounts for 20.7% of the overall global carbon dioxide emissions in 2022 [3] and for 50% of the carbon footprint of the tourist industry in 2018. Tourism has outpaced many other sectors in terms of greenhouse gas emissions [4]. In particular, planes and cars contribute to environmental pollution, while bus and rail transportation have significantly lower emissions [5]. Consumers can contribute to the reduction in carbon emissions by choosing more sustainable modes of transportation. However, since the choice of means of transport is often made habitually, it is vital to break up unsustainable habits and replace them with more sustainable ones. One way of breaking a habit is by going through a contextual change [6].

Recently, consumers worldwide experienced a global contextual change. The COVID-19 pandemic severely affected our daily lives. To curb the spread of the virus, governments across the world set travel restrictions, which led to a slowdown in leisure and vacation travel [7]. The outbreak of the pandemic was a unique change of context for consumers worldwide. Threats to health and the economy caused consumers to experience emotional responses and loss of control. Threats may lead to long-term diseases or unemployment, resulting in disrupted certainties and routines [8].

Moreover, consumers in many countries are currently experiencing an increase in consumer prices and the inflation rate remains high. The context in which consumers make their choices is limited by financial constraints and by economic vulnerability. Consumption is generally low, leading to increased price awareness and frugality. Research suggests that this outcome depends on consumers' attitudes towards the economic situation and their personal finances [9,10]. The economic situation represents a change in the economic circumstance for consumers, especially those who are financially vulnerable.

Consumer behavior varies between economic contractions and expansions, with differences observed in spending patterns and budget constraints. During recessions, consumers tend to prioritize spending on essential goods, particularly when consumption is less visible to others, while income decreases may lead to significant changes in consumption behavior, influenced by a scarcity mindset that causes them to focus on what is most essential and valuable to them, e.g., [11,12]. In addition, new-found focus on value and mind-sets reflects active agency and responsabilisation [13,14]. Research on choices under such changed circumstances identified crises as "'learning journeys' and transformational opportunities" [15] (p. 226), including the formation of new habits.

### 1.1. Habit and Habit Discontinuity

A habit can be defined as automatic behavior, which is always performed in one specific situation, while being exposed to a trigger. The behavior is acted out consistently as long as the trigger, e.g., environmental cues, remains unchanged [16,17]. Individuals learn through reinforcement by pairing a specific context with a specific action, leading to the formation of a connection within the memory [18]. This move towards context-dependency, away from merely acting upon reaching a goal, is also part of forming habits [16]. Repeating past actions and choosing deliberate actions are two potential influences of the past on future behavior. Performing an action based on intentions or derived from attitudes or past behavior to reach a goal, can be the first step toward forming a new habit [19]. Habit formation is related to goals, their activation, and interpretation. If there is a desire to achieve a goal, the performance of a regular action can lead to the formation of a habit. If this goal is presented again later, the desire to achieve it provides the necessary contextual cue to trigger the habitual previously learned action [18].

Habitual behavior makes choices faster and more efficient. Yet, decision-making processes may not necessarily be "good" choices. "Bad" behaviors, like snacking or smoking, happen due to habitual behavior and are hard to control for individuals. In the context of travel, the choice to use a specific mode of transportation may emerge in the same context, for example, when a destination for a vacation is planned. Even if going on holidays is only performed a few times a year, the behavior can become habitual, eventually occurring automatically, without much consideration [20]. When choosing a transportation mode to reach a destination for leisure travel purposes, the mode choice is dependent on various factors, including price, the number of people traveling, or the comfort of the mode choice, making it an even more complex construct [5]. Therefore, people become resistant to change, stop considering other options, or adopt a biased research style [21].

Habits can successfully be broken when the context is changed noticeably for the individual [22]. Two types of interventions are suggested: upstream (i.e., preventing a habit from being formed, e.g., improving the bus network) and downstream (i.e., altering already existing behaviors on a personal level, e.g., educating people to take public transportation) interventions, which differ in how and when they affect habits. In "downstream-plus-context-change" interventions, information is presented during a context change, having a very high potential to intervene in habits, which is proposed by the habit discontinuity hypothesis [16].

### 1.2. Self-Activation

After a context change, new information becomes more salient and can be noticed more easily by the individual. Additionally, the self-activation hypothesis explains that

values of an individual influence their choices. This activation happens when the attention is focused on the value in question and the value is part of a person's self-concept [23].

Generally, values remain stable over time [24], even during significant context changes like commencing university or changing careers [25]. However, previous studies have demonstrated that changes in values can be attributed to incisive life events [25,26]. Societal value changes have occurred after existential threats such as terror attacks [27], war [28], the 2008 global financial crisis [29], or the COVID-19 pandemic [30].

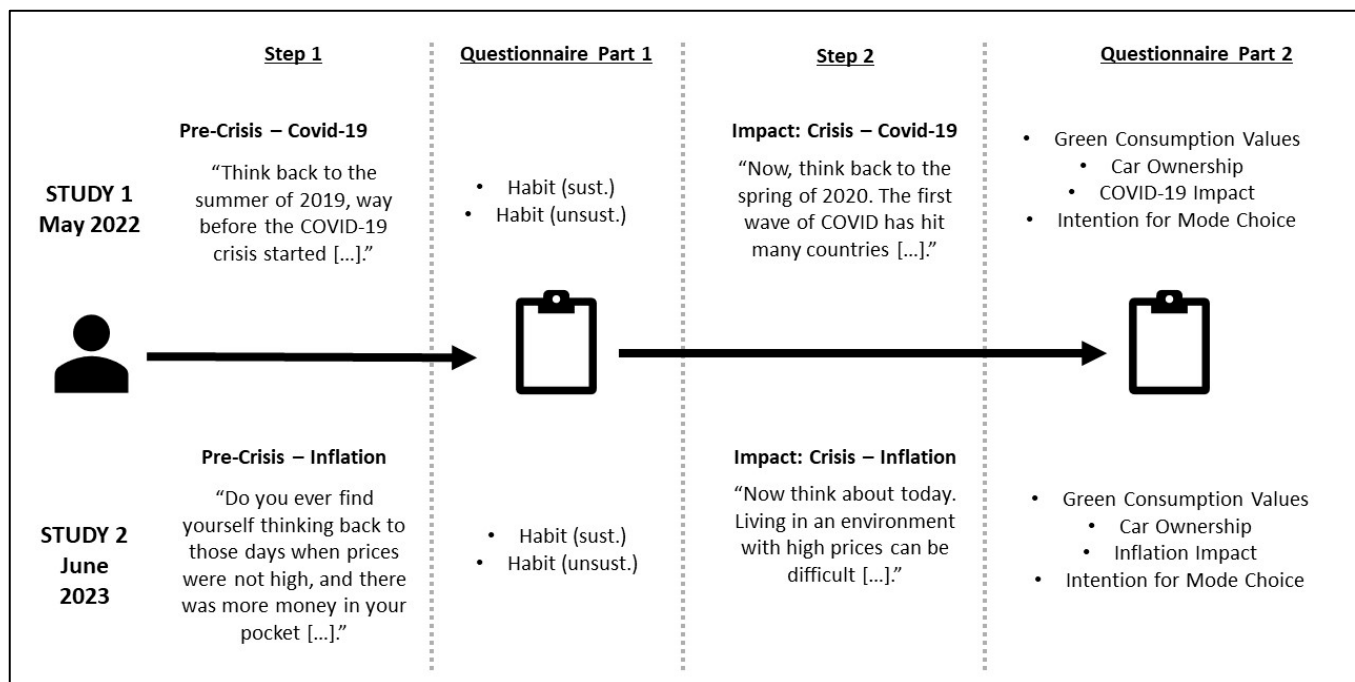
Combining the habit discontinuity hypothesis and the self-activation hypothesis, a contextual change can activate individuals' beliefs, like being concerned and caring about the environment; thus, pro-environmental behaviors can be disrupted by temporary interruptions [31]. This makes individuals more aware of internal information, which can then guide decisions. For instance, people who were environmentally orientated and experienced a context change were more likely to commute less by car to university [23]. However, car ownership was found to curb sustainable behavior [32].

Habitual travel behavior has been explored in the past [19,33–37]. However, most research focused on everyday travel mode choices which occur more often than going on vacation. In addition, the type of contextual change, evoked by (1) a health crisis such as the COVID-19 pandemic or by (2) financial hardship due to inflation, and its effect on changing leisure transportation mode behavior, has not been studied. Due to these unique circumstances, the pandemic and inflation may have served as two different types of a contextual change for habits regarding transportation mode choices.

This is where this research sets in and asks, following the habit discontinuity hypothesis, whether habit (unsustainable (unsust.)/sustainable (sust.)), next to green consumption values and car ownership, affect intentions regarding future transportation modes (unsustainable/sustainable) and what is the perceived impact of (1) the COVID-19 pandemic and (2) financial hardship (RQ 1). Addressing self-activation theory, this research inquiries whether the perceived impact of COVID-19/financial hardship and habit (unsustainable/sustainable) affect green consumption values (RQ 2). Eventually, this research analyses whether green consumption values and car ownership, respectively, mediate the relationship between habit (unsustainable/sustainable) and intentions regarding future transportation modes (unsustainable/sustainable), combining the habit discontinuity hypothesis and the self-activation hypothesis (RQ 3).

It is important to understand whether and how contextual change, such as the COVID-19 pandemic and financial hardship due to inflation, can help to break unsustainable leisure travel habits to fight climate change. In addition, knowing whether external circumstances bring consumers closer to their values helps to identify opportunities for segmenting and targeting consumers more effectively. The current research utilizes the factual context changes caused by the COVID-19 pandemic and the rising inflation to investigate whether unsustainable habits in travel behavior can be abandoned and if so, how. This advances the understanding of the interplay between health and economic threats and habits, as well as green value orientation.

Next, two studies are presented that examine the previously formulated research questions in different contexts (i.e., health threat and financial hardship). Figure 1 provides an overview of the study design.



**Figure 1.** Methodological Roadmap.

## 2. Study 1: Transforming Habit through Health Threats and Green Consumption Values

In the following section, the methodology, including the material (questionnaire) and the sample, will be described. This is followed by the analysis, before presenting the results in detail, and then a discussion of study 1’s results.

### 2.1. Materials and Methods

The research questions were answered using survey data ( $N = 186$  participants, 58.4% female,  $\text{mean}_{\text{age}} = 25.5$  years, age range 19–67 years) from participants within Europe (excluding 8 non-European participants). The focus on Europe ensured that vacation destinations people had in mind could be reached by all proposed transportation mode options.

An a priori power analysis was conducted using G\*Power version 3.1 to determine the minimum sample size required to answer the study’s research questions [38]. Results indicated that the required sample size to achieve 80%/95% power for detecting a medium effect, at a significance criterion of  $\alpha = 0.05$ , was  $N = 85/129$  for linear multiple regression (fixed model,  $R^2$  deviation from zero). Thus, the obtained sample size of  $N = 186$  was adequate to run the regression analysis. To identify (un)sustainable transportation modes, a small pre-test was conducted ( $N = 21$ ). Participants scored various forms of transportation options based on their perceived impact on the environment. While trains and busses were perceived as having a low level of impact, planes and cars were perceived as having a high level of impact on the environment. To measure unsustainable and sustainable habits and intentions to use transportation modes, respectively, these two behaviors each were used in the survey, i.e., planes and private cars (unsustainable), and public buses and trains (sustainable choices).

Two scenarios were used to help participants remember the time (a) before and (b) during the COVID-19 pandemic ((a) “Think back to the summer of 2019, way before the COVID-19 crisis started. There are no restrictions, no masks, and you are free to go wherever you want. One morning you wake up, and you really feel like going on vacation. You decide on a destination within Europe”. (b) “Now, think back to the spring of 2020. The first wave of COVID has hit many countries around the globe. The numbers of cases are high, and the risk of getting infected is always present. There is a lockdown, and even though the government has

announced it will lift restrictions soon, there is a general state of uncertainty. A vaccine has not yet been discovered”). Participants were asked to write down what came to their minds when reading the scenario.

The questionnaire consisted of five sections: (1) habit assessment before the COVID-19 pandemic (measured after scenario (a), eight items, Cronbach’s  $\alpha_{\text{sust}} = 0.93$ , Cronbach’s  $\alpha_{\text{unsust}} = 0.92$ , adapted the Self-Report Habit Index (SRHI), [39]), (2) perceived impact of the COVID-19 pandemic (ten items, Cronbach’s  $\alpha = 0.88$ , COVID-19 Impact Scale, [40]; measured after scenario (b)), (3) intentions regarding future transportation mode choices (four items i.e., intention to use, intention to spend money on, intention to research more about specific options, and would recommend to a friend; Cronbach’s  $\alpha_{\text{sust}} = 0.92$ , Cronbach’s  $\alpha_{\text{unsust}} = 0.87$ ), (4) green consumption values (six items, Cronbach’s  $\alpha = 0.91$ , [41]), and (5) demographics (gender, age, highest completed degree, monthly disposable household income, nationality, and car ownership (1 = no car, 2 = sharing a car, 3 = owning car)). Items (1–4) were measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) (see Appendix A).

## 2.2. Results

Building on past research on habit and travel behavior, we modelled leisure travel mode choices within a global factual context change (i.e., the COVID-19 pandemic). The habit discontinuity hypothesis [23] was used to investigate whether unsustainable habits (i.e., choosing planes or cars for holiday travel instead of opting for buses or trains) could be abandoned in the wake of such a context change.

Before performing regression analyses, multicollinearity was tested to evaluate model fitness and whether multicollinearity is present in the model, which may affect our model with more than one predictor. The variance inflation factor (VIF) for multicollinearity was calculated and was found to be within the interval ( $1 < \text{VIF} < 5$ ). Since this study primarily aimed to investigate whether unsustainable habits in leisure travel behavior can be abandoned in the wake of a context change, in the following section, we report only the *cross-effects* of *unsustainable* habits prior to the COVID-19 pandemic and intentions to use *sustainable* transportation modes (for full results, see Table 1).

**Table 1.** Results of Study 1 for RQ1 and RQ2.

RQ 1	X	Y	B/ $\beta$	Sig	VIF
Model sustainable (F(4, 173) = 35.391, $p < 0.001$ , adj. $R^2 = 0.437$ )	Habit (sust.)	Intention (sust.)	0.348/0.333	$p < 0.001$	1.364
	GCV		0.553/0.414	$p < 0.001$	1.319
	CO		−0.116/−0.051	$p = 0.390$	1.090
	PIC		0.082/0.057	$p = 0.337$	1.091
Model unsustainable (F(4, 173) = 29.378, $p < 0.001$ , adj. $R^2 = 0.391$ )	Habit (unsust.)	Intention (unsust.)	0.526/0.570	$p < 0.001$	1.274
	GCV		−0.069/−0.064	$p = 0.330$	1.261
	CO		0.255/0.139	$p = 0.024$	1.087
	PIC		0.134/0.115	$p = 0.061$	1.085
Model cross-effects (F(4, 173) = 32.601, $p < 0.001$ , adj. $R^2 = 0.417$ )	Habit (unsust.)	Intention (sust.)	−0.320/−0.279	$p < 0.001$	1.274
	GCV		0.599/0.448	$p < 0.001$	1.261
	CO		−0.138/−0.060	$p = 0.314$	1.087
	PIC		0.108/0.074	$p = 0.215$	1.085
RQ 2	X	Y	B/ $\beta$	Sig	VIF
(F(3, 174) = 22.979, $p < 0.001$ , adj. $R^2 = 0.271$ )	Habit (sust.)	GCV	0.254/0.325	$p < 0.001$	1.365
	Habit (unsust.)		−0.206/−0.239	$p = 0.002$	1.337
	PIC		0.142/0.130	$p = 0.049$	1.046

Notes: N = 178; X = predictor variable, Y = outcome variable, B/ $\beta$  = unstandardized/standardized coefficient, Sig = significance level, VIF = variance inflation factor; sust. = sustainable, unsust. = unsustainable, GCV = green consumption values, CO = car ownership, and PIC = perceived impact of COVID-19.

First, it was tested whether unsustainable habit and the perceived impact of COVID-19 affected intentions regarding future sustainable transportation modes. In addition, green consumption values and car ownership were included as predictors.



Multiple regression analysis ( $F(4, 173) = 32.601, p < 0.001, \text{adj. } R^2 = 0.417$ ) tested whether there were any effects (RQ1) of  $\text{habit}_{\text{unsust}}$  ( $B = -0.320, p < 0.001$ ), green consumption values ( $B = 0.599, p < 0.001$ ), and owning a car ( $B = -0.138, p = 0.314$ ) on  $\text{intention}_{\text{sust}}$  (cross-effects). In all analyses, the perceived impact of COVID-19 on intention was not significant. Second, we tested whether unsustainable and sustainable habits and the perceived impact of COVID-19 affected green consumption values (RQ 2). Multiple regression analysis ( $F(3, 174) = 22.979, p < 0.001, \text{adj. } R^2 = 0.271$ ) showed that  $\text{habit}_{\text{sust}}$  ( $B = 0.254, p < 0.001$ ),  $\text{habit}_{\text{unsust}}$  ( $B = -0.206, p = 0.002$ ), and perceived COVID-19 impact ( $B = 0.142, p = 0.049$ ) influenced green consumption values (see Table 1).

Third, to analyze whether green consumption values mediated the relationship between unsustainable habit prior to the COVID-19 pandemic and intentions regarding future sustainable transportation modes (RQ 3, see Table 2), we conducted a simple mediation analysis using PROCESS 4.3 [42]. The mediation test, using bootstrap (5000 times) by Model 4 in PROCESS 4.3 for SPSS v.4.2, revealed a significant total effect (effect =  $-0.566$ ,  $[\text{LLCI}, \text{ULCI}] = [-0.715, -0.417]$ ), direct effect (effect =  $-0.342$ ,  $[\text{LLCI}, \text{ULCI}] = [-0.486, -0.198]$ ) as well as a significant indirect effect (effect =  $-0.224$ ,  $[\text{LLCI}, \text{ULCI}] = [-0.341, -0.128]$ ), indicating partial mediation.

**Table 2.** Results of Study 1 for RQ3.

RQ 3	X	Y	M	Effects	CI [LLCI, ULCI]	Mediation
Model (sust.)	Habit (sust.)	Intention (sust.)	GCV	Total: 0.577 Direct: 0.369 Indirect: 0.208	[0.447, 0.707] [0.237, 0.500] [0.116, 0.318]	Partial
Model (unsust.)	Habit (unsust.)	Intention (unsust.)	GCV	Total: 0.567 Direct: 0.550 Indirect: 0.016	[0.458, 0.675] [0.430, 0.670] [-0.031, 0.075]	No
Model cross- effects	Habit (unsust.)	Intention (sust.)	GCV	Total: $-0.566$ Direct: $-0.342$ Indirect: $-0.224$	$[-0.715, -0.417]$ $[-0.486, -0.198]$ $[-0.341, -0.128]$	Partial

Notes:  $N = 178$ ; X = predictor variable, Y = outcome variable, M = mediator, CI = confidence interval, LLCI = lower limit confidence interval, ULCI = upper limit confidence interval; sust. = sustainable, unsust. = unsustainable, and GCV = green consumption values.

### 2.3. Discussion

Based on previous research on habit and travel behavior, we modelled leisure travel mode choices within global factual context changes (i.e., the COVID-19 pandemic). The habit discontinuity hypothesis [23] was used to examine whether unsustainable habits (i.e., choosing planes or cars for going on holidays over buses or trains) could be forgone following such a change in context.

Not surprisingly, intentions regarding sustainable travel mode choices were influenced by sustainable habits pre-COVID and green consumption values. Similarly, people's intentions regarding unsustainable travel mode choices were influenced by unsustainable habits pre-COVID and car ownership. We found evidence that unsustainable habits pre-COVID negatively and evidence that consumers' green values positively predicted intentions regarding sustainable travel mode choices. The perceived impact of COVID-19 was not significant. This means that the context change did not directly influence intention, and the unsustainable habits pre-COVID did not change into sustainable mobility behavior [32]. However, having green values might be an important changemaker for potential future sustainable behavior. Building on self-activation theory, our results showed that habit (the "sustainable" one in a positive way, and the "unsustainable" one in a negative way) and the perceived impact of COVID-19 activated a person's green consumption values. We conclude that not the context change as such predicts future intentions but rather consumers' green values. Besides demonstrating that consumers' green values mediated the relationship between sustainable transportation habits pre-COVID and their intentions regarding sustainable travel mode choices, we also found that consumers' green values

mediated the relationship between unsustainable habits pre-COVID and intentions to use sustainable transportation modes, combining the habit discontinuity hypothesis and self-activation.

The research examined a health threat as a possible context change, and green consumption values were identified as a possible game changer. To test the effects in a different context, Study 2 sought to determine if and how financial hardship can help break unsustainable leisure travel habits to combat climate change.

### 3. Study 2: Transforming Habit through Financial Hardship and Green Consumption Values

As in Study 1, the material and methods of Study 2 are described first, before the results are presented in detail and a discussion of Study 2 follows.

#### 3.1. Materials and Methods

As in study 1, the research questions addressing the context change of financial hardship were answered using survey data ( $N = 254$  participants, 40.2% female,  $\text{mean}_{\text{age}} = 21.1$  years ( $\text{SD}_{\text{age}} = 2.687$ )) from participants within Europe. The focus on Europe continued, making sure that the vacation destinations of choice were accessible by all modes of travel.

An a priori power analysis was conducted using G\*Power version 3.1 to determine the minimum sample size required to answer the study's research questions [38]. Results indicated that the required sample size to achieve 80%/95% power for detecting a medium effect, at a significance criterion of  $\alpha = 0.05$ , was  $N = 114/166$  for linear multiple regression (fixed model,  $R^2$  deviation from zero). Thus, the obtained sample size of  $N = 254$  was adequate to run the regression analysis.

Two scenarios were used to help participants remember the time (a) before and (b) during financial hardship ((a) *"Do you ever find yourself thinking back to those days when prices were not high, and there was more money in your pocket? How much easier it was to buy things without worrying about breaking the bank. You went to the supermarket and were able to buy so much more than what you can buy now. You could not only afford basic things such as food, clothes, and housing, but you also had more than enough money left over for your hobbies. You were able to go on vacations without any worries. Whether it was a beach holiday or backpacking trip—everything seemed possible. You were content with your daily life because it was affordable"*. (b) *"Now think about today. Living in an environment with high prices can be difficult. The cost of living has gone up significantly, making it harder for people to make ends meet. From groceries to housing costs, everything seems to be getting more expensive by the day. And with fewer jobs available and lower salaries, it feels like we are not even able to afford basic necessities anymore and many people are living month-to-month. The ongoing war in Ukraine only adds to the uncertainty what the future holds for us"*.). Participants were asked to write down what came to their minds when reading the scenario.

The questionnaire consisted of five sections: (1) habit assessment before inflation (measured after scenario (a), eight items (to measure unsustainable and sustainable habits and intentions to use transportation modes, respectively, two behaviors each were used based on the pretest, comprising planes and private cars (unsustainable) and public buses and trains (sustainable choices)), Cronbach's  $\alpha_{\text{sust}} = 0.933$ , Cronbach's  $\alpha_{\text{unsust}} = 0.926$ , adapted SRHI, [39]), (2) perceived impact of the inflation in the form of frugal consumer behavior (three items; Cronbach's  $\alpha = 0.778$ ), consumer confidence (four items; Cronbach's  $\alpha = 0.745$ ), financial distress (three items; Cronbach's  $\alpha = 0.907$ ), financial security (three items; Cronbach's  $\alpha = 0.855$ ), financial guilt (three items; Cronbach's  $\alpha = 0.869$ ), and propensity to plan (three items; Cronbach's  $\alpha = 0.797$ ) [9]; these were measured after scenario (b)). The same materials as in Study 1 were used to examine (3) intentions regarding future transportation mode choices (four items: Cronbach's  $\alpha_{\text{sust}} = 0.894$ , Cronbach's  $\alpha_{\text{unsust}} = 0.878$ ), (4) green consumption values (six items, Cronbach's  $\alpha = 0.869$ , [41]), and (5) demographics (gender, age, highest completed degree, monthly disposable household income, nationality, and car ownership (1 = no car, 2 = sharing a car, 3 = owning car)). Items for

perceived impact of inflation were measured using either a seven-point Likert scale (1 = disagree strongly, 7 = agree strongly; items (1–4) were measured using either a five-point Likert scale (1 = strongly disagree, 5 = strongly agree; for frugal consumer behavior, financial distress, financial guilt, and propensity to plan) or a nine-point Likert scale (1 = extremely negative, 9 = extremely positive; for consumer confidence and financial security) (see Appendix A).

### 3.2. Results

We modelled leisure travel mode choices within a global factual context change (i.e., financial hardship). Multicollinearity was tested to evaluate model fitness and whether multicollinearity was present in the model, which may affect our model with more than one predictor. The variance inflation factor (VIF) for multicollinearity was calculated and was found to be within the interval ( $1 < \text{VIF} < 5$ ). Since this study primarily aims to investigate whether unsustainable habits in leisure travel behavior can be abandoned in the wake of a context change, in the following section, we report only the *cross-effects* of *unsustainable* habits prior the inflation and intentions to use *sustainable* modes (for full results, see Table 3).

**Table 3.** Results of Study 2 for RQ4 and RQ5.

RQ 1	X	Y	B/ $\beta$	Sig	VIF
Model sustainable (F(9, 244) = 14.983, $p < 0.001$ , adj. $R^2 = 0.332$ )	Habit (sust.)	Intention (sust.)	0.342/0.374	$p < 0.001$	1.095
	GCV		0.456/0.343	$p < 0.001$	1.188
	CO		−0.146/−0.068	$p = 0.202$	1.061
	FCB		0.043/0.056	$p = 0.359$	1.407
	CC		−0.014/−0.018	$p = 0.765$	1.382
	FD		0.012/0.017	$p = 0.789$	1.529
	FS		−0.048/−0.092	$p = 0.124$	1.356
	FG		0.012/0.017	$p = 0.759$	1.212
	PTP		−0.061/−0.084	$p = 0.153$	1.309
Model unsustainable (F(9, 244) = 14.222, $p < 0.001$ , adj. $R^2 = 0.320$ )	Habit (unsust.)	Intention (unsust.)	0.417/0.470	$p < 0.001$	1.125
	GCV		−0.227/−0.194	$p < 0.001$	1.160
	CO		0.106/0.056	$p = 0.304$	1.089
	FCB		0.039/0.057	$p = 0.351$	1.405
	CC		−0.038/−0.054	$p = 0.377$	1.395
	FD		0.039/0.063	$p = 0.326$	1.530
	FS		0.065/0.141	$p = 0.020$	1.364
	FG		−0.033/−0.053	$p = 0.351$	1.214
	PTP		−0.020/−0.032	$p = 0.591$	1.308
Model cross-effects (F(9, 244) = 14.103, $p < 0.001$ , adj. $R^2 = 0.318$ )	Habit (unsust.)	Intention (sust.)	−0.360/−0.358	$p < 0.001$	1.125
	GCV		0.495/0.372	$p < 0.001$	1.160
	CO		−0.098/−0.045	$p = 0.402$	1.089
	FCB		0.027/0.035	$p = 0.572$	1.405
	CC		0.015/0.019	$p = 0.753$	1.395
	FD		0.016/0.022	$p = 0.729$	1.530
	FS		−0.025/−0.048	$p = 0.432$	1.364
	FG		0.006/0.008	$p = 0.883$	1.214
	PTP		−0.018/−0.025	$p = 0.678$	1.308
RQ 2	X	Y	B/ $\beta$	Sig	
(F(9, 244) = 5.213, $p < 0.001$ , adj. $R^2 = 0.130$ )	Habit (sust.)	GCV	0.119/0.174	$p = 0.010$	1.289
	Habit (unsust.)		−0.048/−0.063	$p = 0.354$	1.357
	CO		−0.156/−0.096	$p = 0.116$	1.081
	FCB		0.117/0.203	$p = 0.003$	1.359
	CC		0.066/0.111	$p = 0.109$	1.382
	FD		−0.043/−0.082	$p = 0.259$	1.522
	FS		−0.026/−0.068	$p = 0.322$	1.365
	FG		0.092/0.176	$p = 0.006$	1.177
	PTP		0.019/0.034	$p = 0.611$	1.325

Notes: N = 254; X = predictor variable, Y = outcome variable, B/ $\beta$  = unstandardized/standardized coefficient, Sig = significance level, VIF = variance inflation factor; sust. = sustainable, unsust. = unsustainable, GCV = green consumption values, CO = car ownership, FCB = frugal consumer behavior, CC = consumer confidence, FD = financial distress, FS = financial security, FG = financial guilt, and PTP = propensity to plan.

Multiple regression analysis (F(9, 244) = 14.103,  $p < 0.001$ , adj.  $R^2 = 0.318$ ) was used to test RQ4. Firstly, we tested whether there were any cross-effects, of habit<sub>unsust</sub> ( $B = -0.360$ ,



$p < 0.001$ ), green consumption value ( $B = 0.495$ ,  $p < 0.001$ ), owning a car ( $B = -0.098$ ,  $p = 0.402$ ), frugal consumer behavior ( $B = 0.027$ ,  $p = 0.572$ ), consumer confidence ( $B = 0.015$ ,  $p = 0.753$ ), financial distress ( $B = 0.016$ ,  $p = 0.729$ ), financial security ( $B = -0.025$ ,  $p = 0.432$ ), financial guilt ( $B = 0.006$ ,  $p = 0.883$ ), or of propensity to plan ( $B = -0.018$ ,  $p = 0.678$ ) on intention<sub>sust</sub>.

Secondly, we tested whether (un)sustainable habits, car ownership, frugal consumer behavior, consumer confidence ( $B = 0.015$ ,  $p = 0.753$ ), financial distress ( $B = 0.016$ ,  $p = 0.729$ ), financial security, financial guilt, or propensity to plan affected green consumption values (RQ 5). Multiple regression analysis ( $F(9, 244) = 5.213$ ,  $p < 0.001$ , adj.  $R^2 = 0.130$ ) showed an impact of habit<sub>sust</sub> ( $B = 0.119$ ,  $p = 0.010$ ), frugal consumer behavior ( $B = 0.117$ ,  $p = 0.003$ ), and financial guilt ( $B = 0.092$ ,  $p = 0.006$ ) on green consumption values (see Table 3).

Based on significant relationships from the multiple regression analysis (see Table 3), we examined whether green consumption values, frugal consumer behavior, financial security, or financial guilt mediate the relationship between unsustainable habits prior to inflation and intentions regarding future sustainable transportation modes (RQ 6, see Table 4). We conducted a simple mediation analysis using PROCESS 4.3 [42]. The mediation test, using bootstrap (5000 times) by Model 4 in PROCESS 4.3 for SPSS v.4.2, revealed a significant total effect (effect =  $-0.442$ , [LLCI, ULCI] =  $[-0.555, -0.330]$ ) and direct effect (effect =  $-0.377$ , [LLCI, ULCI] =  $[-0.481, -0.274]$ ) as well as a significant indirect effect (effect =  $-0.065$ , [LLCI, ULCI] =  $[-0.120, -0.010]$ ), indicating partial mediation. Only green consumption values served as a mediator.

**Table 4.** Results of Study 4 for RQ6.

RQ 3	X	Y	M	Effects	CI [LLCI, ULCI]	Mediation
Model (sust.)	Habit (sust.)	Intention (sust.)	GCV	Total: 0.420 Direct: 0.341 Indirect: 0.079	[0.319, 0.521] [0.245, 0.437] [0.034, 0.132]	Partial
	Habit (sust.)	Intention (sust.)	FCB	Total: 0.420 Direct: 0.417 Indirect: 0.003	[0.319, 0.521] [0.317, 0.518] [-0.010, 0.019]	No
	Habit (sust.)	Intention (sust.)	FS	Total: 0.420 Direct: 0.425 Indirect: -0.004	[0.319, 0.521] [0.324, 0.525] [-0.023, 0.011]	No
	Habit (sust.)	Intention (sust.)	FG	Total: 0.420 Direct: 0.413 Indirect: 0.007	[0.319, 0.521] [0.313, 0.514] [-0.007, 0.031]	No
	Habit (unsust.)	Intention (unsust.)	GCV	Total: 0.468 Direct: 0.437 Indirect: 0.031	[0.375, 0.562] [0.345, 0.530] [0.005, 0.065]	Partial
	Habit (unsust.)	Intention (unsust.)	FCB	Total: 0.468 Direct: 0.468 Indirect: 0.000	[0.375, 562] [0.375, 562] [-0.009, 0.008]	No
	Habit (unsust.)	Intention (unsust.)	FS	Total: 0.468 Direct: 0.456 Indirect: 0.013	[0.375, 0.562] [0.361, 0.550] [-0.002, 0.035]	No
	Habit (unsust.)	Intention (unsust.)	FG	Total: 0.468 Direct: 0.459 Indirect: 0.009	[0.375, 0.562] [0.365, 0.553] [-0.004, 0.032]	No
Model cross- effects	Habit (unsust.)	Intention (sust.)	GCV	Total: -0.442 Direct: -0.377 Indirect: -0.065	[-0.555, -0.330] [-0.481, -0.274] [-0.120, -0.010]	Partial
	Habit (unsust.)	Intention (sust.)	FCB	Total: -0.442 Direct: -0.443 Indirect: 0.000	[-0.555, -0.330] [-0.554, -0.331] [-0.018, 0.018]	No
	Habit (unsust.)	Intention (sust.)	FS	Total: -0.442 Direct: -0.435 Indirect: -0.007	[-0.555, -0.330] [-0.549, -0.322] [-0.029, 0.010]	No
	Habit (unsust.)	Intention (sust.)	FG	Total: -0.442 Direct: -0.430 Indirect: -0.012	[-0.555, -0.330] [-0.543, -0.318] [-0.041, 0.005]	No

Notes: N = 254; X = predictor variable, Y = outcome variable, M = mediator, CI = confidence interval, LLCI = lower limit confidence interval, ULCI = upper limit confidence interval; sust. = sustainable, unsust. = unsustainable, GCV = green consumption values, FCB = frugal consumer behavior, FS = financial security, and FG = financial guilt.

### 3.3. Discussion

Currently, many consumers worldwide are experiencing financial hardship. Ongoing inflation across the world is tightening up household budgets, limiting consumer purchasing power, and boosting up the overall cost of living [43].

While we found that one's intentions regarding sustainable travel mode choices were influenced by sustainable habits pre-inflation and green consumption values, we also showed that people's intentions regarding unsustainable travel mode choices were influenced by unsustainable habits pre-inflation, their green consumption values, and their perceived financial security in the light of an inflation. Furthermore, we found evidence that unsustainable habits (negatively) and consumers' green values (positively) predict intentions regarding sustainable travel mode choices. Car ownership and the impact of inflation were not significant. This means that the context change did not directly influence intention, and unsustainable habits go along with intentions for unsustainable mobility behavior [32]. Thus, as seen in Study 1, building on self-activation theory, our results showed that sustainable pre-inflation habits and the perceived inflationary impact in the form of frugal consumer behavior and financial guilt activate a person's green consumption values. Similar to Study 1, we concluded that the context change does not predict future intentions as such, but individuals' green values do. We found that consumers' green values mediated the relationship between unsustainable habits and sustainable choices of future transportation mode, combining the habit discontinuity hypothesis and the self-activation hypothesis.

## 4. General Discussion

In this section, the research questions addressed by the two studies will be discussed, along with the findings presented. Additionally, potential limitations and suggestions for future research directions will be considered.

The reduction in emissions, besides conventional mitigation, can be achieved by choosing more sustainable transportation modes, such as public transportation [44,45]. However, since the choice of means of transport is often made without much consideration and habitually, it is vital to break unsustainable habits and replace them with more sustainable ones. One way of breaking a habit is by going through a contextual change, such as moving to a new place [6,46,47] or changing jobs [48].

The habit discontinuity hypothesis [23] was used to investigate whether unsustainable habits (i.e., choosing the plane or car for going on holidays instead of taking buses or trains) can be abandoned in the wake of a context change. We found evidence that unsustainable habits and owning a car negatively and evidence that consumers' green values positively predicted sustainable travel mode choices. The perceived impact of COVID-19 or financial hardship was not significant. This means that the context change did not directly influence intention, and the unsustainable habit went along with unsustainable mobility behavior (see [32]). However, having green values pointed to potential future sustainable behavior. Thus, building on self-activation theory, our results showed that habit (the "sustainable" one in a positive, the "unsustainable" one in a negative way) and the perceived impact of COVID-19 or financial hardship activated a person's green consumption values. Therefore, we concluded that the context change does not, as such, predict future intentions, but individuals' green values do. We found that consumers' green values mediated the relationship between unsustainable habits and sustainable choices of future transportation modes, combining the habit discontinuity hypothesis and the self-activation hypothesis.

Limitations relate to the factual context change in real life. At the time of data collection, respondents could still remember the time before and during the widespread lockdowns. Thus, as the open answers in the survey showed, memories of habits regarding leisure travel mode choices were evoked. However, the survey could not be repeated, nor could a follow-up study be conducted. Thus, a different context change, albeit in another area such as high inflation rates from which individuals suffer in their daily life, was utilized to investigate whether such large-scale crises affect individuals' habits directly or via their

values. Another limitation relates to the scenarios presented, which focused on areas with train-accessible vacation destinations within Europe and vacation travel in general.

Our research shows that activating consumers' green values may help in breaking unsustainable habits, highlighting the importance of identifying strategic intervention points [49]. There is an urgent need to reduce car ownership and usage and instead provide sharing services or, even better, environmentally friendly alternatives. Research predicts that COVID-19 may not be the last pandemic [50] and that consumers are still experiencing financial hardship. Therefore, insights on how a global crisis changes or triggers consumer behaviors can be relevant for decision-makers, who can provide sustainable options and incentives at the right points in time to fight climate change.

## 5. Conclusions

Both health and financial crises have previously affected consumers across the world. The COVID-19 pandemic introduced widespread travel restrictions, border closures, and potential health risks, compromising overall travel ability. Rising inflation has made going on trips financially burdensome for many, through increased costs associated with traveling such as fares and accommodation, as well as overall daily costs. This study aims to highlight the role of incisive, contextual changes on transportation mode choices and offers valuable insights for marketers and policy-makers alike who wish to convince consumers to pick up sustainable behaviors, especially environmentally friendly travel behavior, to address pending environmental challenges more effectively [49].

We examined whether existing unsustainable habits can be transformed through the impact of green consumption values, COVID-19, and financial hardship, increasing intentions to use sustainable transportation modes. We found that the context does not, *per se*, predict one's future intentions to travel sustainably, but people's green consumption values do. Moreover, based on the self-activation theory, our results revealed that both sustainable and unsustainable habits, the perceived impact of COVID-19, and financial hardship trigger individuals' green consumption values, emphasizing the ability of crises to "flip the switch" and to possibly turn unsustainable behavior into sustainable behavior. This knowledge can be further leveraged in campaigns advocating for sustainable behavior, by directly appealing and highlighting consumers' green values, especially in times of health or economic crises, prompting behavioral change. Further, we support previous findings demonstrating that context change can activate significant values affecting the decision-making process regarding sustainable travel behavior, serving as an important tool to further establish sustainable practices in today's world [23].

We also observed the mediating role of consumers' green values in unsustainable travel habits and the intention to travel via sustainable transportation modes, supporting existing research indicating that green values positively influence sustainable consumption practices, including transportation engagement [51–53].

Considering the limitations of this study, we suggest the following future research directions: First, while this study was looking at what drives up sustainable transportation behavior, the scope of the study remained narrow. Future research should further look at other forms of sustainable behavior and how drastic contextual changes can positively influence individuals' actions. Other interventions can be targeted at reducing waste, promoting recycling, or encouraging health food consumption. Second, we used the COVID-19 pandemic and inflation as context changes. However, perceptions of these contexts might vary among individuals, depending on their travel frequency and economic status. Less frequent travelers may have seen the COVID-19 pandemic as less restrictive, while frequent travelers perceived its constraints more constrictive. Likewise, wealthy individuals may not have felt the inflation's detrimental influence as much as average consumers. Therefore, future research should investigate the impact of other context changes, which are more uniformly perceived by consumers, on sustainable travel mode choices, including territorial or social context changes.

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## Appendix A

Habits Pre-COVID-19/Pre-Inflation (Sustainable/Unsustainable) [39]	
Taking trains or public buses/planes or cars to fulfill my goal of reaching a destination within Europe is something. . .	
1. . . I do frequently.	5. . . I would find hard not to do it.
2. . . I do automatically.	6. . . that would require effort not to do it.
3. . . I do without thinking.	7. . . I have no need to think about doing.
4. . . that belongs to my routine.	8. . . I have been doing for a long time.
COVID-19 Impact [40]	
1. How much is your life affected by the COVID-19-related problems?	
2. How much is your quality of life damaged by COVID-19-related problems?	
3. How much are you worried about the COVID-19-related problems currently?	
4. How often are you experiencing stress regarding the COVID-19-related problems currently?	
5. How much are you experiencing fatigue regarding the COVID-19-related problems currently?	
6. How much are you depressed by the COVID-19-related problems currently?	
7. How often are you experiencing irritation regarding the COVID-19-related problems currently?	
8. How often are you experiencing anger regarding the COVID-19-related problems currently?	
9. How much do the COVID-19-related problems interfere with your interpersonal relationship?	
10. How much do the COVID-19-related problems interfere with your studies, work, or household chores?	
Frugal Consumer Behavior [9]	
1. I discipline myself to get the most from my money.	
2. I often wait on a purchase I want so that I can save money.	
3. There are things I resist buying today so I can save the money for tomorrow.	
Consumer Confidence [9]	
1. Compared with 18 months ago, how do you feel about the economic situation of your home country?	
2. What are your expectations of the economic situation of your home country 18 months from now?	
3. Compared with 18 months ago, how do you feel about the financial situation of your household?	
4. What are your expectations of your household's financial situation 18 months from now?	
Financial Distress [9]	
My present financial situation makes me. . .	
1. . . upset.	3. . . struggle to relax.
2. . . agitated.	
Financial Security [9]	
1. Ability to pay rent/mortgage.	
2. Ability to pay for utilities (including electricity and phone costs).	
3. Your ability to pay for an unexpected medical bill of EUR 500.	
Financial Guilt [9]	
In the current economic climate, spending on major items makes me feel. . .	
1. . . guilty.	3. . . ashamed.
2. . . irresponsible.	
Propensity to Plan [9]	
1. I set financial goals for what I want to achieve with my money.	
2. I decide beforehand how my money will be used in the next 1–2 months.	
3. I actively consider the steps I need to take to stick to my budget.	

Intention for Future Transportation Mode Choice (Sustainable: trains and buses; unsustainable: planes and cars)	
1.	In the future, in order to fulfil my goal of reaching a vacation destination within Europe, I am intending to use...
2.	In the future, in order to fulfil my goal of reaching a vacation destination within Europe, I am going to spend my money to use...
3.	In the future, in order to fulfil my goal of reaching a vacation destination within Europe, I am going to research more about possible options to travel by...
4.	The transportation methods for reaching a vacation destination within Europe I would recommend to a friend are...
Green Consumption Values [41]	
1.	It is important to me that the products I use do not harm the environment.
2.	I consider the potential environmental impact of my actions when making many of my decisions.
3.	My purchase habits are affected by my concern for our environment.
4.	I am concerned about wasting the resources of our planet.
5.	I would describe myself as environmentally responsible.
6.	I am willing to be inconvenienced in order to take actions. and that are more environmentally friendly.

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