



HHL

LEIPZIG
GRADUATE SCHOOL
OF MANAGEMENT

Dissertation

Sustainable Consumer Behavior

Socio-Psychological Determinants and Promotion Measures

Xisi Yang

xisi.yang@hhl.de

More sustainable private consumption is necessary to achieve the common goal of sustainable development. This dissertation deals with the underlying socio-psychological determinants of sustainable consumer behavior in different domains, based on which promotion measures are recommended to companies and policymakers. Among others, I discuss consumers' perceptions of their responsibilities for sustainability in contrast to their expectations on governments' and companies' contributions. Furthermore, I shed light on a main barrier of sustainable consumption that most consumers support sustainability but their behaviors are, to a decisive extent, driven by other motives such as customer-oriented services or offered incentives, which primarily benefit consumers themselves instead of the sustainability agenda. To tackle this barrier, I develop several promotion measures based on activating psychological concepts such as empowerment and self-determination in a single or multi-country setting. Results of this dissertation serve to more effectively understand consumers' concerns with sustainable consumption and to add new perspectives to improve tactics to promote sustainable behaviors.



LEIPZIG
GRADUATE SCHOOL
OF MANAGEMENT

Sustainable Consumer Behavior

Socio-Psychological Determinants and Promotion Measures

Publication-based dissertation submitted in partial fulfillment of the requirements for the degree

Doktorgrades der Wirtschaftswissenschaften (Dr. rer. oec.)

at

HHL Leipzig Graduate School of Management, Leipzig, Germany

submitted by

Xisi Yang

on November 26, 2020

First Supervisor:

Prof. Dr. Manfred Kirchgeorg

HHL Leipzig Graduate School of Management
Chair of Marketing Management and Sustainability

Second Supervisor:

Prof. Dr. Vivek K. Velamuri

HHL Leipzig Graduate School of Management
Rolf Schrömgens Chair of Entrepreneurship and Technology Transfer

Acknowledgement

First, I would like express my gratitude and appreciation to my PhD supervisor Professor Manfred Kirchgeorg and my colleague and mentor Dr. Anja Weber for their support and supervision in all different respects during the whole process of my PhD dissertation. I would also like to thank Professor Velamuri for being the second assessor of my dissertation.

Without the personal support from my parents Jian Zou and Shuyong Yang, my best friend Xiaonan Li and my grandmother Yihuan Li, I would not have been able to complete my PhD project. I would like to deeply thank them for their care and love.

I would like to especially thank Professor John Thøgersen from Aarhus University for his generous support on my research project, his general advices for me as a young researcher and the opportunity for a research stay.

Further, I would like to thank my colleagues Dr. Rico Bornschein and Dr. Anna-Katharina Grimm (née Jäger) for their conscientious feedbacks and cooperation in several research projects. I would also like to thank Professor Yan Li from Renmin University and Dr. Sungha Jang from San Francisco State University for their constructive suggestions and discussion on several research questions and methods. In addition, I would like to thank my colleagues Dr. Susanne Pankov and Dr. Lennard Schmidt for their comments in different phases of my PhD project.

I thank my colleagues Nadine Horbas, Birgit Simmank and Björn Friedrich for their support during my work as a research associate at HHL Leipzig Graduate School of Management.

The data collection in this dissertation was financially supported by Deutsche Post Chair of Marketing, Akademische Marketinggesellschaft e.V. and the Circular Economy Network of Aarhus University.

Finally, thank you, Yannick, for being a part of my life.

Table of Content

List of Figures.....	IV
List of Tables.....	V
List of Abbreviations	VI
1. Relevance	1
2. Research Gaps and Objectives	2
3. Overview of Articles	5
4. Introduction into Theoretical Foundation.....	8
4.1 Consumers' Perspective on Locus of Control.....	8
4.2 Responsibility Attributions and Crisis Response	9
4.3 Consumer Empowerment in the Context of Sustainable Consumption	10
4.4 Incentivization of Sustainable Consumption: A Self-determination Theory Approach..	10
5. Summary of Articles.....	11
5.1 Summary of Article I: Who Can Improve the Environment—Me or the Powerful Others? An Integrative Approach to Locus of Control and Pro-environmental Behavior in China ...	11
5.2 Summary of Article II: “Let Me Decide How Green You Are!” – The Effects of Green Consumer Empowerment on Corporate Evaluations and Purchase Intention in Advertising	12
5.3 Summary of Article III: When People Can Be Green and Greedy – A New Perspective of Recycling Rewards and Motivation Crowding-out in Germany, the USA, and China	13
5.4 Summary of Article IV: Potential Consequences of COVID-19 for Sustainable Meat Consumption – The Role of Food Safety Concerns and Responsibility Attributions	14
6. Article I	15
6.1 Introduction	16
6.2 Literature Review	18
6.2.1 Locus of Control	18
6.2.2 Sub-dimensions of IN-ELOC	19
6.2.3 Sub-dimensions of EX-ELOC	19
6.2.4 Confucian Values.....	21
6.3 Conceptual Model and Hypotheses	21
6.4 Methods	24
6.4.1 Procedure	24
6.4.2 Survey Design.....	25
6.4.3 Sample.....	25
6.4.4 Measurement model.....	27
6.4.5 Structural model.....	29
6.5 Results	30
6.5.1 Descriptive Analysis and Correlations.....	30
6.5.2 PLS Model	30

6.5.4 Provincial Comparison.....	32
6.5.5 Cross-national Comparison.....	32
6.5.6 Social Desirability Bias.....	32
6.6 Discussion.....	33
6.6.1 Implications.....	35
6.6.2 Limitations	36
6.7 Conclusion	37
References	38
Appendices	49
7. Article II.....	52
7.1 Introduction	53
7.2 Theoretical Foundation and Hypotheses	54
7.2.1 The Role of Consumer Empowerment in Green Consumption	54
7.2.2 The Effect of Green Empowerment Ad on Corporate Associations.....	56
7.2.3 Organizational Resources and CER.....	58
7.3 Study 1: Green Empowerment Ad versus Green Appeal	59
7.3.1 Method	59
7.3.2 Results.....	61
7.4 Study 2: Green and Non-green Empowerment and the Moderating Effect of Perceived Corporate Resources	64
7.4.1 Method	64
7.4.2 Results.....	66
7.5 Discussion.....	71
7.5.1 Theoretical and Managerial Implications	71
7.5.2 Limitations and Future Research	73
References	75
Appendices	83
8. Article III.....	89
8.1 Introduction	90
8.2 Theoretical Foundation and Hypotheses	92
8.2.1 Self-determination Theory and Pro-environmental behaviors.....	92
8.2.2 Perceived Autonomy Support	94
8.2.3 Country Effects	95
8.3 Methods	96
8.3.1 Sample.....	97
8.3.2 Stimuli.....	98
8.3.3 Procedure and Survey Design	99
8.3.4 Analysis Approach.....	101
8.4 Results	101
8.4.1 Data Cleaning and Manipulation Checks.....	101
8.4.2 Individual-level Characteristics	102
8.4.3 Analyses of Variance	103
8.4.4 Correlations.....	104

8.4.5 Reliability and Validity	104
8.4.6 Metric Invariance	105
8.4.7 Structural Equation Model	106
8.5 Discussion.....	109
8.6 Conclusion and Future Research	111
References	113
Appendices	124
9. Article IV	128
9.1 Introduction	129
9.2 Theoretical Foundation and Hypotheses	130
9.2.1 Food Safety Concern.....	130
9.2.2 Responsibility Attribution.....	132
9.3 Methods	134
9.3.1 Procedure	134
9.3.2 Survey Design	135
9.3.3 Sample.....	135
9.3.4 Measurement Model	136
9.3.5 Structural model.....	137
9.4 Results	138
9.4.1 Descriptive Analysis and Correlations.....	138
9.4.2 PLS model.....	139
9.5 Discussion.....	142
9.5.1 Implications.....	142
9.5.2 Limitations	144
9.6 Conclusion	145
References	147
Appendices	155
10. Summary and Conclusion.....	158
10.1 Overall Contribution	158
10.2 Summary of Practical Implications	159
10.3 Limitations and Future Research.....	161
References	164

List of Figures

Figure 1: Conceptual overview based on S-O-R model.....	6
Figure 2: Conceptual model Article I.....	24
Figure 3: Conceptual model Article II	59
Figure 4: Means for corporate environmental responsibility	68
Figure 5: Conceptual model Article III	96
Figure 6: Conceptual model Article IV	134

List of Tables

Table 1: Key theoretical constructs and references.....	7
Table 2: Study design and sample characteristics	7
Table 3: List of Manuscript.....	8
Table 4: IN-ELOC-dimensions	19
Table 5: EX-ELOC-dimensions	20
Table 6: Socio-demographic features.....	26
Table 7: Evaluation of measurement mode.....	28
Table 8: R squared and Q squared	29
Table 9: Path coefficients and f squared	31
Table 10: Effects of ad type on CO, CER and purchase intention (ANOVAs)	62
Table 11: Regression coefficients and significance levels for the parallel mediation analysis	63
Table 12: Confidence intervals for the mediation analysis (relative indirect effects on purchase intention)	63
Table 13: Effects of ad type and company resources on CO, CER, and purchase intention (two-way ANOVAs)	67
Table 14: Regression coefficients and significance levels for the parallel mediation analysis	69
Table 15: Confidence intervals for the mediation analysis (relative indirect effects on purchase intention)	69
Table 16: Relative conditional indirect effects of ad type (moderated mediation analysis)....	70
Table 17: Individual-level characteristics in three countries.....	102
Table 18: Means of motivational patterns in three countries	103
Table 19: Means of perceived autonomy support, attitude toward recycling and intention to recycle in three countries.....	104
Table 20: Evaluation of the measurement model.....	105
Table 21: Measurement invariance and model comparison.....	106
Table 22: Structural equation model of intervention type, motivational patterns, autonomy perception and intention to recycle	108
Table 23: Total effects of intervention type on intention to recycle	108
Table 24: R square of latent variables	109
Table 25: Socio-demographic features.....	136
Table 26: Evaluation of measurement model.....	137
Table 27: R squared and Q squared	138
Table 28: Path coefficients and hypotheses	140
Table 29: Consumer motives of buying animal welfare products	140
Table 30: Table of overall practical implications.....	161

List of Abbreviations

ANOVA	Analysis of variance
CO	Customer orientation
CER	Corporate environmental responsibility
COVID-19	Coronavirus disease 2019
ELOC	Environmental locus of control
e.g.	For example
EX-ELOC	External environmental locus of control
GDP	Gross domestic product
IN-ELOC	Internal environmental locus of control
KgCO _{2eq}	Carbon dioxide equivalent (unit)
Mj _{eq}	Mega joule equivalent (unit)
N	Sample size
p.	Page
SFS	Sustainable Food System Programme (United Nations)
S-O-R	Stimulus-Organism-Response
UN	United Nations

1. Relevance

Severe environmental and social hazards have raised a peak of public attention on sustainability issues among different stakeholders including individuals, corporations and governments (e.g. Fernandez-Feijoo et al., 2014; van Zomeren et al., 2010), while the importance of reaching a healthy human-nature relationship keeps increasing (De Groot et al., 2011). In 2019, six million people expressed their voices for fighting climate change in historically one of the largest civic protests worldwide (Guardian, 2019). State governments and international organizations commit themselves to ambitious goals through the adoption of new green deals in the European Union, the United States but also in emerging economies such as China according to its 15th five-year plan (European Commission, 2019a; Ministry of Civil Affairs of China, 2020; US Congress, 2019). Under the growing pressure of consumer demand for environmental and social responsibility of corporations (e.g. Grimmer & Bingham, 2013; Odongo & Wang, 2018), companies compete in revolutionizing production and operations but also in developing an engaging and trustworthy way of communication towards consumers (e.g. Parguel et al., 2011).

Considering the research history of management and marketing science over decades, scholars incorporated crucial topics on sustainable production and consumption into the research agenda (Kirchgeorg, 1990; Meffert & Kirchgeorg, 1993). The concept of sustainability is defined in the Brundtland Report of the United Nations in 1987 accordingly: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (UN, 1987, p. 41). At a global level, the direct and indirect impact of private consumption contributes to 60% of overall greenhouse gas emissions (Ivanova et al., 2016). It also causes multiple kinds of environmental degradation such as soil erosion, waste contamination, and water and air pollution (e.g. Hu & Cheng, 2013; Huo et al., 2014; Luo et al., 2011; Van Oost et al., 2007). A shift to more sustainable consumption patterns is the key to maintain human well-being in the short term but also for future generations (e.g. Prothero et al., 2011).

Environmentally sustainable or pro-environmental behaviors refer to individuals’ behaviors that “consciously seek to minimize the negative impact of one’s actions on the natural and built world” (Kollmuss & Agyeman, 2002, p. 240). A large bundle of pro-environmental behaviors in all different facets of our daily lives is considered as important countermeasures to fight the climate crisis: among others, the purchase of environmentally friendly or emission-reduced

products, the usage of green/public transportation, energy conservation/the usage of renewable energy, waste sorting and recycling and so forth (e.g. Buerke, 2016; Lee et al., 2017; Scialabba & Mller-Lindenlauf, 2010; Vergara & Tchobanoglous, 2012). For instance, a municipal paper recycling rate of 83% can avoid 14,708 Mj_{eq} of energy and 445 KgCO_{2eq} emissions (Cremiato et al., 2018). Further, organic food production systems cause 20% less environmental impacts compared to conventional systems due to the lower toxicity explained by the application of synthetic pesticides (Meier et al., 2015). However, the adoption of pro-environmental behaviors is a challenging task across countries both in the purchase and non-purchase context, indicated by e.g. low global household recycling rates and the marginal market share of organically grown products (European Commission 2019b; Kumar et al., 2017; Singh et al., 2014). My dissertation addresses this problem and develops effective approaches that motivate individuals to adopt more sustainable consumption in various areas of living based on socio-psychological theories. The research gaps from a theoretical perspective are discussed in detail in section 2, while applied theoretical frameworks are further explained in section 3.

Referring to the three-pillar approach of sustainability that indicates the environmental, social and economic dimension (Belz, 2004; Kirchgeorg, 2004), this dissertation focuses on the investigation of environmentally sustainable consumer behaviors (see Article I to III). In the following, the term *sustainable behaviors* is mostly used to refer to environmentally sustainable behaviors. Besides, the social sustainability dimension is also considered when discussing animal welfare products in Article IV. Further, this dissertation provides handling mechanisms to improve marketing activities of sustainable products; therefore, it also serves the dimension of economic sustainability, especially from the corporate perspective.

2. Research Gaps and Objectives

As discussed in section 1, I contribute my cumulative dissertation to the promotion of sustainable consumption with two superior objectives based on a bundle of four research articles: First, I conceptually and empirically analyze important socio-psychological determinants of sustainable consumer behaviors in Article I and IV. Second, I develop action measures aiming at a behavioral transformation in Article II and III. Within the scope of the first objective, my research attempts to enlighten the concepts of controllability and responsibility attributions. Most of the previous research examined the concept locus of control by internal and external factors separately (Cleveland et al., 2012; Kalamas et al., 2014), which means that it gained a

parallel view on individuals' beliefs if the control over environmental events lies either within or outside an individual. How individuals' perceptions of internal and external factors correlate and simultaneously affect their pro-environmental behaviors requires a more integrative investigation. A broader perspective helps to understand individuals' perceptions of co-existing responsible stakeholders' roles and capabilities to conserve the environment. This perspective can support policymakers in their decisions, specifically, in which manners they should emphasize shared responsibility, individual engagement or both in environmental campaigns. Overall, evidences serve to understand the questions which stakeholders among consumers, corporations and the government are perceived to be responsible for dedicating their actions to sustainability issues including the deteriorating environment (Article I) but also the current crisis of the Coronavirus disease 2019 (COVID-19) (Article IV).

Within the frame of the second objective of developing action measures for a behavioral transformation, this dissertation provides experimental findings on the optimization of interventions to adopt sustainable purchase but also other behaviors. Research designs were developed, both considering practically applied measures in real markets and scientifically validated concepts in the context of intentional and behavioral change. Specifically, I discuss two approaches for my research purpose: the concept of empowerment for environmentally friendly purchase (Article II) and incentive designs for household recycling (Article III). The former approach utilizes non-economic measures such as message priming, while the latter approach applies economic measures such as tangible rewards. In previous research, empowerment strategies were mainly investigated in the product development context where consumers were conceptualized as co-creators of products or services (Fuchs & Schreier, 2011; Füller et al., 2009). While empowerment in this kind stimulates consumers through fulfilling their individual needs for concrete product characteristics, other needs of individuals that are probably more abstract and implicit such as maintaining a clean environment, have not been targeted by the empowerment approach (Reczek et al., 2018). Whether the positive effects of empowerment can be realized for an environmental purpose but still in association with a consumer product leaves an open question to explore.

Besides the research on measures stimulating individuals' environmental considerations in their minds, scholars broadly discussed and empirically investigated the application of economic incentives in the frame of behavioral adoptions (e.g. Frey & Oberholzer-Gee, 1997; Thøgersen, 2003). Although environmental appeals appear effective to increase individuals' interest in a

certain topic, numerous studies recognize the challenge of transforming it into actual behaviors – also framed as “intention-behavior gap” by many scholars (e.g. Carrington et al., 2014; Harackiewicz et al., 1998). In comparison, the advantages of economic incentives, particularly their effects on triggering actual behaviors and generating “foot-in-the-door” effects (Harackiewicz et al., 2002; Lanzini & Thøgersen, 2014), indicate a potential of complementing the disadvantages of environmental appeals. Nevertheless, potential negative effects of extrinsic incentives such as crowding out intrinsic motivation need to be countered (Frey & Oberholzer-Gee, 1997). Still, previous research showed inconsistent results on the effectiveness of both interventions. Furthermore, previous research did not yet consider cross-national differences of such interventions in an experimental setting (e.g. Asensio & Delmas, 2015; Kaiser et al., 2020). My research on analyzing different types of monetary and non-monetary interventions in the recycling domain in a cross-national setting tests a new incentive design, which aims to combine benefits of both intervention types in a practical sense and to compensate for the motivation crowding-out from a theoretical perspective. Depending on the socio-political context, evidences provide policymakers and marketers improved measures to promote individual recycling practices but also the purchase of environmentally friendly products.

Another research gap addressed by this dissertation is the lack of evidence for conceptual and empirical research, especially experimental studies on sustainable consumer behaviors in China’s emerging economy (Marrucci et al., 2019; Shao, 2019). China has become one of the world’s largest consumer markets, while the fast and large-scale consumption also led to severe environmental damages (Cao, 2011). Environmentally sustainable products such as organic foods have been introduced to Chinese retail markets for almost two decades, reaching domestic sales of 63.15 billion RMB (9.09 billion USD) in 2018 (Daxue, 2020). It is crucial to understand potential differences of major determinants of sustainable behaviors in China compared to other countries due to its unique socio-cultural (e.g. Confucian values in Article I) and political features (e.g. role of autonomy perception in Article III). As most previous research used samples from the European countries and the USA, this dissertation aims to close this research gap in addition to the previously discussed ones.

In summary, this dissertation contributes to previous research in two ways: (1) extending and validating socio-psychological constructs and frameworks for understanding sustainable behaviors (locus of control in Article I; responsibility attributions in Article IV), and (2) developing action measures that corporations and governments can apply to stimulate

sustainable behaviors (empowerment in Article II; incentive design in Article III) (also see Figure 1, Table 1). Practical implications of the dissertation for promoting different types of sustainable behaviors are summarized in section 9.2 in the purchase domain, i.e. environmentally friendly products and animal welfare products¹, and in the non-purchase domain, especially waste sorting and recycling.

3. Overview of Articles

In the following, I provide an overview of the four research articles of my dissertation. In the first place, to understand the overall structure among examined theoretical concepts and developed promotion measures, a conceptual overview based Stimulus-Organism-Response (S-O-R) model is given (Figure 1). As next, I provide a summarizing table that lists major theoretical constructs or socio-psychological determinants examined and their operationalization (Table 1), as well as a review of study design, data collection and sample characteristics in each article (Table 2). Finally, to indicate the publication status, a list of published and work-in-progress articles is provided (Table 3).

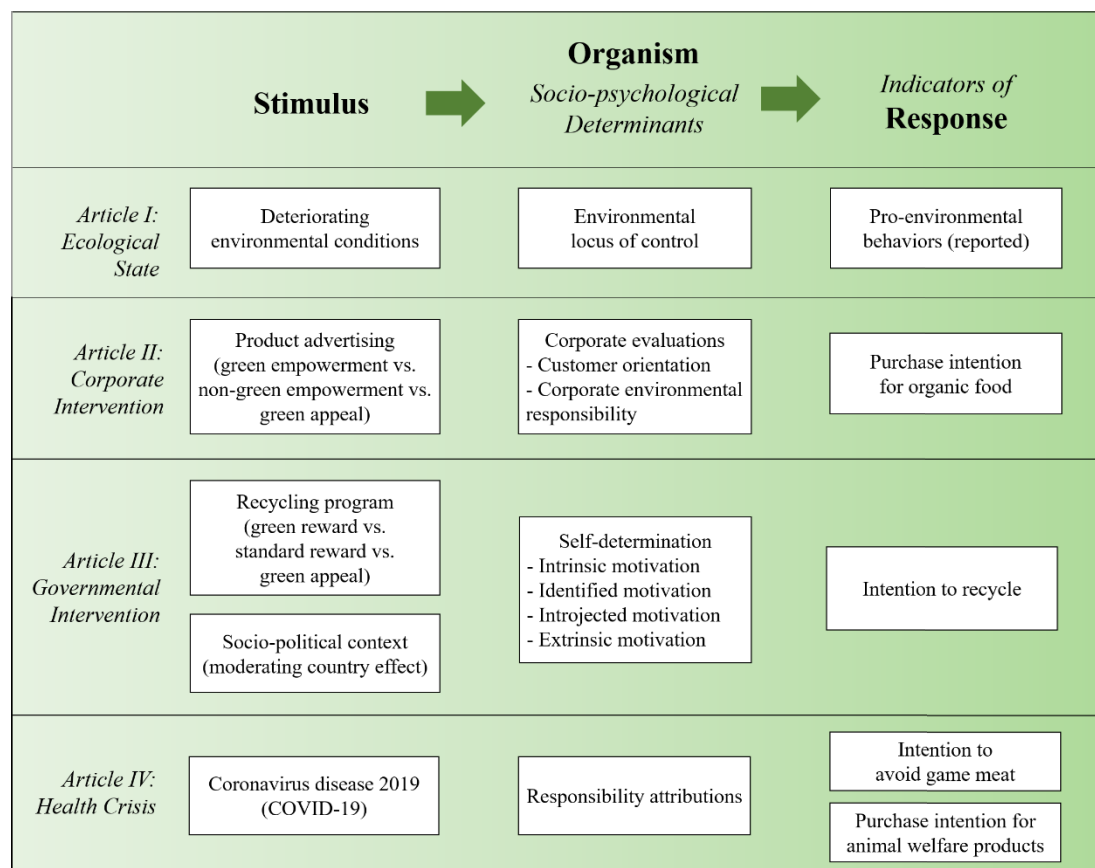
In the classical S-O-R paradigm (Figure 1), *stimulus* refers to external factors that affect an individual's internal states, which can be conceptualized as an influence that stimulates an individual (Eroglu et al., 2001; Meffert et al., 2015). According to Bagozzi (1986), external stimuli can consist of marketing mix variables but also other environmental inputs. In this dissertation, governmental and corporate interventions, the ecological state, the health crisis of COVID-19 and the socio-political context are investigated (Figure 1). Further, *organism* is defined as “internal processes and structures intervening between stimuli external to the person and the final actions, reactions or responses emitted. The intervening processes and structures consist of perceptual, physiological, feelings and thinking activities.” (Bagozzi, 1986, p. 46) In this dissertation, socio-psychological determinants based on established theories or constructs including individuals' beliefs in locus of control, responsibility attributions, perception of self-determination and consumers' corporate evaluations are analyzed. *Response* in the S-O-R model addresses individuals' decisions or the final outcomes, which can be approach behaviors (positive actions) or avoidance behaviors (negative actions) (Sherman et al., 1997). Behavioral

¹ Animal welfare products are produced in animal-friendly conditions considering procedures of feeding, livestock breeding and keeping (for example, by free-range grazing cattle, goats, and sheep). Animal welfare products also fulfill certain standards for animal slaughtering (for example, reducing physical pain and mental suffering; based on WCAFAW, 2019 see Article IV).

intentions and reported behaviors are significant indicators of actual behaviors as shown in previous research (in consumer and behavioral research: e.g. Morwitz, 2014; Sheeran & Abraham, 2003; in sustainability research: e.g. Si et al., 2020; Tapia-Fonllem et al., 2013) and reasoned by the cost-effective data collection, these factors are investigated in this dissertation. Specifically, reported pro-environmental behaviors (Article I), purchase intention for organic food (Article II), intention to recycle (Article III) and intentions to adopt more sustainable meat consumption (intention to avoid game meat and to buy animal welfare products) (Article IV) are investigated.

Socio-psychological determinants examined in this dissertation as demonstrated in Table 1, concept similarities/differences such as between locus of control and responsibility attributions and reasons for the choice of concepts are discussed in section 4. Applied research methods are explained in detail in each article (section 5 to 8).

Figure 1: Conceptual overview based on S-O-R model



Note(s): This graphical overview only considers country effects analyzed using own survey data in each region; please see definition of animal welfare products on p. 5 and in Article IV.

Table 1: Key theoretical constructs and references

Key constructs and sub-dimensions (socio-psychological determinants)	References for measurement	Article
<i>Locus of control</i>	Cleveland et al. (2012)	I
<ul style="list-style-type: none"> • Internal locus of control <ul style="list-style-type: none"> - Green consumer - Activist - Advocate - Recycler • External locus of control <ul style="list-style-type: none"> - Governmental responsibility - Corporate responsibility - Higher powers - Natural earth-cycles 	Kalamas et al. (2014)	
<i>Responsibility attributions</i>	Michaelidou & Hassan (2008)	IV
<ul style="list-style-type: none"> • Individual responsibility • Governmental responsibility • Marketer responsibility 	Coombs (2007a) McDonald & Hartel (2000)	
<i>Self-determination</i>	Guay et al. (2010)	III
<ul style="list-style-type: none"> • Intrinsic motivation • Identified motivation • Introjected motivation • Extrinsic motivation 	Reeve (2002) Vlachopoulos & Karageorghis (2005)	
<i>Corporate evaluations</i>	Blocker et al. (2011)	II
<ul style="list-style-type: none"> • Perceived customer orientation • Perceived corporate environmental responsibility 	Turker (2009) Walsh & Beatty (2007)	

Table 2: Study design and sample characteristics

Article	Design	Location	Sample size	Sample characteristics
I	Online questionnaire	China	N = 754	Representative for urban Chinese in terms of sex, age, education, income and religion; Females and better-educated people are slightly overrepresented
II	Between-subjects experiment in online survey	China	N _{Study1} = 291, N _{Study2} = 457	Young and better-educated individuals
III	Between-subjects experiment in online survey	Germany, USA, China	N _{Germany} = 322, N _{USA} = 305, N _{China} = 361	Representative in terms of sex, age (adults in Germany and USA) and place of residence in each country; People older than 70 years are underrepresented in the USA; Women are slightly overrepresented in China
IV	Online questionnaire	China	N = 234	Young and better-educated individuals

Table 3: List of Manuscripts

Manuscript	Publication status
A <i>Who can improve the environment—Me or the powerful others? An integrative approach to locus of control and pro-environmental behavior in China</i>	<ul style="list-style-type: none"> Published in the journal <i>'Resources, Conservation & Recycling'</i> (ISSN: 0921-3449), 146, 55-67; Scopus CiteScore[®] 2019: 10.7; DOI: https://doi.org/10.1016/j.resconrec.2019.03.005 Presented at 2018 International Conference on Resource Sustainability in Beijing, China (2018)
B <i>Let me decide on the products' and companies' level of green!" – How green consumer empowerment improves corporate evaluations and purchase intention in green advertising</i>	<ul style="list-style-type: none"> Under 2nd revision in the journal <i>'Review of Managerial Science'</i> (ISSN: 1863-6691); VHB-JOURQUAL3-Rating: B; Presented at 48th Annual Conference of the European Marketing Academy 2019 in Hamburg, Germany (2019)
C <i>When people can be green and greedy – A new perspective of recycling rewards and motivation crowding-out in Germany, the USA and China</i>	<ul style="list-style-type: none"> Under 1st revision in the journal <i>'Journal of Business Research'</i> (ISSN: 0148-2963); VHB-JOURQUAL3-Rating: B; Presented at Sustainable Consumption Research and Action Initiative (SCORAI) 4th International Conference 2020 in Boston, USA/virtual (2020)
D <i>Potential consequences of COVID-19 for sustainable meat consumption: the role of food safety concerns and responsibility attributions</i>	<ul style="list-style-type: none"> Published in the journal <i>'British Food Journal'</i> (ISSN: 0007-070X), 123(2), 455-474; Scopus CiteScore[®] 2019: 3.1 DOI: https://doi.org/10.1108/BFJ-04-2020-0332

4. Introduction into Theoretical Foundation

4.1 Consumers' Perspective on Locus of Control

In this cumulative dissertation, different theoretical frameworks are used to investigate sustainable consumer behaviors. For the first research objective of conceptualizing and empirically analyzing important determinants of sustainable consumer behaviors (as discussed in section 2), two socio-psychological theories are taken into consideration: locus of control and responsibility attributions. Extant research discussed both theories in different disciplines. Locus of control was applied in a number of studies to explain health behaviors (e.g. Wallston et al., 1978), employee satisfaction, and performance (Judge & Bono, 2001) but also consumer behaviors such as acceptance of regulations (Hoffman et al., 2003). Locus of control indicates the individual's perception of whether the result of an event is under or out of one's control. The belief in one's significant abilities to affect the result is conceptualized as *internal*. Perceiving possible influence outside the individual is equivalent to *external*. Environmental locus of control specifies the dimensions such as personal control and care for others to investigate pro-environmental intentions and behaviors (Allen & Ferrand, 1999). More recently, environmental

locus of control has been extended to eight sub-dimensions: green consumer, activist, advocate, and recycler in the internal dimensions indicating the individual's ability to improve environmental status by these four different domains. In contrast, governmental responsibility and corporate responsibility, higher powers, and natural earth-cycles in the external dimensions conceptualize the belief in other institutions' impacts to affect the environment (Kalamas et al., 2014). This framework considers not only generalized internal and external dimensions but also explicitly people's perceptions of governmental and corporate abilities for environmental conservation. Since China's environmental management is mainly guided by the government and strong Confucian values of hierarchy (Monkhouse et al., 2013; Shu et al., 2016), it is substantial to find out how individuals perceive powerful institutions such as governmental authorities and large companies in their roles of protecting the environment. Hence, this framework is chosen to analyze pro-environmental behaviors in China (Article I).

4.2 Responsibility Attributions and Crisis Response

A concept that is related to locus of control is the attribution theory (see Figure 1; Table 1). While locus of control refers to the control of reinforcement through a perceived behavioral outcome contingency, the attribution theory deals with the responsibility attributions for positive or negative outcomes of specific events (Brewin & Shapiro, 1984; Pettersen, 1987). Within the attribution theory, scholars specified internal and external attributions indicating whether individuals perceive themselves or others in their environment to be responsible for the outcomes of a certain event such as a crisis (Kelley, 1967; Weiner, 1985). Rooting from people's needs to seek for causes especially when unexpected and negative consequences occur, previous research indicated people's responsibility attributions to individual behaviors, organizational activities and/or situational factors (McDonald & Hartel, 2000). This theory is chosen in Article IV to understand Chinese people's perceptions in times of the ongoing COVID-19 pandemic regarding the questions, in particular, who among different stakeholders (consumers, marketers, government) is responsible for adapting behaviors or operations in order to avoid a similar pandemic in the future. This approach supposes to contribute to the timely discussion while exploring individuals' perceived causes of the pandemic and pointing out possible behavioral responses to the pandemic, which could be beneficial for reaching more sustainable consumption.

4.3 Consumer Empowerment in the Context of Sustainable Consumption

With regard to the second objective of developing action measures to undergo a behavioral transformation (as discussed in section 1), one approach that is applied in this dissertation is consumer empowerment. Power indicates the capacity to control one's own (but also others') resources or outcomes (Keltner et al., 2003). Consumer empowerment refers to the process of transferring control over specific corporate activities or resources to the consumer (Fuchs et al., 2010). While individuals' perceptions of locus of control focus on the question who impacts an (e.g. environmental) event, the concept of power is more suitable to discuss power relations between stakeholders (Fiske & Dépret, 1996). Power is relevant in the decision-making phase for addressing the question who has the right and competence to decide on the usage of resources or the performance of certain activities (Kim & Hsieh, 2006). When companies offer consumer products and highlight their environmental benefits, a major challenge arises that consumers assume a concentration of corporate resources on environmental aspects of the products (Newman et al., 2014). This assumption might conflict with individuals' purchase motivations, since they often buy environmentally friendly products for non-environmental reasons such as health considerations or other self-benefits (e.g. Green & Peloza, 2014). Consumers might feel powerless, since they seem unable to influence companies' decisions in this regard. In this case, it is vital to signal a sufficient level of priority for fulfilling customer needs instead of only generating environmental benefits. Since the concept of consumer green empowerment serves to emphasize consumers' decision power on corporate pro-environmental operations and offerings (cf. Buerke et al., 2017), it is chosen for an investigation in the advertising context for environmentally friendly products in Article II.

4.4 Incentivization of Sustainable Consumption: A Self-determination Theory Approach

Economic incentives are one of the common measures to stimulate pro-environmental behaviors in different domains (e.g. Viscusi et al., 2011; Price et al., 2009). In this research field, the self-determination theory is mostly used to conceptualize and structure individuals' different motivational patterns (Deci & Ryan, 1985). Self-determination theory can be applied to understand individuals' task-specific motivation in several dimensions. In comparison to other theories used in this dissertation that deal with people's beliefs about the influence of different stakeholders on the environment or pro-environmental activities, self-determination theory helps to answer the question why an individual performs a specific behavior, especially when interventions are offered to regulate behaviors. In general, this theory divides individuals' motivations into internalized and non-internalized dimensions (Ryan & Deci, 2000a;

Thøgersen, 2003). Internalized dimensions refer to motivations such as intrinsic and identified motivation meaning that individuals take actions because they enjoy the behavior or consider it important (Osbaldeston & Sheldon, 2003). Non-internalized dimensions incorporate introjected and extrinsic motivation patterns: Individuals perform a behavior to avoid feelings of guilt and shame or intend to receive the desired outcome that is separable from the behavior itself (Ryan & Deci, 2000). The purpose of my research (Article III) is to investigate the effects of several interventions, including environmental appeals, regular economic incentives and conditioned economic incentives that are associated with pro-environmental spending on individuals' motivational patterns and in return their recycling intentions. Since the self-determination theory enlightens whether individuals intend to practice a behavior because they consider it enjoyable and/or meaningful or want to achieve a separate desirable outcome (e.g. rewards), this theory is applied here. In addition, perceived autonomy support, as a major factor of internalized motivation (Church et al., 2013), is analyzed.

5. Summary of Articles

5.1 Summary of Article I: Who Can Improve the Environment—Me or the Powerful Others? An Integrative Approach to Locus of Control and Pro-environmental Behavior in China

The first article of this dissertation serves to generate an overall view on Chinese individuals' perceptions of different stakeholders' abilities to conserve the environment. It relates these perceptions with individuals' reported pro-environmental behaviors in several domains including recycling, transportation, energy usage, activism, and environmentally friendly purchase. Many people believe that only power institutions but not they as individuals are effective to combat environmental problems, especially in government-guided countries such as China (Chan, 2000). This study contrasts people's beliefs in their own abilities to improve the environment to their perceptions of other powers (e.g. government, corporations, higher powers, and earth-cycles). As discussed earlier in section 3.1, it is still unknown how internal and external control beliefs simultaneously influence individuals' pro-environmental behavior in China's cultural and socio-political context. An integrative model of environmental locus of control (ELOC) is tested to address possible interactions and simultaneous effects. An online survey (N = 754) was conducted in China using a sample that represents the actual distribution of sex, age and education of urban Chinese. Results show that internal ELOC dimensions positively influence Chinese people's reported pro-environmental behaviors. However,

contrary to our predictions, external ELOC was positively correlated with internal factors and also caused positive effects on reported behaviors. The belief in one's own abilities outperforms the belief in others to translate the confidence into reported behaviors. Nevertheless, Chinese people perceive a higher level of governmental and corporate responsibility relative to their own environmental impacts, which is driven by Confucian values (i.e. group orientation, belief in hierarchy) according to the present study. Compared to relatively consistent internal ELOC, the perceptions of most external ELOC factors significantly differ among provinces by levels of GDP per capita. Promotional programs should stress the individual's significance through daily behaviors in specific ways such as green purchase, activism, advocate (e.g. persuasion of friends), and recycling. Communicating the influence of strong institutions may not necessarily trigger diffusion of responsibility but appears to promote a sense of shared responsibility.

5.2 Summary of Article II: “Let Me Decide How Green You Are!” – The Effects of Green Consumer Empowerment on Corporate Evaluations and Purchase Intention in Advertising

The second article of this dissertation aims to improve the effectiveness of advertisements for environmentally friendly products. From a practical perspective, marketers often attempt to motivate people's purchase of environmentally friendly products through appealing for more environmental engagement or quantifying the individuals' environmental impact (e.g. Chahal & Kaur, 2015; Muralidharan et al., 2017). A crucial challenge of green appeals in this kind is that they are likely to strengthen customers' perceptions of the company's environmental orientation but not customer focus. Consumers might perceive a neglect of their primary needs, such as product quality instead of environmental benefits, which could lead to a more negative overall evaluation of the company. As previously discussed (section 3.2), the concept of consumer empowerment is applied to develop and empirically test a new form of advertisement based on message priming. Specifically, I investigate empowerment ads that communicate customer demand as the central criterion for companies' decisions on adopting pro-environmental operations. Green empowerment ads are compared with green appeals that emphasize consumers' ecological impacts realized through their purchase actions. Two survey-based online experiments were conducted in China. The samples mainly represent younger and better-educated individuals. Study 1 shows that green empowerment ads significantly improved perceptions of the company's customer orientation and increased purchase intentions ($N_{\text{Study1}} = 291$). Perceived corporate environmental responsibility was also improved, although at a comparable level to green appeals. Study 2 ($N_{\text{Study2}} = 457$) suggests that a green empowerment

ad highlighting both customer orientation and eco-friendliness is more effective for large, high-resource companies than for small companies. In comparison, green appeals are more beneficial for improving perceived corporate environmental responsibility for small companies. Overall, green empowerment is still the best advertising approach.

5.3 Summary of Article III: When People Can Be Green and Greedy – A New Perspective of Recycling Rewards and Motivation Crowding-out in Germany, the USA, and China

In the third article of this dissertation, I investigate a new design of economic incentive that aims to improve the effectiveness of previous incentives and green appeals in two ways: (1) by compensating for the adverse effects of economic incentives, which is called motivation crowding-out (Frey & Oberholzer-Gee, 1997), (2) by tackling the challenge of green appeals that they only increase individuals' interest but not actual behaviors compared to economic incentives (Harackiewicz et al., 1998). Previous research found conflicting results about the effectiveness of economic incentives compared to green appeals to promote pro-environmental behaviors (e.g. Bolderdijk & Steg, 2015; Green & Peloza, 2014; Steinhorst et al., 2015). Further, the possibility of combining both approaches was largely neglected. In addition, most experimental studies were limited to single countries or smaller geographical areas and did not account for possible country differences. A survey-based online experiment was conducted in Germany, the USA, and China using a representative sample in each country according to the actual distribution of sex, age and place of residence ($N_{\text{Germany}} = 322$, $N_{\text{USA}} = 305$, $N_{\text{China}} = 361$). In this study, I tested a monetary reward for recycling that can be only redeemed for eco-friendly products, which is called a “green reward,” and compared it to a standard reward (redeemable for any product of choice) and a green appeal (highlighting the environmental impact of individuals' choices). The results show, that in China, green rewards significantly increased internalized and introjected motivation, which contributed to an individual's recycling intentions. In the USA, rewards improved recycling intentions mainly via extrinsic motivation. In Germany, green appeals appeared to be the most effective strategy. In the USA, but not Germany and China, the restrictions in the use of money in the green reward reduced individuals' perceived autonomy support. Hence, this research finds differences between countries in the occurrence of “crowding-out” of internalized motivation and shows under what circumstances these effects could be compensated. Findings suggest that policymakers and marketers should recognize the potential of designing incentives with an environmental purpose, which at least

under some conditions is able to neutralize earlier identified negative effects of economic incentives on people's motivations and behavioral intentions to recycle.

5.4 Summary of Article IV: Potential Consequences of COVID-19 for Sustainable Meat Consumption – The Role of Food Safety Concerns and Responsibility Attributions

The last article of this dissertation deals with potential effects of the COVID-19 crisis on individuals' intentions to adopt more sustainable meat choices in China. This study contributes to explore people's reactions to negative consequences of a shock event and how they subjectively explain causes of the event, as well as what necessary changes they perceive for the future. Academics and international organizations call for discussion on the potential of transiting to more sustainable consumption patterns alongside the ongoing COVID-19 pandemic (e.g. Cohen, 2020; SFS, 2020). Thus, this study attempts to deliver the first insights into consumers' perceptions of responsibility attributions and food safety concerns related to the pandemic in a geographical context where the first infection case was assumed to be identified (Sun et al., 2020). An online survey (N = 234) was conducted among young adults in China who contribute to a significant part of sustainable consumption in China according to previous research (Li et al., 2016; McCarthy et al., 2016). This study enlightens the potential effects of the pandemic on young adults' willingness to avoid game meat consumption as well as to purchase animal welfare products. Food safety concerns and perceived responsibility for a future change of individuals, marketers, and the government as predictors are related to behavioral intentions. Results show that food safety concern, which is significantly triggered by risk perception and anxiety, negatively affects the willingness to buy animal welfare products. Perceived responsibility of marketers' change positively relates to people's willingness to avoid game meat and to buy animal welfare products, while the latter is also positively related to perceived governmental responsibility. Consumers demand marketers' improvements in safety and hygiene standards as a necessary condition for adopting sustainable consumption behaviors. Animal welfare products have the potential to pronounce the demanded level of product safety, while the game meat market needs to be prepared for necessary adaptations for coping with the adverse effects of COVID-19. This article adds knowledge to the behavioral consequences of a viral hazard in the context of sustainable food choices while relating those to attribution theories and food safety concerns.

6. Article I

Who Can Improve the Environment—Me or the Powerful Others? An Integrative Approach to Locus of Control and Pro-environmental Behavior in China

Published in: Resources, Conservation and Recycling

Note: In accordance with the journal's author rights, the version published here is the accepted manuscript. You can find the published article here: Yang, X., & Weber, A. (2019). Who can improve the environment—Me or the powerful others? An integrative approach to locus of control and pro-environmental behavior in China. Resources, Conservation and Recycling, 146, 55-67. <https://doi.org/10.1016/j.resconrec.2019.03.005>

Abstract

Many people think that only powerful institutions are effective to combat environmental problems, especially in government-guided countries such as China. This study contrasts people's beliefs in their own abilities to improve the environment to their perceptions of other powers (e.g. government, corporations, higher powers, and earth-cycles). Previous research explored the impact of internal and external control beliefs on individuals' pro-environmental behavior mostly separately in developed Western countries. Since China's cultural and sociopolitical environment significantly differs from that of Western countries, we develop and test an integrated model of environmental locus of control (ELOC) to enlighten possible interactions and simultaneous effects in China. As expected, results indicate that internal ELOC generates positive effects on Chinese people's behaviors. But contrary to our predictions, external ELOC is positively correlated with internal factors and also positively influences behaviors. The belief in one's own abilities outperforms the belief in others to translate the confidence into reported behaviors. Nevertheless, Chinese perceive a higher level of governmental and corporate responsibility relative to their own environmental impacts which is driven by Confucian values (i.e. group orientation, belief in hierarchy). Compared to relatively consistent internal ELOC, the perceptions of most external ELOC factors significantly differ among provinces by levels of GDP per capita. Promotional programs should stress the individual's significance through daily behaviors in specific ways such as green purchase, activism, advocate (e.g. persuasion of friends), and recycling. Communicating the impact of powerful institutions might not necessarily trigger responsibility diffusion, but seems to promote the sense of shared responsibility.

Keywords: internal locus of control, external locus of control, pro-environmental behavior, China, cross-cultural comparison.

6.1 Introduction

In the last decades, China has achieved an outstanding, but costly economic success accompanied by severe ecological damages (Dasgupta et al., 2001). Booming consumption excessively exploits the nature through accelerated environmental pollutions such as carbon emissions, water contamination, and soil erosion (Chan & Yao, 2008; Shao et al., 2006; Wei & Yang, 2010; Zhang & Cheng, 2009). Effective approaches are urgently demanded to overcome environmental threats and consequently to sustain people's well-being (Zhu & Sarkis, 2016). In 2016, the contribution of consumption to economic growth has increased by 15.2%-points signaling a rapid shift to a consumer-driven economy (RDICASS, 2017; SCC, 2015, 2016). Lo and Fryxell (2005) argue that the combination of governmental and societal support generates the best outcome of regulatory enforcement. However, a major contradiction of China's environmental protection exists between the insufficient governmental activity and the strong public dependence on the government (Schroeder, 2014; Wang et al., 2003). Local particularism, corruption, and the abuse of power impede the implementation of unified regulations (Muldavin, 2000). Hence, involving consumers in environmental conservation has become a particularly important task. The crucial questions arise as to whether/how Chinese consumers' perceptions of their dependence on the government influence their self-confidence and willingness for environmental commitment. A simultaneous consideration of consumers' perceptions of their and other institutions' environmental impact is necessary.

Previous research criticizes constrained involvement of Chinese consumers and NGOs in environmental conservation processes (Wang et al., 2003). Recently, the government has stressed the promotion of autonomous environmental-friendly behaviors (Ministry of Agriculture, 2015). However, 34% of Chinese consumers have been identified as eco-bystanders who believe in the ineffectiveness of their individual environmental activities (Chan, 2000). One theory reflecting this paradox is the concept *locus of control* (LOC; Rotter, 1966). Our study follows this research path (a) to identify relevant indicators of Chinese people's confidence in their personal and other institutions' abilities to improve the environment in an integrated perspective, and (b) to link these indicators to different pro-environmental behaviors.

Several socio-psychological theories have been widely used and modified to explain pro-environmental behaviors (Groening et al., 2018; Morren & Grinstein, 2016). Among others, the perception of responsibility has been investigated from various perspectives: Rotter's (1966) approach *locus of control* focuses on people's mindset, as it distinguishes events that individuals perceive to be under or beyond their control. Extended models provide a broader perspective by including the perceived influence of relevant stakeholders in the environment (e.g. Guagnano, 1995; McCarty & Shrum, 2001). Individual-centric explanations, focusing on the extent of perceived personal control, attitudes and norms, are more suitable for autonomous consumers in countries where political authority for environmental conservation has been delegated to the civil society to a significant extent (Schroeder, 2014). However, in countries such as China, governmental interventions are seen as the most powerful measures that work as high-order prerequisites for social engagement (Dendler & Dewick, 2016). The high percentage of state-owned companies might strengthen the centralistic governance, and therefore people's perceived dependence on the government (Shu et al., 2016). To include the perception of oneself and other institutions, extended models of *locus of control* are better suited compared to other theories (e.g. Theory of Planned Behavior, Ajzen, 1991).

Existing studies on environmental locus of control (ELOC) were conducted mostly using samples from Western developed countries (e.g. Allen & Ferrand, 1999; Cleveland et al., 2005; Fielding & Head, 2012; McCarty & Shrum, 2001). A series of recent studies recognizes the differences in environmental behaviors across cultures and sociopolitical contexts (e.g. Grinstein & Riefler, 2015; Rauwald & Moore, 2002; Schultz & Zelezny, 1999). Especially, people's perceptions of external factors such as government, corporations, and religious powers require a country-specific analysis. Thus, we are exploring the impact of ELOC in China in response to the calls for research in non-Western settings with a different cultural background (Cho et al., 2013; Cleveland et al., 2012; Kalamas et al., 2014; Morren & Grinstein, 2016). Further, Groening et al. (2018) and Ramayah et al. (2010) call for an improved substantiation of the effects of ELOC factors, especially regarding the identification of antecedents of ELOC factors. Therefore, the main contribution of our study is to shrink the research gap by specifying the ELOC factors in China at three geographical levels: (1) We explore possible discrepancies that can be traced back to different economic status at provincial level, (2) analyze the influence of Confucian values as ELOC antecedents at national level, and (3) compare results between China and Canada at international level. Furthermore, we aim to advance the field by reporting

the results of a study that examines both the perceived effectiveness of one's own behaviors against that of others' activities in specified sub-dimensions.

6.2 Literature Review

6.2.1 Locus of Control

The concept *locus of control* was initially developed by Rotter (1966). It indicates the individual's perception of whether the result of an event is under or out of one's control. The belief in one's significant abilities to affect the result is conceptualized as *Internal*. Perceiving possible influence outside the individual is equivalent to *External*. Levenson (1974) refined the concept to three distinct dimensions: Internal, Powerful Others, and Chance. Locus of control has been widely used to explain health behaviors (Hallal, 1982; Wallston et al., 1978), self-esteem and stress coping behaviors (Judge et al., 2002; Parkes, 1984), job satisfaction and performance (Judge & Bono, 2001). Some studies apply locus of control to explain consumer behavior (Busseri et al., 1998), e.g. the adoption of games (Koo, 2009) or the acceptance of regulations (Hoffman et al., 2003).

Guagnano (1995) applied Levenson's generalized 3-dimensional scales to examine environmental behavioral intention in a path regression analysis. Internal locus of control has been found to have an indirect positive impact on environmental agentic disposition. The belief in Powerful Others (PO) leads to higher perceptions of personal costs, but its effect on behavioral intention is non-significant. In contrast, the belief in chance/luck-factors significantly decreases a person's environmental intention. However, context- and behavior-specific concepts outperform generalized scales to predict pro-environmental behaviors (Bradley & Sparks, 2002; Huebner & Lipsey, 1981). Recently, environmental locus of control has been extended to eight sub-dimensions: green consumer, activist, advocate, and recycler in the internal dimensions (IN-ELOC) indicating the individual's ability to improve environmental status in these four different kinds of pro-environmental behaviors. In contrast, governmental responsibility and corporate responsibility (or *Powerful Others*; PO), higher powers, and natural earth-cycles (or *Chance/Fate*; CF) in the external dimensions (EX-ELOC) conceptualize the belief in other institutions' impacts (Kalamas et al., 2014). The authors identified significant positive effects of IN-ELOC on (self-reported) pro-environmental behaviors (PEBs) (Cleveland et al., 2012). For EX-ELOC, a different pattern appeared – while Powerful Others was most positively related to PEBs, Chance/Fate showed mostly negative

associations (Kalamas et al., 2014). In sum, these results confirm that both internal and external ELOC are associated with PEBs. However, the strength of effects could not be directly compared, as they were considered in separate models. Hence, the question remains which ELOC sub-dimensions have a dominating effect on different PEBs. As an extension to Guagnano's (1995) generalized, 3-dimensional LOC model we provide a specified, 8-dimensional ELOC framework.

6.2.2 Sub-dimensions of IN-ELOC

If environmental events are perceived to be under an individual's control, internal locus of control is high. The IN-ELOC factors indicate that consumers believe in the significant impact of their functions as green consumer, activist, advocate, and/or recycler (Table 4; see Appendix A1 for sample items).

Table 4: IN-ELOC-dimensions

IN-ELOC	Theoretical foundation
Green Consumer	Positive environmental impact is considered as a significant motivator (Thøgersen & Zhou, 2012). Although the purchase of everyday products is strongly driven by habits (Biel et al., 2005), habits can be formed by the repetition of deliberate decisions (Grunert, 2005). The confidence in contributing to the environment through green purchase has been proved a significant predictor for Chinese consumers' deliberate purchase (Ng & Law, 2015; Wang et al., 2014).
Activist	Compared to green consumption, environmental activism is a more effortful ecological behavior to cope with the dissatisfying environmental quality, e.g. through protests, petitions, financial support, and voluntary work (Dono et al., 2010; Fielding et al., 2008). In China, societal engagement is still limited due to NGOs' lack of organizational capacities and their slowly growing activities in policy advocacy (Zhan & Tang, 2013).
Advocate	Advocates are willing to take part in some environmental movements which are less public and require a lower level of commitment, e.g. persuading friends to join environmental activities (Larson et al., 2015; Stern et al., 1999). The consumer's perceived indirect impact on sustainability by motivating others for sustainable behaviors strongly influences his/her own purchase intention (Hanss et al., 2016).
Recycler	Recycling is considered a relatively simple and affordable environmental commitment (Iyer & Kashyap, 2007). It is one of the most investigated environmental behavior in the literature (e.g. Baxter & Gram-Hanssen, 2016; Miliute-Plepiene et al., 2016; Wan et al., 2014). Recycling is conceptualized as an individual choice determined by personal beliefs or as a result of situational and socio-technical systems (Thomas & Sharp, 2013).

6.2.3 Sub-dimensions of EX-ELOC

If environmental events are perceived to be under an external institution's control, external locus of control is high. The EX-ELOC factors refer to consumers' beliefs in the impact of other

institutions incl. the government, companies, higher powers, and natural earth-cycles (Table 5; see A1 for sample items).

Table 5: EX-ELOC-dimensions

EX-ELOC	Theoretical foundation
Governmental responsibility	People tend to diffuse responsibility when group size is large or a group leader is recognized (Forsyth et al., 2002). In China, government and corporations are assigned high responsibility for achieving environmental goals (Harris, 2006). Although perceived effectiveness of policy measure increases environmental behaviors (Wan et al., 2014), top-down governance is identified to be more effective in China (Schroeder, 2014).
Corporate responsibility	Chinese corporations have shown improved awareness and proactivity in environmental management in response to the growing regulatory, competitive, and social pressure (Liu et al., 2010; Zhang et al., 2008). However, the actual environmental commitment remains difficult for the public to evaluate due to the lack of reliable information (Fryxell et al., 2004; Noronha et al., 2013). Consumers seem to have high expectations towards companies with regard to environmental-friendly adoptions (Zhu et al., 2005).
Higher powers	Religion and environment create a robust interdisciplinary field which is important for understanding human-nature interactions (Jenkins & Chapple, 2011). Kalamas et al. (2014) assume most individuals to belong to one of the world religions. Prioritizing others' well-being and emphasizing spiritual fulfillment are major religious principles that may affect the practice of PEBs (McDonald et al., 2006).
Natural earth-cycles	By improving education and natural sciences, the old beliefs in supernatural powers as an explanation for vulnerability in agricultural production have diminished in China (Zuo, 1991). However, a significant part of the general public (e.g. 12% of Americans) disagrees to consider climate change as human-caused (Borick et al., 2018). Leiserowitz (2005) defines "naysayers" (p. 1439) as people who see climate change as natural earth-cycles.

Numerous studies link ELOC with specific kinds of pro-environmental behavior. Regarding green consumption, Schwepker and Cornwell (1991) find a positive relationship between internal LOC and the purchase of ecologically packaged products. In more recent studies, people with greater internal LOC show a higher level of environmental concern and behaviors reflected in higher willingness to pay (Bodur & Sarigöllü, 2005; Fielding & Head, 2012; Trivedi et al., 2015). McCarty and Shrum (2001) indicate that internal LOC and collectivism improve the propensity to recycle. People with higher IN-ELOC are rather motivated by perceived importance of recycling, while others are dominantly affected by the inconvenience of recycling. Furthermore, extant research has shown a positive effect of IN-ELOC on donation to environmental charities, usage of sustainable transportation modes (Cleveland et al. (2012), and intention to support conservation policies (Pavalache-Ilie & Maria, 2012). Taking the

shared responsibility into account, responsibility attribution to the community is positively related to environmental behaviors, whereas a delegation to the government creates a negative effect (Fielding & Head, 2012). Overall, the positive effects of IN-ELOC are supported in most previous studies, whereas the direction of effects of EX-ELOC is controversial.

Results from single empirical studies are reflected by several meta-analyses. In the first meta-analysis of this research line, Hines et al. (1987) identified a significant positive correlation between locus of control/self-efficacy and PEBs based on 15 studies. Bamberg & Möser's (2007) and Klöckner's (2013) meta-analyses gain a more general view of the psycho-social approaches (incl. locus of control, environmental knowledge, moral norms) and confirm their significant correlations to PEBs.

6.2.4 Confucian Values

China has undergone decades of religious repression leaving the majority (52%) of its population non-denominational (PEW-TEMPLETON, 2018). Instead, Confucianism as an ethical philosophy has dominantly shaped the Chinese culture and values (Overmyer, 2003). People are considered as parts of a larger society who depend on each other to be significant. Furthermore, everybody has a fixed position in the social ranking (Monkhouse et al., 2013). Ackerman et al. (2009) suggest an influence of Confucianism on consumers' perceptions of governmental involvement. In particular, Chinese people expect powerful stakeholders (e.g. political officials) in the society to take care of them.

6.3 Conceptual Model and Hypotheses

As both IN- and EX-ELOC have been shown to influence PEBs and research on these factors is rare in non-Western countries, this study integrates IN- and EX-ELOC based on Cleveland et al. (2012) and Kalamas et al. (2014). Interestingly, Kalamas et al. (2014) found a high positive correspondence between internal ELOC and PO which indicates that individuals cannot be characterized as primarily internal or external. Individuals are assumed to be willing to do their part, but to allocate shared responsibility to powerful others (Kalamas et al., 2014). This idea might rather apply to Western consumers who have adopted self-initiated environmental activities. China's centralism in environmental conservation might trigger opposed responses on perceived responsibilities of consumers and PO. Our study enables a comparison of the importance of single IN- and EX-ELOC factors for explaining PEBs by integrating both concepts.

Furthermore, our model examines single relationships between each ELOC dimension and different kinds of pro-environmental behaviors (see Figure 2). Especially in the external dimensions, Kalamas et al. (2014) show inconsistent results for these relationships while using higher-order reflective constructs for PO and CF. However, reflective constructs are supposed to be unidimensional. To model multidimensional constructs, the first-order constructs which are conceptually not identical should be treated as separate variables (Lee & Cadogan, 2013).

We expect that consumers would delegate more responsibility to government and corporations, if an advanced level of their effective control is perceived. People estimate their own competence by comparing themselves with others (Gilbert et al., 1995). When Chinese people recognize the high effectiveness of radical governmental measures (Jin et al., 2016), they would feel a large discrepancy of power between the government and themselves. Therefore, consumers would perceive their own actions as less effective. Although perceived impacts of consumers and PO are compatible in Western countries (Kalamas et al., 2014), the dominant role of Chinese authorities in environmental conservation might trigger the assignment of responsibility from consumer to powerful institutions. In contrast, the negative effect of HiPo/EarthCyc would be consistent with Western countries: The more Chinese people believe in non-anthropogenic causes, the less would they believe in the effectiveness of human behaviors.

H1: IN-ELOC and EX-ELOC are negatively correlated.²

H1a: IN-ELOC and GovResp/CorpResp are negatively correlated.

H1b: IN-ELOC and HiPo/EarthCyc are negatively correlated.

Based on previous literature (e.g. Cleveland et al., 2012), we expect a positive effect of IN-ELOC on pro-environmental behaviors also for Chinese consumers. The stronger one's belief in being able to change the environment through a specific kind of environmental behavior, the more likely is a person to practice that behavior. Indeed, green consumption includes the

² IN-/EX-ELOC only function as abbreviations of the single factors listed below:

IN-ELOC	[a]: Green Consumer (GreenCons), [b]: Activist, [c]: Advocate, [d]: Recycler
EX-ELOC	[e]: Governmental Responsibility (GovResp), [f]: Corporate Responsibility (CorpResp), [g]: Higher Powers (HiPo), [h]: Earth-cycles (EarthCyc)
PEB	[i]: Purchase (Pur), [j]: Activism (Act), [k]: Recycling (Rec), [l]: Energy (En), [m]: Transport (Tra)
CONF	[n]: Group Orientation (GOrien), [o]: Hierarchy (Hier)

purchase of environmental-friendly and energy-efficient products. Further, persuading others to join environmental behaviors has the potential to affect all kinds of PEBs.

H2: IN-ELOC positively influences PEBs.

H2a: Green Consumer has a positive effect on PEB Purchase and PEB Energy.

H2b: Activist has a positive effect on PEB Activism.

H2c: Advocate has positive effects on all PEBs.

H2d: Recycler has a positive effect on PEB Recycling.

On the contrary, the belief that primarily others' actions have a significant effect would demotivate one's own behaviors. Due to China's centralism, we expect negative effects for EX-ELOC in line with Fielding & Head (2012) and Schwepker & Cornwell (1991): If Chinese consumers delegate environmental tasks to government and corporations, they would be less likely to engage in PEBs. Understanding ecological phenomena as religious events would make consumers feel powerless to actively improve the environment themselves. Differently to IN-ELOC, external dimensions indicate the general beliefs in others' responsibilities without targeting specific kinds of behaviors. Therefore, the single relationships to all behaviors are tested:

H3: EX-ELOC [(H3a) GovResp; (H3b) CorpResp; (H3c) HiPo; (H3d) EarthCyc] negatively influences all PEBs.

Although the extremely restricted consumer involvement has been criticized, most significant environmental actions are still fulfilled by the government (Che et al., 2002). Furthermore, Bodur & Sarigöllü (2005) assume that collectivistic culture such as in Turkey could lead to more externally controlled people. Therefore, we assume that Chinese people would still perceive greater governmental effects relative to their own. In contrast, people would rather recognize human-caused environmental damages according to weak religious and natural beliefs.

H4a: At average, consumers perceive stronger GovResp/CorpResp relative to IN-ELOC.

H4b: At average, consumers have weaker beliefs in HiPo/EarthCyc relative to IN-ELOC.

Furthermore, Confucian values such as group orientation and the belief in hierarchy might strengthen GovResp/CorpResp. If people believe that group actions lead to an improved outcome (Monkhouse et al., 2013), they would see government and corporations as

communities that are able to achieve more for environmental protection than individuals. Moreover, Chinese have trust in high-positioned seniors to take over the responsibility (Ackerman et al., 2009). Thus, they would expect political or business leaders to improve environmental conditions for the public.

H5: Confucian values [(H5a) group orientation; (H5b) belief in hierarchy] positively affect GovResp/CorpResp.

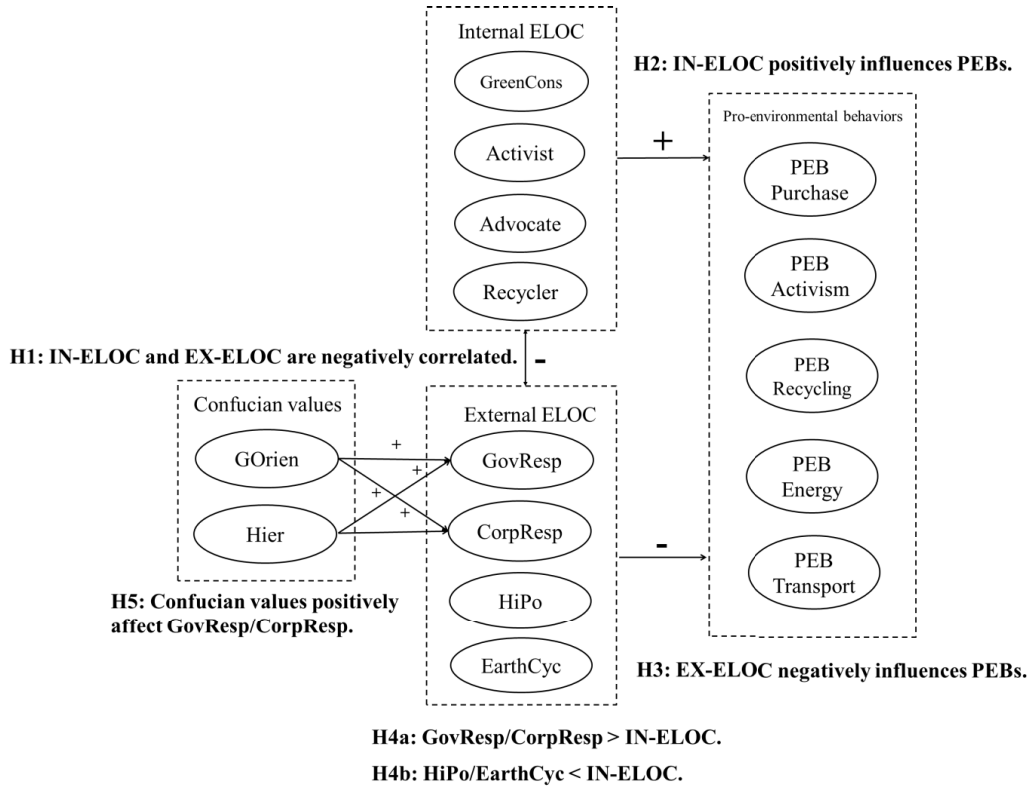


Figure 2: Conceptual model

6.4 Methods

6.4.1 Procedure

We collected 754 usable online questionnaires from May 18, 2018 to June 3, 2018. Based on the results from two pre-tests that we collected from 65 participants, the questionnaire was improved in order to enhance its internal validity. It was composed in English and translated into Mandarin Chinese by two Ph.D. students using the iterative approach which strives for the equivalence rather conceptually than literally (Douglas & Craig, 2007). The translated questionnaire was improved based on the independent review of five native speakers followed by in-depth discussions with regard to cultural understanding.

6.4.2 Survey Design

The questionnaire contains four major parts: (1) PEB, (2) IN-/EX-ELOC, (3) Confucian values, and (4) socio-demographics. To improve response quality, we reduced Kalamas et al. (2014)'s 50-item queries for PEBs and selected 16 questions according to five categories: activism (2), purchase (4), recycling (2), energy (3), and transport (5) based on 7-point Likert scales (1=never; 7=always). The items were selected considering two criteria: relevance for the majority of people and applicability for China. For example, highly specific behaviors such as using biodegradable soaps and behaviors that are rarely practiced in China such as buying products in refillable containers are excluded. Queries for IN- and EX-ELOC were adopted from Cleveland et al. (2012) and Kalamas et al. (2014; Appendix A1). To consider the Chinese context, minor adaptations of EX-ELOC items were undertaken. For the factor CorpResp, one item was added (CORRESP3) referring to the responsibility of state-owned corporations. For the factor GovResp, the item wording was changed from "politicians" to "government" as responsible actor. All HiPo items referred to "higher powers" instead of "God" due to low levels of Christianity. For measuring group orientation and the belief in hierarchy, three items each from Kim (2005) and Monkhouse et al. (2013) were applied based on 7-point Likert scales (1=strongly disagree; 7=strongly agree; A1).

As an attempt to consider overestimated environmental behaviors in self-reporting (Lee et al., 2011), the questionnaire closes with a real lottery that asks participants to freely allocate a cash prize of 30 RMB that they can potentially win for self-use or donation. Intention to donate was captured at the beginning of the survey in an open response format (Bradburn et al., 1980): "If you find 30 RMB in the street, how much would you donate to a tree-planting action?" Later, intention to donate and actual donation will be compared with regard to social desirability bias (Milfont et al., 2006).

6.4.3 Sample

Participants were acquired from various institutions mainly including schools and organizations in the real estate and health sector. According to the latest data from *National Bureau of Statistics of China* (2016; NBSC)³, our sample delivers a similar profile to that of urban adult Chinese in terms of gender, age, education, income, and religion. Females and better-educated people are slightly overrepresented.

³ Detailed data also used from the *Tabulation on the 2010 Population Census of the People's Republic of China (2010; latest census)* under <http://www.stats.gov.cn/tjsj/pcsj/rkpc/6rp/indexce.htm> (19.08.2018).

Due to stronger economic disparities in China (Knight & Song, 1999), we have assigned the 28 provinces from which our data was collected into three groups of low-, middle-, and high-GDPPC (GDP-per-capita) provinces based on *China Statistical Yearbook 2017* (NBSC, 2017). The cut-off values of 41,804 RMB and 61,579 RMB are derived from the 33%- and 66%-quartile. Each sub-sample consists of 190, 264, and 300 participants which properly represents the real distribution of population.

Table 6: Socio-demographic features

Variable	N	%
<i>Gender</i>		
Female	473	62.7%
Male	281	37.3%
<i>Age</i>		
≤ 19	36	4.8%
20-29	184	24.4%
30-39	239	31.7%
40-49	183	24.3%
50-59	92	12.2%
60-69	18	2.4%
≥ 70	2	0.4%
<i>Education level</i>		
Middle school or lower	164	21.8%
High school	207	27.5%
Bachelor	242	32.1%
Master	105	13.9%
Doctor or higher	35	4.8%
<i>Household income per month (RMB)</i>		
≤ 2,999	209	27.7%
3,000-5,999	200	26.5%
6,000-9,999	146	19.4%
10,000-29,999	120	15.9%
30,000-49,999	34	4.5%
50,000-69,000	23	3.1%
70,000-89,999	9	1.2%
≥ 90,000	13	1.7%
<i>Province of residence¹</i>		
Beijing	124	16.4%
Liaoning	97	12.9%
Shandong	56	7.4%
Hebei	50	6.6%
Shanxi	49	6.5%
Fujian	40	5.3%
Anhui	38	5.0%
Chongqing	37	4.9%
Guangdong	33	4.4%
Gansu	27	3.6%
<i>Religion</i>		
Unreligious	525	69.6%

6.4.4 Measurement model

In this study, a PLS-structural equation model is computed using SmartPLS 3 to test the integrated concept of ELOC and the effects on PEBs. Descriptive analyses are conducted using IBM SPSS Statistics 22. According to Hair et al. (2011), PLS-SEM has high statistical power in order to achieve this study's aims of identifying key drivers and extending an existing theory. Our model aims to identify the key constructs in a more holistic ELOC model, especially to answer the question whether IN- or EX-constructs have stronger impacts (H1-H3). Furthermore, the model serves as an extension to an existing theory by adding cultural components such as Confucian values (H5).

Based on Fornell & Larcker (1981)'s criteria, the PLS measurement model has been assessed according to reliability and validity. Indicator reliability is confirmed by indicator loadings between 0.716 and 0.933 (>0.7). Average variance extracted (AVE) ranges from 0.638 to 0.836 (>0.5) which supports the convergent validity of indicators. Discriminant validity is confirmed, as AVE of each latent construct is larger than that

construct's squared correlation with other latent constructs (r^2 -range: 0.001-0.531). The internal consistency of scales is supported by Cronbach' alpha scores identified from 0.718 to 0.902 (>0.7 ; Cronbach, 1951). PEB Recycling ($\alpha=0.626$) is the only exception. However, Cronbach's alpha assumes equal reliability of all indicators which is not required by Composite Reliability (CR). For all constructs, CR exceeds the cut-off value of 0.7 (CR-range: 0.841-0.939). Additionally, all variables are normally distributed with standard deviations from 1.621 to 1.954.

Since single source studies, especially self-reported measurements, are vulnerable to social desirability bias, we tested the common method variance (Podsakoff et al., 2003). Harman's one-factor test was conducted through a principal component analysis with all survey items (Morrison & Harman, 1961). As result, more than one factor emerged. The largest factor explains 38.06% of variance, hence, the factor does not account for the majority of the variance which indicates low threat of CMV bias.

Table 7: Evaluation of measurement mode

Constructs	Indicators	Indicator loadings	CR	CA	AVE
GreenCons	GRCON1	0.874	0.911	0.854	0.774
	GRCON2	0.885			
	GRCON3	0.881			
Activist	ACT1	0.862	0.894	0.823	0.738
	ACT2	0.831			
	ACT3	0.883			
Advocate	ADV1	0.860	0.887	0.809	0.724
	ADV2	0.865			
	ADV3	0.827			
Recycler	REC1	0.874	0.904	0.840	0.758
	REC2	0.890			
	REC3	0.848			
GovResp	GOVRESP1	0.890	0.939	0.902	0.836
	GOVRESP2	0.919			
	GOVRESP3	0.933			
CorpResp	CORRESP1	0.776	0.915	0.876	0.730
	CORRESP2	0.891			
	CORRESP3	0.875			
	CORRESP4	0.872			
HiPo	HIPO1	0.900	0.910	0.858	0.772
	HIPO2	0.893			
	HIPO3	0.842			
EarthCyc	ECYC1	0.822	0.879	0.794	0.708
	ECYC2	0.844			
	ECYC3	0.857			
PEB Purchase	PEBPUR1	0.738	0.869	0.773	0.689
	PEBPUR2	0.880			
	PEBPUR3	0.866			
PEB Activism	PEBACT1	0.888	0.895	0.767	0.810
	PEBACT2	0.913			
PEB Recycling	PEBREC1	0.860	0.843	0.626	0.728
	PEBREC2	0.846			
PEB Energy	PEBEN1	0.831	0.881	0.819	0.650
	PEBEN2	0.860			
	PEBEN3	0.812			
	PEBEN4	0.716			
PEB Transport	PEBTRA1	0.852	0.875	0.788	0.700
	PEBTRA2	0.861			
	PEBTRA3	0.796			
GOrien	GORIEN1	0.893	0.888	0.810	0.726
	GORIEN2	0.887			
	GORIEN3	0.769			
Hier	HIER1	0.837	0.841	0.718	0.638
	HIER2	0.824			
	HIER3	0.731			

Note(s): CR = Composite Reliability; CA = Cronbach's Alpha. AVE = Average Variance Extracted.

6.4.5 Structural model

As suggested by Henseler et al. (2014), the predictive relevance is prioritized in PLS models. Therefore, the current model is evaluated considering R^2 (Fornell & Larcker, 1981), Q^2 (Geisser, 1975), path coefficients, and f^2 (J. Cohen, 1988).⁴

Three different models were calculated, one integrated model including both IN- and EX-ELOC factors and models solely containing IN-ELOC or EX-ELOC factors (Table 7). A moderate amount of variance of endogenous latent variables is explained for PEB Energy in the integrated model. For the other PEBs, a weak amount of variance is explained. Confucian values explain a moderate amount of variance for both GovResp/CorpResp. All Q^2 values are above zero indicating a predictive relevance for all endogenous variables. The integrated model outperforms separated models in terms of R^2 and Q^2 .

Table 8: R squared and Q squared

Latent variable	Model 1: Integrated model (IN-/ EX-ELOC)		Model 2: IN-ELOC as predictor		Model 3: EX-ELOC as predictor	
	R^2	Q^2	R^2	Q^2	R^2	Q^2
PEB Purchase	0.393	0.253	0.357	0.231	0.294	0.189
PEB Activism	0.295	0.222	0.240	0.184	0.213	0.160
PEB Recycling	0.370	0.254	0.333	0.231	0.304	0.210
PEB Energy	0.512	0.312	0.434	0.266	0.441	0.269
PEB Transport	0.245	0.157	0.209	0.101	0.239	0.115
GovResp	0.500	0.395			0.500	0.395
CorpResp	0.525	0.361			0.525	0.361
Ø	0.462	0.279	0.315	0.203	0.359	0.243

A bootstrap procedure with 5,000 random samples is run to test the significance of the estimates for hypothesized relationships in 754 cases. 25 of 33 relationships are statistically significant at the level of 5%.

Compared to covariance-based models, measurements for the goodness of fit (GoF) still expect further empirical testing (Henseler et al., 2014). Tenenhaus et al. (2005) propose a global criterion for GoF which has been used by a number of scholars (e.g. Alan et al., 2016; Hew et al., 2015; Wan et al., 2014; Wang et al., 2016). It is defined as small (0.10), medium (0.25), and

⁴ The following evaluation criteria are applied: R^2 : weak (0.25), moderate (0.50), substantial (0.75); $Q^2 > 0$; f^2 : small (0.02), medium (0.15), large (0.35).

large (0.36) (Tenenhaus et al., 2005). Our model delivers a large GoF of 0.582 which is compatible with the good predictive quality assessed before.

6.5 Results

6.5.1 Descriptive Analysis and Correlations

According to the sample means, consumers tend to believe in their abilities to cause environmental impacts. Within internal ELOC dimensions, Recycler is assigned the highest perceived environmental impact, followed by Activist, Green Consumer, and Advocate (Appendix A6). At the same time, consumers also believe in the abilities of government and corporations. Considering results from the paired-sample t-test ($t(753)=6.303$, $p=0.000$), consumers perceive stronger GovResp/CorpResp compared to IN-ELOC (total mean across all sub-dimensions). Thus, *H4a* is accepted. In contrast, the belief in higher powers or natural earth-cycles is weaker than the perception of IN-ELOC which supports *H4b* ($t(753)=-16.127$, $p=0.000$).

Furthermore, internal and external factors are positively correlated with two exceptions of non-significant correlations of HiPo (see Appendix A2). Therefore, *H1a*, *H1b* are rejected. Stronger correlations up to 0.691 are identified between GreenCons, Activist, Recycler and GovResp, CorpResp. EarthCyc shows moderate correlations with other factors, while HiPo has the weakest or non-significant correlation coefficients. Nevertheless, all VIF values are under 5 ranging from 1.263 to 3.506, and therefore acceptable (Hair et al., 2011).

6.5.2 PLS Model

All nine tested paths between IN-ELOC and PEB are significantly positive at the level of $p<0.01$ with one exception for Activist \rightarrow PEB Activism ($p<0.5$; Table 9). Thus, *H2a-H2d* are accepted paths. The average coefficient size among internal factors is 0.217. GreenCons generates relatively strong relationships with PEB Purchase and Energy. Moreover, Advocate has a clearly stronger impact on PEB Activism than Activist. As hypothesized, Advocate turns out to be a significant indicator for all categories of behaviors. The effect sizes (f^2) are weak (J. F. Hair et al., 2011).

Among ten paths from GovResp/CorpResp on PEBs, six attain a significant positive effect. Hence, as the results consistently indicate positive effects, *H3a*, *H3b* are rejected. GovResp shows the strongest influence among all predictors, esp. in its relationship to PEB Energy.

Furthermore, CorpResp shows significant effects on two PEBs (Transport, Energy). Among ten paths from HiPo/EarthCyc on PEBs, five attain a significant positive effect. One significant negative coefficient is found for HiPo -> PEB Energy. As results are mostly contrary to our expectations, *H3c*, *H3d* are rejected. The effect sizes (f^2 ; Table 9) are weak at most (Hair et al., 2011). Considering the Chinese context, both Confucian values GOrien and Hier are identified to have significant positive effects on GovResp/CorpResp (Table 9). Particularly, GOrien achieves a large effect size (Hair et al., 2011), while Hier has considerably weaker effects. According to these results, *H5a* and *H5b* are accepted.

Due to the larger model size, the contributions of single exogenous variables to R^2 of endogenous latent variables tend to be small ranging from 0.007 to 0.438. Among others, GreenCons, Advocate, and GovResp have greater f^2 values for PEB Purchase and Energy. The R^2 of PEB Activism is dominantly explained by Advocate and HiPo. Furthermore, Recycler and Advocate are mainly responsible for the contribution to the R^2 of PEB Recycling.

Table 9: Path coefficients and f squared

Path	β	f ²	Hypothesis	Decision
IN-ELOC -> PEBs				
GreenCons -> PEB Purchase	0.271**	0.051	H2a	✓
GreenCons -> PEB Energy	0.268**	0.062		
Activist -> PEB Activism	0.125*	0.009	H2b	✓
IN-ELOC -> PEBs				
Advocate -> PEB Purchase	0.239**	0.054	H2c	✓
Advocate -> PEB Activism	0.277**	0.053		
Advocate -> PEB Recycling	0.196**	0.035		
Advocate -> PEB Energy	0.165**	0.032		
Advocate -> PEB Transport	0.191**	0.032	H2d	✓
Recycler -> PEB Recycling	0.223**	0.032		
EX-ELOC (GovResp/CorpResp) -> PEBs				
GovResp ->PEB Purchase	0.118*	0.008	H3a	×
GovResp -> PEB Recycling	0.170**	0.015		
GovResp -> PEB Energy	0.272**	0.051		
GovResp -> PEB Transport	0.190**	0.017		
CorpResp -> PEB Energy	0.125**	0.010	H3b	×
CorpResp -> PEB Transport	0.165**	0.013		
EX-ELOC (HiPo/EarthCyc) -> PEBs				
HiPo -> PEB Purchase	0.083*	0.008	H3c	×
HiPo -> PEB Activism	0.183**	0.035		✓
HiPo -> PEB Energy	-0.076*	0.009		
EarthCyc -> PEB Purchase	0.109**	0.013	H3d	×
EarthCyc -> PEB Activism	0.097*	0.009		
EarthCyc -> PEB Recycling	0.082*	0.007		
Confucian values -> EX-ELOC				
GOrien -> GovResp	0.615**	0.386	H5a	✓
GOrien -> CorpResp	0.639**	0.438		
Hier -> CorpResp	0.124**	0.016	H5b	✓
Hier -> GovResp	0.116**	0.014		

Note(s): ** significant at the level of 1%; * significant at the level of 5%; ✓ hypothesis supported; × rejected.

Besides the consideration of R^2 and Q^2 after model integration (Table 8), the changes in path coefficients are also identified. All internal factors have significant positive effects as in the separate model. Most external factors still have significant positive effects in the integrated model. Nevertheless, eight positive effects have become non-significant after model integration including GovResp → PEB Activist; CorpResp → PEB Purchase, Activist, Recycling; HiPo → PEB Recycling, Transport; EarthCyc → PEB Energy, Transport. One negative relationship has become significant after model integration which is HiPo → PEB Energy.

6.5.4 Provincial Comparison

All variable means are compared between low-, middle-, and high-GDPPC provinces (see assignment of provinces in Appendix A3). According to a one-way ANOVA and Scheffé's post-hoc-tests (Appendix A4, A5), significant differences are identified for four ELOC dimensions (Recycler, GovResp, CorpResp, HiPo), two PEBs (Activism, Energy) and GOrien at $p=0.05$. Within internal dimensions, Recycler has the highest scores in middle-GDPPC provinces. Considering external dimensions, people in middle-GDPPC provinces indicate higher GovResp/CorpResp as well as GOrien. Moreover, the belief in HiPo is highest in low-GDPPC provinces. When looking at reported behaviors, green activism is practiced most frequently in low-GDPPC provinces. With regard to energy usage, people in middle-GDPPC provinces are more environmental-friendly than in other provinces.

6.5.5 Cross-national Comparison

Using sample means extracted from Cleveland et al. (2012) and Kalamas et al. (2014; $n=263$), one-sample t-tests were conducted to identify potential differences between Chinese and Canadian consumers (Appendix A6). Generally, Canadians have higher beliefs in internal factors and Powerful Others than Chinese. CorpResp is perceived to be higher than GovResp in Canada which is the opposite among Chinese consumers. The belief in Chance/Fate is measured to be larger in China. Further, Chinese consumers have stronger beliefs in EarthCyc compared to HiPo in contrast to Canadians. Overall, larger differences above 1.0 are identified in the measurements of EarthCyc, Recycler, and GreenCons.

6.5.6 Social Desirability Bias

With regard to the intention-behavior gap, participants' intention to donate and actual donation in the lottery are compared using a paired-sample t-test: no significant difference has been found between the means: $M_{D-intent}=23.83$ and $M_{D-choice}=23.94$. Interestingly, actual donation choice is even descriptively higher than the initially stated intention to donate. The measures are

significantly correlated ($r=0.552$, $p=0.000$). Additionally, actual donation is weakly correlated with PEB Purchase, Activism, and Energy.

6.6 Discussion

The current study examined a comprehensive, integrated model of pro-environmental behavior which encompassed both internal and external dimensions of locus of control. The results show that these factors predict various forms of environmental efforts undertaken by consumers: 51% of the variance of energy-saving behavior and 25% of green transport choices are explained. Chinese consumers' beliefs in their own and others' abilities are confirmed to be positively associated with reported behaviors. In addition, the integration of Confucian values helps to understand what drives the high level of perceived governmental and corporate responsibility.

People with high IN-ELOC are more likely to engage in environmental actions which is compatible with existing literature (Cleveland et al., 2012; McCarty & Shrum, 2001; Schwepker & Cornwell, 1991). In detail, people who recognize the environmental improvement through green consumption and recycling also tend to buy green products and to recycle. The belief in the effectiveness of green activism leads to being an activist, but to a smaller extent. Indeed, when people perceive themselves as capable of convincing friends and families, they tend to behave in favor of the environment in all kinds of daily activities, esp. to join activist programs.

In contrast, we reject the negative impact of EX-ELOC, suggested by e.g. Fielding and Head (2012) and Schwepker and Cornwell (1991). Differently than expected, even in countries with strong central guidance, people who highly assess the power of government and corporations are also more likely to behave environment-friendly. Kalamas et al. (2014)'s assumption that people fulfill their own parts and delegate the rest to PO is proved to apply on Chinese as well. Since people with Confucian values perceive the dependence on others to be significant, they might see government and companies as organizing bodies for common environmental actions. Nevertheless, Chinese people share the feeling of responsibility with the government to a similar extent than with corporations. In addition, the belief in Confucian values still plays an important role in explaining higher governmental and corporate responsibility in modern China.

Regarding the positive interrelationships between the IN- and EX-ELOC factors, we can confirm the finding by Kalamas et al. (2014) that people cannot simply be classified as

“externally” or “internally” oriented. Furthermore, the EX-ELOC factors are composed of different facets which have to be distinguished. The Chinese customers’ belief in higher powers is not significantly correlated with the belief in the power of government or corporations. However, in contrast to Kalamas et al. (2014) who found that the belief in natural earth-cycles is uncorrelated with governmental/corporate responsibility, we found a positive correlation in the Chinese sample. Hence, even if Chinese people believe that some environmental changes are due to normal natural cycles, this will not release government or corporations from their responsibility.

Furthermore, more effortful environmental behaviors including green purchase and recycling can be motivated by the perception of governmental responsibility. In contrast, simpler forms of environmental behaviors such as using public transport and saving energy additionally have the potential to be increased by the perception of corporate responsibility. It can be assumed that people who see the government as the key actor for environmental conservation are more willing to accept environmental efforts such as additional costs and time compared to believers of corporate responsibility. Additionally, environmental activism might require a higher level of sovereignty that could be generated from religious beliefs.

Our GDPPC-based analysis delivers a diversified assessment of Chinese provinces from different state of development. Considering ELOC indicators, significant differences are mostly found in external dimensions. This could imply that people’s beliefs in their own abilities are generally unique, regardless of the state of development and therefore the availability of infrastructure for practicing environmental behaviors. Furthermore, people’s perceptions of other institutions could be traced back to their personal assessment of these institutions’ performance. In averagely developed areas, people might honor the environmental commitment of government and companies more than in poor or well-developed areas. The high frequency of green activism in poorer areas might be caused by the motive of sustaining agricultural quality in cooperation with NGOs.

This study shed lights on the applicability of ELOC in China compared to Canada as a representative Western country. The lower perceived impacts of PO in spite of strong centralism in China could be caused by the recognition of governmental inefficiency (Muldavin, 2000). However, Chinese seem to see governmental regulations as effective as corporately initiated activities based on market mechanisms. Moreover, scientific knowledge among Chinese people appears to lie behind that of Canadians, since environmental problems are more likely to be

interpreted as natural earth-cycles. In addition, the weaker beliefs in the impact of recycling and green consumption in China could be explained by underdeveloped conservation systems and restricted green offerings (Thøgersen & Zhou, 2012; Wang et al., 2014).

6.6.1 Implications

Considering changes after model integration, the significance and larger effect sizes of all internal factors and the non-significance of several external factors emphasize the importance of IN-ELOC. The dominance of intrinsic motivation derived from our specified, integrated model support evidence from Guagnano (1995). Indeed, the effects of IN-/EX-ELOC are different from an integrated perspective than in separate models. Therefore, conclusions on EX-ELOC from Kalamas et al. (2014) only apply if people separately assess others' environmental impacts. However, a distinct consideration of internal and external factors digresses from the fact that consumers commonly realize all responsible stakeholders. Instead, a simultaneous consideration of internal and external factors is necessary to systematically compare the importance of single factors for different behaviors across the internal and external dimension. Thus, studies should reflect effects of ELOC in an integrated perspective. Furthermore, the perception of external responsibility is shown to depend on one's belief in the underlying patterns of social relationships guided by Confucian values: the acceptance of superiority in the vertical direction and the attitude towards individualism/collectivism in the horizontal direction. While Confucian values are relatively specific for the Chinese context, future studies could research whether general societal beliefs are affecting ELOC in other countries as well.

With regard to differences between Eastern and Western countries, our results fall in line with other studies concluding that differences are not as large as expected. Thøgersen and Zhou (2012) noted that early adopters of organic food in China are driven by the same basic values than, for instance, European consumers. Hence, this could imply that many research findings from Western countries also hold true in the Eastern world, while the causative antecedents could be different such as Confucian values in China. Thus, future research should enquire more critically when and how Chinese consumers really differ from other international contexts.

We recommend marketing managers and governmental authorities to target specific kinds of environmental behaviors in promotional programs. Although government and corporations are seen as slightly more effective than consumers, the belief in the individual's impact rather transforms into behaviors. Therefore, consumers' impacts should be primarily emphasized but can be supported by strengthening their beliefs in powerful institutions. In particular, shared

responsibility is recognized regardless of political orientation. This study denies the assumption that expectations towards others in the society are contra-productive for individual engagement (e.g. Darley & Latané, 1968). Thus, we encourage practitioners to consider the communication of mutual engagement among state, enterprises, and consumers as a positive multiplier rather than an accelerator of responsibility delegation.

Taking Canada as an example of a developed country (Kalamas et al., 2014), a further shift of perceived responsibility from government to corporations could be anticipated for China in the future. Therefore, Chinese companies should be prepared for growing pressure from the public. Government and companies should increasingly involve more consumers in common environmental activities, especially in provinces of average living standards. The underscored group orientation could be utilized through mutual encouragement at community events.

6.6.2 Limitations

Several limitations of this study should be addressed in future research. Our results only represent the Chinese context according to its political and cultural features, although previous studies should be also reviewed in an integrated ELOC model. As political structure is the strongest contextual factor for environmental behaviors (Hadler & Haller, 2011), further data collection would be valuable in different political systems, especially with regards to identify different antecedents of ELOC factors. Moreover, our sample consists of participants across 28 provinces basically representing urban Chinese. Rural residents would need to be acquired through face-to-face interviews.

Moreover, our results are delivered based on reported behaviors which might have suffered from social desirability bias (Milfont et al., 2006). Additionally, since most lottery winners donate a part of their prize to charities (Kaplan, 1987), the allocation of money potentially to win in a lottery might not reflect people's donation behaviors in a daily setting. Therefore, the non-significant intention-behavior gap between intended and actual donation should be viewed carefully.

Further research should also explore potential differences in the effects of ELOC between provinces at different GDPPC-levels. Based on the mean differences identified, a multi-group analysis might be more suitable than a pooled data analysis and could be tested next. Moreover, measurements from the middle level are often higher than from the rest. These results could be

caused by different response styles among people from different regions (Johnson et al., 2005). Researchers could add few questions to the survey that attempt to capture the response habits.

This study only provides a theoretical foundation by testing the applicability of an integrated model. In the next step, the model's significance should be tested using a multiple-survey method and real behavioral data. To increase the practical relevance, studies should examine the manipulability of locus of control to improve people's environmental behaviors such as actual purchases. For example, a future study could analyze how internal ELOC can be strengthened through different environmental messages in an experimental setting.

6.7 Conclusion

This study integrated the internal and external dimension of the model *locus of control* to explain various pro-environmental behaviors including purchase, activism, recycling, energy usage, and transport. The following results could be concluded:

- Internal and external locus of control are positively correlated and both have a positive impact on pro-environmental behaviors. The effects of internal dimensions are stronger than those of external dimensions.
- Green purchase and recycling can be enhanced by internal dimensions and the perception of governmental responsibility, while energy saving and green transport can be additionally motivated by the perception of corporate responsibility.
- Confucian values including the belief in group orientation and hierarchy are significant predictors of people's perception of governmental and corporate environmental responsibility.
- The perception of internal dimensions remains similar in different Chinese provinces, while the perception of powerful others differ by GDP per capita.

This study fills the research gap of testing the ELOC model in the Chinese context, delivers differentiated results for provinces at different economic stage, and points out potential differences to a Western country. Confucian values have been successfully identified as antecedents of external ELOC-PO. Our integrated ELOC model contributed to the research stream by identifying the explanatory power of single sub-dimensions across internal and external ELOC for specific kinds of behaviors in a more holistic reflection of responsible actors from the individual perspective.

References

- Ackerman, D., Hu, J., & Wei, L. (2009). Confucius, cars, and big government: Impact of government involvement in business on consumer perceptions under confucianism. *Journal of Business Ethics*, 88(3), 473–482. <https://doi.org/10.1007/s10551-009-0304-9>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Allen, J. B., & Ferrand, J. L. (1999). Environmental Locus of Control, Sympathy, and Proenvironmental Behavior: A Test of Geller's Actively Caring Hypothesis. *Environment and Behavior*, 31(3), 338–353. <https://doi.org/10.1177/00139169921972137>
- Akan, Y., Kuzey, C., Acar, M. F., & Açıkgöz, A. (2016). The relationships between corporate social responsibility, environmental supplier development, and firm performance. *Journal of Cleaner Production*, 112, 1872–1881. <https://doi.org/10.1016/j.jclepro.2014.08.090>
- Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14–25. <https://doi.org/10.1016/j.jenvp.2006.12.002>
- Baxter, J., & Gram-Hanssen, I. (2016). Environmental message framing: Enhancing consumer recycling of mobile phones. *Resources, Conservation and Recycling*, 109, 96–101. <https://doi.org/10.1016/j.resconrec.2016.02.012>
- Biel, A., Dahlstrand, U., & Grankvist, G. (2005). Habitual and value-guided purchase behavior. *Ambio*, 34(4–5), 360–365. <https://doi.org/10.1579/0044-7447-34.4.360>
- Bodur, M., & Sarigöllü, E. (2005). Environmental sensitivity in a developing country: Consumer classification and implications. *Environment and Behavior*, 37(4), 487–510. <https://doi.org/10.1177/0013916504269666>
- Borick, C., Rabe, B. G., Ira, J., Harris, N., Fitzpatrick, N. B., & Mills, S. B. (2018). As Americans Experienced the Warmest May on Record Their Acceptance of Global Warming Reaches a New High. *Issues in Energy and Environmental Policy*, (37). Retrieved from <http://closup.umich.edu/issues-in-energy-and-environmental-policy/37/as-americans-experienced-the-warmest-may-on-record-their-acceptance-of-global-warming-reaches-a-new-high/>
- Bradburn, N. M., Sudman, S., Blair, E., William, L., Miles, C., Singer, E., & Stocking, C.

- (1980). Improving Interview Method and Questionnaire Design: Response Effects to Threatening Questions in Survey Research. Oxford Journals.
- Bradley, G. L., & Sparks, B. a. (2002). Service Locus of Control: Its Conceptualization and Measurement. *Journal of Service Research*, 4(4), 312–324.
<https://doi.org/10.1177/1094670502004004008>
- Busseri, M. A., Lefcourt, H. M., & Kerton, R. R. (1998). Locus of Control for Consumer Outcomes: Predicting Consumer Behavior. *Journal of Applied Social Psychology*, 28(12), 1067–1087. <https://doi.org/10.1111/j.1559-1816.1998.tb01668.x>
- Chan, C. K., & Yao, X. (2008). Air pollution in mega cities in China. *Atmospheric Environment*, 42(1), 1–42. <https://doi.org/10.1016/j.atmosenv.2007.09.003>
- Chan, R. Y. (2000). An emerging green market in China: Myth or reality? *Business Horizons*, 43(March), 55–60. [https://doi.org/10.1016/S0007-6813\(00\)88561-4](https://doi.org/10.1016/S0007-6813(00)88561-4)
- Che, X., Shang, J., Wang, J., Xiuzhen, C., Jincheng, S., Jinhu, W., Wang, J. (2002). Strategic Environmental Assessment and its development in China. *Environmental Impact Assessment Review*, 22(2), 101–109. [https://doi.org/10.1016/S0195-9255\(01\)00096-8](https://doi.org/10.1016/S0195-9255(01)00096-8)
- Cho, Y. N., Thyroff, A., Rapert, M. I., Park, S. Y., & Lee, H. J. (2013). To be or not to be green: Exploring individualism and collectivism as antecedents of environmental behavior. *Journal of Business Research*, 66(8), 1052–1059.
<https://doi.org/10.1016/j.jbusres.2012.08.020>
- Cleveland, M., Kalamas, M., & Laroche, M. (2005). Shades of green: linking environmental locus of control and pro-environmental behaviors. *Journal of Consumer Marketing*, 22(4), 198–212. <https://doi.org/10.1108/07363760510605317>
- Cleveland, M., Kalamas, M., & Laroche, M. (2012). “It’s not Easy Being Green”: Exploring Green Creeds, Green Deeds, and Internal Environmental Locus of Control. *Psychology & Marketing*, 30(6), 461–469. <https://doi.org/10.1002/mar>
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences. *Statistical Power Analysis for the Behavioral Sciences*. <https://doi.org/10.1234/12345678>
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334. <https://doi.org/10.1007/BF02310555>
- Darley, J., & Latané, B. (1968). Bystander intervention in emergencies: Diffusion of responsibility. *Journal of Personality and Social Psychology*, 8(4), 377–383.
<https://doi.org/10.1037/h0025589>
- Dasgupta, S., Laplante, B., Mamingi, N., & Wang, H. (2001). Inspections, pollution prices,

- and environmental performance: evidence from China. *Ecological Economics*, 36(3), 487–498.
- Dendler, L., & Dewick, P. (2016). Institutionalising the organic labelling scheme in China: a legitimacy perspective. *Journal of Cleaner Production*, 134(Part A), 239–250.
<https://doi.org/10.1016/j.jclepro.2016.02.141>
- Dono, J., Webb, J., & Richardson, B. (2010). The relationship between environmental activism, pro-environmental behaviour and social identity. *Journal of Environmental Psychology*, 30(2), 178–186. <https://doi.org/10.1016/j.jenvp.2009.11.006>
- Douglas, S. P., & Craig, C. S. (2007). Collaborative and Iterative Translation: An Alternative Approach to Back Translation. *Journal of International Marketing*, 15(1), 30–43.
<https://doi.org/10.1509/jimk.15.1.030>
- Fielding, K. S., & Head, B. W. (2012). Determinants of young Australians' environmental actions: the role of responsibility attributions, locus of control, knowledge and attitudes. *Environmental Education Research*, 18(2), 171–186.
<https://doi.org/10.1080/13504622.2011.592936>
- Fielding, K. S., McDonald, R., & Louis, W. R. (2008). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology*, 28(4), 318–326. <https://doi.org/10.1016/j.jenvp.2008.03.003>
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics.
- Forsyth, D. R., Zyzanski, L. E., & Giammanco, C. A. (2002). Responsibility Diffusion in Cooperative Collectives. *Personality and Social Psychology Bulletin*, 28(1), 54–65.
- Fryxell, G. E., Chung, S. S., & Lo, C. W. H. (2004). Does the selection of ISO 14001 registrars matter? Registrar reputation and environmental policy statements in China. *Journal of Environmental Management*, 71(1), 45–57.
<https://doi.org/10.1016/j.jenvman.2004.01.005>
- Geisser, S. (1975). The predictive sample reuse method with applications. *Journal of the American Statistical Association*, 70(350), 320–328.
<https://doi.org/10.1080/01621459.1975.10479865>
- Gilbert, D. T., Giesler, R. B., & Morris, K. A. (1995). When Comparisons Arise. *Journal of Personality and Social Psychology*, 69(2), 227–236. <https://doi.org/10.1037/0022-3514.69.2.227>
- Grinstein, A., & Riefler, P. (2015). Citizens of the (green) world? Cosmopolitan orientation

- and sustainability. *Journal of International Business Studies*, 46(6), 694–714.
<https://doi.org/10.1057/jibs.2015.1>
- Groening, C., Sarkis, J., & Zhu, Q. (2018). Green marketing consumer-level theory review: A compendium of applied theories and further research directions. *Journal of Cleaner Production*, 172, 1848–1866. <https://doi.org/10.1016/j.jclepro.2017.12.002>
- Grunert, K. G. (2005). Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics*, 32(3), 369–391.
<https://doi.org/10.1093/eurrag/jbi011>
- Guagnano, G. A. (1995). Locus of control, altruism and agentic disposition. *Population and Environment: A Journal of Interdisciplinary Studies*, 17(1), 63–77.
<https://doi.org/10.1007/BF02208278>
- Hadler, M., & Haller, M. (2011). Global activism and nationally driven recycling: The influence of world society and national contexts on public and private environmental behavior. *International Sociology*, 26(3), 315–345.
<https://doi.org/10.1177/0268580910392258>
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *The Journal of Marketing Theory and Practice*, 19(2), 139–152.
<https://doi.org/10.2753/MTP1069-6679190202>
- Hallal, J. C. (1982). The relationship of health beliefs, health locus of control, and self concept to the practice of breast self-examination in adult women. *Nursing Research*, 31(3), 137–42. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/6918918>
- Hanss, D., Böhm, G., Doran, R., & Homburg, A. (2016). Sustainable Consumption of Groceries: the Importance of Believing that One Can Contribute to Sustainable Development. *Sustainable Development*, 24(6), 357–370.
<https://doi.org/10.1002/sd.1615>
- Harris, P. G. (2006). Environmental Perspectives and Behavior in China. *Environment and Behavior*, 38(1), 5–21. <https://doi.org/10.1177/0013916505280087>
- Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Calantone, R. J. (2014). Common Beliefs and Reality About PLS: Comments on Rönkkö and Evermann (2013). *Organizational Research Methods*, 17(2), 182–209.
<https://doi.org/10.1177/1094428114526928>
- Hew, J.-J., Lee, V.-H., Ooi, K.-B., & Wei, J. (2015). What catalyses mobile apps usage intention: an empirical analysis. *Industrial Management & Data Systems*, 115(7), 1269–

1291. <https://doi.org/10.1108/IMDS-04-2016-0141>
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education*, 18, 1–8. <https://doi.org/10.1080/00958964.1987.9943482>
- Hoffman, D. L., Novak, T. P., & Schlosser, A. E. (2003). Locus of control, web use, and consumer attitudes toward internet regulation. *Journal of Public Policy & Marketing*, 22(1), 41–57. <https://doi.org/10.1509/jppm.22.1.41.21352>
- Huebner, R. B., & Lipsey, M. W. (1981). The Relationship of Three Measures of Locus of Control to Environment Activism. *Basic and Applied Social Psychology*, 2(1), 45–58. <https://doi.org/10.1207/s15324834basp0201>
- Iyer, E. S., & Kashyap, R. K. (2007). Consumer recycling: role of incentives, information, and social class. *Journal of Consumer Behaviour*, 6(1), 32–47. <https://doi.org/10.1002/cb.206>
- Jenkins, W., & Chapple, C. K. (2011). Religion and Environment. *Annual Review of Environment and Resources*, 36(1), 441–463. <https://doi.org/10.1146/annurev-environ-042610-103728>
- Jin, Y., Andersson, H., & Zhang, S. (2016). Air pollution control policies in China: A retrospective and prospects. *International Journal of Environmental Research and Public Health*, 13(12). <https://doi.org/10.3390/ijerph13121219>
- Johnson, T., Kulesa, P., Cho, Y. I., & Shavitt, S. (2005). The relation between culture and response styles: Evidence from 19 countries. *Journal of Cross-Cultural Psychology*, 36(2), 264–277. <https://doi.org/10.1177/0022022104272905>
- Judge, T. A., & Bono, J. E. (2001). Relationship of core self-evaluations traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: A meta-analysis. *Journal of Applied Psychology*, 86(1), 80–92. <https://doi.org/10.1037/0021-9010.86.1.80>
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology*, 83(3), 693–710. <https://doi.org/10.1037/0022-3514.83.3.693>
- Kalamas, M., Cleveland, M., & Laroche, M. (2014). Pro-environmental behaviors for thee but not for me: Green giants, green Gods, and external environmental locus of control. *Journal of Business Research*, 67(2), 12–22.

- <https://doi.org/10.1016/j.jbusres.2013.03.007>
- Kaplan, H. R. (1987). Lottery winners: The myth and reality. *Journal of Gambling Behavior*, 3(3), 168-178. <https://doi.org/10.1007/BF01367438>
- Kim, B. K., Li, L. C., & Ng, G. F. (2005). The Asian American values scale--multidimensional: development, reliability, and validity. *Cultural Diversity and Ethnic Minority Psychology*, 11(3), 187.
- Klößner, C. A. (2013). A comprehensive model of the psychology of environmental behaviour-A meta-analysis. *Global Environmental Change*, 23(5), 1028–1038. <https://doi.org/10.1016/j.gloenvcha.2013.05.014>
- Knight, J., & Song, L. (1999). *The rural-urban divide: Economic disparities and interactions in China*. OUP Catalogue.
- Koo, D. (2009). Computers in Human Behavior The moderating role of locus of control on the links between experiential motives and intention to play online games. *Computers in Human Behavior*, 25(2), 466–474. <https://doi.org/10.1016/j.chb.2008.10.010>
- Larson, L. R., Stedman, R. C., Cooper, C. B., & Decker, D. J. (2015). Understanding the multi-dimensional structure of pro-environmental behavior. *Journal of Environmental Psychology*, 43, 112–124. <https://doi.org/10.1016/j.jenvp.2015.06.004>
- Lee, N., & Cadogan, J. W. (2013). Problems with formative and higher-order reflective variables. *Journal of Business Research*, 66(2), 242-247.
- Lee, Z., & Sargeant, A. (2011). Dealing with social desirability bias: An application to charitable giving. *European Journal of Marketing*, 45(5), 703-719.
- Leiserowitz, A. A. (2005). American risk perceptions: Is climate change dangerous? *Risk Analysis*, 25(6), 1433–1442. <https://doi.org/10.1111/j.1540-6261.2005.00690.x>
- Liu, X., Liu, B., Shishime, T., Yu, Q., Bi, J., & Fujitsuka, T. (2010). An empirical study on the driving mechanism of proactive corporate environmental management in China. *Journal of Environmental Management*, 91(8), 1707–1717. <https://doi.org/10.1016/j.jenvman.2010.03.011>
- Lo, C. W.-H., & Fryxell, G. E. (2005). Governmental and Societal Support for Environmental Enforcement in China: An Empirical Study in Guangzhou. *Journal of Development Studies*, 41(4), 558–588. <https://doi.org/10.1080/00220380500092655>
- McCarty, J. a., & Shrum, L. J. (2001). The Influence of Individualism, Collectivism, and Locus of Control on Environmental Beliefs and Behavior. *Journal of Public Policy & Marketing*, 20(1), 93–104. <https://doi.org/10.1509/jppm.20.1.93.17291>

- McDonald, S., Oates, C. J., Young, C. W., & Hwang, K. (2006). Toward sustainable consumption: Researching voluntary simplifiers. *Psychology and Marketing*, 23(6), 515–534. <https://doi.org/10.1002/mar.20132>
- Milfont, T. T., Duckitt, J., & Cameron, L. D. (2006). A cross-cultural study of environmental motive concerns and their implications for proenvironmental behavior. *Environment and Behavior*, 38(6), 745–767. <https://doi.org/10.1177/0013916505285933>
- Miliute-Plepiene, J., Hage, O., Plepys, A., & Reipas, A. (2016). What motivates households recycling behaviour in recycling schemes of different maturity? Lessons from Lithuania and Sweden. *Resources, Conservation and Recycling*, 113, 40-52.
- Ministry of Agriculture. (2015). The National Rural Sustainable Development Plan 2015-2030 (Whole Text) (《全国农业可持续发展规划(2015-2030年)》发布(全文)). http://www.moa.gov.cn/sjzz/jgs/cfc/syxwtp/201505/t20150529_4622289.htm (accessed 27.10.2018).
- Monkhouse, L. Le, Barnes, B. R., & Hanh Pham, T. S. (2013). Measuring Confucian values among East Asian consumers: A four country study. *Asia Pacific Business Review*, 19(3), 320–336. <https://doi.org/10.1080/13602381.2012.732388>
- Morren, M., & Grinstein, A. (2016). Explaining environmental behavior across borders: A meta-analysis. *Journal of Environmental Psychology*, 47, 91–106. <https://doi.org/10.1016/j.jenvp.2016.05.003>
- Morrison, D. F., & Harman, H. H. (1961). Modern Factor Analysis. *Journal of the American Statistical Association*, 56(294), 444-446. <https://doi.org/10.2307/2282293>
- Muldavin, J. (2000). The Paradoxes of Environmental Policy and Resource Management in Reform-Era China. *Economic Geography*, 76(3), 244–271. <https://doi.org/10.1111/j.1944-8287.2000.tb00143.x>
- National Bureau of Statistics of China (2016). National Data-Education. <http://data.stats.gov.cn/ks.htm?cn=C01> (accessed 19.08.2018).
- National Bureau of Statistics of China. (2017). China Statistical Yearbook 2017. <http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm> (accessed 26.08.2018).
- Ng, M., & Law, M. (2015). Encouraging Green Purchase Behaviours of Hong Kong Consumers. *Asian Journal of Business Research*, 5(2), 1–18. <https://doi.org/10.14707/ajbr.150013>
- Noronha, C., Tou, S., Cynthia, M. I., & Guan, J. J. (2013). Corporate social responsibility reporting in China: An overview and comparison with major trends. *Corporate Social*

- Responsibility and Environmental Management, 20(1), 29-42.
<https://doi.org/10.1002/csr.1276>
- Overmyer, D. L. (2003). Religion in China Today: Introduction. *The China Quarterly*, (174), 307–316. <https://doi.org/doi:10.1017/S0009443903000196>
- Parkes, K. R. (1984). Locus of control, cognitive appraisal, and coping in stressful episodes. *Journal of Personality and Social Psychology*, 46(3), 655–668.
<https://doi.org/10.1037/0022-3514.46.3.655>
- Pavalache-Ilie, M., & Unianu, E. M. (2012). Locus of control and the pro-environmental attitudes. *Procedia-Social and Behavioral Sciences*, 33, 198-202.
- PEW-TEMPLETON. (2018). China Religious Demography: Affiliation.
http://www.globalreligiousfutures.org/countries/china#/?affiliations_religion_id=0&affiliations_year=2010®ion_name=All%20Countries&restrictions_year=2016 (accessed 12.08.2018).
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology*, 88(5), 879–903.
<https://doi.org/10.1037/0021-9010.88.5.879>
- Ramayah, T., Lee, J. W. C., & Mohamad, O. (2010). Green product purchase intention: Some insights from a developing country. *Resources, Conservation and Recycling*, 54(12), 1419–1427. <https://doi.org/10.1016/j.resconrec.2010.06.007>
- Rauwald, K. S., & Moore, C. F. (2002). Environmental attitudes as predictors of policy support across three countries. *Environment and Behavior*, 34(6), 709–739.
<https://doi.org/10.1177/001391602237243>
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1–28.
<https://doi.org/10.1037/h0092976>
- Rural Development Institute Chinese Academy of Social Sciences (RDICASS). (2017). 2016-2017: Rural Economy of China Analysis and Forecast (农村绿皮书：中国农村经济形势分析与预测(2016-2017)). <http://rdi.cssn.cn> (accessed 27.08.2018).
- Schroeder, P. (2014). Assessing effectiveness of governance approaches for sustainable consumption and production in China. *Journal of Cleaner Production*, 63, 64–73.
<https://doi.org/10.1016/j.jclepro.2013.05.039>
- Schwepker, Charles H., J., & Cornwell, T. B. (1991). An examination of ecologically

- concerned consumers and their intention to purchase ecologically packaged products. *Journal of Public Policy & Marketing*, 10(2), 77–101.
<https://doi.org/10.1161/ATVBAHA.108.183210>
- Shao, M., Tang, X., Zhang, Y., & Li, W. (2006). City clusters in China: Air and surface water pollution. *Frontiers in Ecology and the Environment*, 4(7), 353–361.
[https://doi.org/10.1890/1540-9295\(2006\)004\[0353:CCICAA\]2.0.CO;2](https://doi.org/10.1890/1540-9295(2006)004[0353:CCICAA]2.0.CO;2)
- Shu, C., Zhou, K. Z., Xiao, Y., & Gao, S. (2016). How Green Management Influences Product Innovation in China: The Role of Institutional Benefits. *Journal of Business Ethics*, 133(3), 471–485. <https://doi.org/10.1007/s10551-014-2401-7>
- State Council of China (SCC). (2016). Full Text: Report on the Work of the Government (2016). http://english.gov.cn/premier/news/2016/03/17/content_281475309417987.htm (accessed 27.08.2018).
- Stern, P. C., Dietz, T., Abel, T. D., Guagnano, G. A., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism. *Research in Human Ecology*, 6(2), 81–97.
<https://doi.org/10.2307/2083693>
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. *Computational Statistics and Data Analysis*, 48(1), 159–205.
<https://doi.org/10.1016/j.csda.2004.03.005>
- Thøgersen, J., & Zhou, Y. (2012). Chinese consumers' adoption of a 'green' innovation – The case of organic food. *Journal of Marketing Management*, 28(3–4), 313–333.
<https://doi.org/10.1080/0267257X.2012.658834>
- Thomas, C., & Sharp, V. (2013). Understanding the normalisation of recycling behaviour and its implications for other pro-environmental behaviours: a review of social norms and recycling, 79, 11–20. <https://doi.org/10.1016/j.resconrec.2013.04.010>
<https://doi.org/10.1016/j.resconrec.2013.04.010>
- Trivedi, R. H., Patel, J. D., & Savalia, J. R. (2015). Pro-environmental behaviour, locus of control and willingness to pay for environmental friendly products. *Marketing Intelligence & Planning*, 33(1), 67–89. <https://doi.org/10.1108/02634501011078138>
- Wallston, K. A., Wallston, B. S., & DeVellis, R. (1978). Development of the Multidimensional Health Locus of Control (MHLC) Scales. *Health Education & Behavior*, 6(1), 160–170. <https://doi.org/10.1177/109019817800600107>

- Wan, C., Shen, G. Q., & Yu, A. (2014). The role of perceived effectiveness of policy measures in predicting recycling behaviour in Hong Kong. *Resources, Conservation and Recycling*, 83, 141–151. <https://doi.org/10.1016/j.resconrec.2013.12.009>
- Wang, P., Liu, Q., & Qi, Y. (2014). Factors influencing sustainable consumption behaviors: A survey of the rural residents in China. *Journal of Cleaner Production*, 63, 152–165. <https://doi.org/10.1016/j.jclepro.2013.05.007>
- Wang, Y., Huscroft, J. R., Hazen, B. T., & Zhang, M. (2016). Green information, green certification and consumer perceptions of remanufactured automobile parts. *Resources, Conservation & Recycling*, 128, 187–196. <https://doi.org/10.1016/j.resconrec.2016.07.015>
- Wang, Y., Morgan, R. K., & Cashmore, M. (2003). Environmental impact assessment of projects in the People's Republic of China: New law, old problems. *Environmental Impact Assessment Review*, 23(5), 543–579. [https://doi.org/10.1016/S0195-9255\(03\)00071-4](https://doi.org/10.1016/S0195-9255(03)00071-4)
- Wang, Z., Zhang, B., Yin, J., & Zhang, X. (2011). Willingness and behavior towards e-waste recycling for residents in Beijing city, China. *Journal of Cleaner Production*, 19(9–10), 977–984. <https://doi.org/10.1016/j.jclepro.2010.09.016>
- Wei, B., & Yang, L. (2010). A review of heavy metal contaminations in urban soils, urban road dusts and agricultural soils from China. *Microchemical Journal*, 94(2), 99–107. <https://doi.org/10.1016/j.microc.2009.09.014>
- Schultz, P., & Zelezny, L. (1999). Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of Environmental Psychology*, 19(3), 255–265. <https://doi.org/10.1006/jevp.1999.0129>
- Zhan, X., & Tang, S.-Y. (2013). Political opportunities, resource constraints and policy advocacy of environmental NGOs in China. *Public Administration*, 91(2), 381–399.
- Zhang, B., Bi, J., Yuan, Z., Ge, J., Liu, B., & Bu, M. (2008). Why do firms engage in environmental management? An empirical study in China. *Journal of Cleaner Production*, 16(10), 1036–1045. <https://doi.org/10.1016/j.jclepro.2007.06.016>
- Zhang, X.-P., & Cheng, X.-M. (2009). Energy consumption, carbon emissions, and economic growth in China. *Ecological Economics*, 68(10), 2706–2712. <https://doi.org/10.1016/j.ecolecon.2009.05.011> 855
- Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: Pressures, practices and performance. *International Journal of Operations and Production*

Management, 25(5), 449–468. <https://doi.org/10.1108/01443570510593148>

Zhu, Q., & Sarkis, J. (2016). Green marketing and consumerism as social change in China: Analyzing the literature. *International Journal of Production Economics*, 181, 289–302. <https://doi.org/10.1016/j.ijpe.2016.06.006>

Zuo, J. (1991). Political Religion: The Case of the Cultural Revolution in China. *Sociological Analysis*, 52(1), 99–110. <https://doi.org/10.2307/3710718>

Appendices

A1: Exemplary items

IN-ELOC sub-dimensions (all items cited from Cleveland et al., 2012)

- Green Consumer

By buying greener products, I can make a difference in helping the environment.

- Activist

By making donations to pro-environmental groups (such as Greenpeace), I can help make a positive difference on the state of environment.

- Advocate

I am able to convince a friend to change his/her conservation habits.

- Recycler

By recycling, I am helping to reduce pollution.

EX-ELOC sub-dimensions (all items cited from Kalamas et al., 2014)

- Governmental responsibility

The government has the power to deal with local environmental challenges (such as air quality in cities).

- Corporate responsibility

Companies need to take the lead in promoting environmental responsibility.

- Higher powers

The state of environment is ultimately under the control of higher powers.

- Natural earth-cycles

Some of the global climate changes we are witnessing are due, in part, to earth's normal cycles.

Confucian values

- Group orientation (B. S. K. Kim, 2005)

I recognize and respect social expectations, norms, and practices.

- Belief in hierarchy (Monkhouse et al., 2013)

We have a vertical order in the society that we should respect.

A2: Correlation table

		GreenCons	Activist	Advocate	Recycler	GovResp	CorpResp	HiPo	EarthCyc
IN- ELOC	GreenCons	1							
	Activist	0.729*	1						
	Advocate	0.594*	0.681*	1					
	Recycler	0.691*	0.655*	0.598*	1				
EX- ELOC	GovResp	0.659*	0.615*	0.493*	0.691*	1			
	CorpResp	0.689*	0.604*	0.509*	0.687*	0.790*	1		
	HiPo	0.040	0.140*	0.232*	0.040	0.046	0.036	1	
	EarthCyc	0.272*	0.306*	0.357*	0.307*	0.344*	0.302*	0.482*	1

* Correlation is significant at the level of 5%.

A3: GDPPC-levels of Chinese provinces

Level	Province	GDPPC
High	Beijing	118,128
	Shanghai	116,441
	Tianjin	114,503
	Jiangsu	96,747
	Zhejiang	84,528
	Fujian	74,369
	Guangdong	73,511
	Inner Mongolia	71,937
	Shandong	68,387
Middle	Chongqing	58,204
	Hubei	55,506
	Jilin	54,068
	Liaoning	50,815
	Ningxia	46,942
	Hunan	46,249
	Hainan	44,201
	Qinghai	43,381
	Hebei	42,932
Low	Henan	42,459
	Heilongjiang	40,500
	Jiangxi	40,285
	Sichuan	39,863
	Anhui	39,393
	Guangxi	37,862
	Shanxi	35,444
	Guizhou	33,127
	Yunnan	30,996
	Gansu	27,588

GDPPC retrieved from NBSC (2017).

A4: Mean comparison between provinces of different GDPPC-levels

GDPPC	Recycler	GovResp	CorpResp	Analysis of variance			
				HiPo	PEB Activism	PEB Energy	GOrien
Low	4.78	4.88	4.69	3.68	4.01	4.72	4.54
Middle	5.21	5.43	5.27	2.88	3.44	5.14	5.03
High	4.84	4.84	4.75	3.32	3.54	4.75	4.65
F(2,752)	4.409	0.012	8.437	8.578	9.701	5.514	4.851
p		0.000	0.000	0.000	0.004	0.008	0.005

A5: Scheffé's post-hoc-tests: significant provincial differences

Construct	GDPPC		MD ¹
Recycler	low	middle	-0.434*
	middle	high	-0.370*
GovResp	low	middle	-0.549**
	middle	high	0.591**
CorpResp	low	middle	-0.580**
	middle	high	0.519**
HiPo	low	middle	0.797**
	low	high	-0.444*
PEB	low	middle	0.567**
	low	high	0.476*
Activism	low	middle	-0.423*
	middle	high	0.395*
Energy	low	middle	-0.489*
	middle	high	0.381*

¹MD=mean difference.

** mean difference significant at the level of 1%, * significant at the level of 5%.

A6: Cross-cultural comparison

Construct	China ¹	Canada ²	One-sample t-test	
			t(753)	MD ³
IN-ELOC	4.728	5.46	-13.502	-0.741**
<i>GreenCons</i>	4.698	5.72	-15.548	-1.022**
<i>Activist</i>	4.710	5.17	-7.296	-0.460**
<i>Advocate</i>	4.511	4.91	-6.446	-0.399**
<i>Recycler</i>	4.953	6.04	-16.916	-1.087**
EX-ELOC-PO	4.986	5.7	-11.737	-0.724**
<i>GovResp</i>	5.058	5.6	-8.023	-0.542**
<i>CorpResp</i>	4.914	5.8	-13.972	-0.886**
EX-ELOC-CF	3.619	2.9	12.326	0.719**
<i>HiPo</i>	3.258	3.8	-7.619	-0.542**
<i>EarthCyc</i>	3.980	2.1	-29.256	1.880**

¹n=754; current study.

²n=263; Cleveland et al. (2012); Kalamas et al. (2014).

³MD=mean difference

** mean difference significant at the level of 1%.

7. Article II

“Let Me Decide How Green You Are!” – The Effects of Green Consumer Empowerment on Corporate Evaluations and Purchase Intention in Advertising

Under Review in: Review of Managerial Science

Note: In accordance with the journal's author rights, the version published here is the first submitted manuscript. If the paper is accepted and published, it will be available on the Journal Homepage: <https://www.springer.com/journal/11846>.

Abstract

Green advertisement appeals that communicate a product's ecological benefit are likely to strengthen customers' perceptions of its company's green orientation but not its customer focus. This perceived neglect of customer needs could lead to a more negative overall evaluation of the company. In this article, we therefore investigate a new form of green advertising: empowerment ads that identify customer demand as the major driver of companies' decisions such as the adoption of eco-friendly manufacturing. We compare these ads with green appeals, which emphasize consumers' personal contribution to environmental protection, and we find significantly improved perception of the company's customer orientation and increased purchase intention when they see a green empowerment ad ($n_{\text{Study1}} = 291$). Corporate environmental responsibility is also improved, although at a comparable level to green appeals. We further examine ad effectiveness depending on companies' resources ($n_{\text{Study2}} = 457$), and find that a green empowerment ad that highlights both customer orientation and eco-friendliness is more effective for large, high-resource companies than for small companies. We find no evidence that small companies can boost their perceived environmental responsibility with green empowerment ads but that green appeals are effective for both large and small companies. We conclude that, overall, green empowerment is still the best advertising strategy.

Keywords: Green advertisement, consumer empowerment, customer orientation, green purchase.

7.1 Introduction

Severe ecological damage such as climate change demands major shifts in consumer behaviors. Increasingly, companies are responding to this altered consumer demand with eco-friendly products and operations (Guoyou et al. 2013; Ito and Zhang 2016). However, previous research shows that companies need to be cautious with unexpected adverse effects when advertising eco-friendly products. For instance, consumers show more negative product evaluations and decreased buying intentions if they perceive the product's environmental benefit to be intended by the company, as consumers assume that the company shifts resources from assuring product quality to environmental protection (Newman et al. 2014). Thus, the endeavor of promoting consumer participation requires not only effective communication strategies, but also more academic research on consumers' cognitive responses to green advertising (Kong and Zhang 2012). Previous research has broadly investigated green appeals, which focus on a product's ecological benefits, to increase consumers' perception of pro-environmental intentions and behaviors (e.g., Atkinson and Rosenthal 2014; Chang et al. 2015). However, a crucial disadvantage of these appeals is that their effectiveness depends on a person's level of environmental involvement (e.g., Cheng et al. 2020), such that green appeals may have little effect on less environmentally involved customers. Furthermore, appeals to the ecological impact of personal purchase can leave the impression that the consumer alone is obligated to take responsibility for environmental protection, which is inconsistent with consumers' belief that both consumers' and companies' actions can make a difference (Lenzen et al. 2007; Yang and Weber 2019). While consumers can primarily contribute through their product choices, companies face the challenge of implementing the eco-friendly operations and offerings. Consumers' purchase choices are an essential driver of companies' operations and offerings (e.g., King and Venturini 2005), and therefore, they also have a proactive role in the collaboration for environment conservation.

Further, consumers' product choices can be understood as their purchasing power, which can be exerted over the company (Buerke et al. 2017). A communication tactic that embraces this consumer power and, thereby, shifts decision power from the company to the customer in the green purchase context can be viewed as "green consumer empowerment." Fuchs et al. (2010) demonstrate that consumer empowerment in the phase of product development enhances attitudes toward the company and purchase intentions. Therefore, such an empowering green ad could lead to consumers evaluating the company more positively in two ways. On the one

hand, the company demonstrates its environmental responsibility. Previous studies deliver evidence that consumers respond positively to corporate social and environmental activities (e.g., Nan and Heo 2007). On the other hand, the company also appears to be more customer oriented, in the sense that it bases its production decisions on consumer demands. Both customer orientation and environmental responsibility are positively related to a company's overall reputation (see e.g. Walsh and Beatty 2007; Chang and Zhu 2011). Therefore, a green empowerment ad might be a valuable strategy for manufacturers of sustainable products. To date, however, researchers have mainly examined empowerment as a strategy in human resource management (see Liu et al. 2019), where it has proved to be a useful means to increase green behavior (Saeed et al. 2019; Tariq et al. 2016). In contrast, few studies investigate consumer empowerment with regard to increasing green purchase behavior (Akhavannasab et al. 2018).

Furthermore, little research addresses whether characteristics of the company, such as company size, influence the effectiveness of a green empowerment ad. Depending on the company size and resource availability (e.g., technological know-how, financial capital), consumers might have different expectations about the companies' ability to react to consumers' demand and to implement more eco-friendly technologies in the production (Wu 2017).

Two empirical studies explore the effects of empowerment elements in ads for green products on consumers' corporate evaluations and, therefore, green purchase intention compared with other ad types. Study 1 tests a green empowerment ad against a green appeal and analyzes whether consumers' corporate evaluations mediate their effect on purchase intention. Study 2 tests the moderating influence of company size, comparing large companies with greater resource availability with smaller companies. Furthermore, the second study includes a non-green empowerment ad, which also stresses that consumers can influence companies by purchase decisions but without referring to the environmental attribute. It aims to test whether the pure customer focus is more efficient than eco-advertising or if environmental elements provide an additional benefit.

7.2 Theoretical Foundation and Hypotheses

7.2.1 The Role of Consumer Empowerment in Green Consumption

Power is defined as the capacity to control one's own (but also others') resources or outcomes (Keltner et al. 2003). Therefore, *consumer empowerment* refers to signaling or implementing

the process of transferring control over specific corporate activities or resources to the consumer (Fuchs et al. 2010). An empowered person is more optimistic and active than one who feels less powerful (Anderson and Galinsky 2006). Moreover, a “can-do” state of mind is achieved through empowerment, and it fosters behavioral actions (Pierce et al. 2003). An individual who feels more powerful is likely to make a buying decision or to buy a higher quantity (Galinsky et al. 2003; Rucker et al. 2012). For instance, when consumers are invited to select which products are marketed, the product demand increases (Fuchs et al. 2010). Similar effects occur when consumers are actively involved in product co-creation processes (Fuchs and Schreier 2010). To date, however, little research addresses how consumers can be put into this empowered state during a purchase decision in an easily implementable and time-efficient way. Advertising messages could be a useful tool for this.

Most sustainable product marketing employs classic green appeals, which are aimed at making consumers aware of their personal impact on the environment. Green appeals can refer, for instance, to the positive consequences of engaging in an eco-friendly behavior or to the negative consequences (gain- vs. loss-framed messages; e.g., White et al. 2011). However, in both cases, these appeals only direct consumers’ attention to their impact on the environment (e.g., how they can reduce emissions or conserve natural resources (Ramirez et al. 2015), ignoring the impact that consumers can have on the companies that create the products. Apart from consumers’ environmental impact directly related to the eco-friendly product purchased, consumer purchase choices can also shape the company’s decisions on product offerings or production manners (generally or specifically with regard to eco-friendly operations; e.g., Buerke et al. 2017).

Therefore, we propose a new form of advertising herein: A *green empowerment ad* identifies customer demand as the major driver of companies’ decisions to become green and offer more eco-friendly products, shifting power to the consumer. In light of the positive effects of consumer power, as discussed in the preceding paragraphs (e.g., Anderson and Galinsky 2006; Fuchs et al. 2010; Rucker et al. 2012), green empowerment elements could improve corporate perceptions and also increase green purchase intentions.

Of course, this empowerment tactic via messages can also be applied without focusing on environmental aspects, only making consumers aware of their power over a company’s offer. Such a non-green empowerment ad only stresses customer needs, ignoring the sustainability of the product, which can be an important driver for purchasing decisions (e.g. Nilssen et al. 2019).

In this respect, the green empowerment ad might be more promising than non-green empowerment or green appeals, considering it addresses both customer orientation and sustainability.

7.2.2 The Effect of Green Empowerment Ad on Corporate Associations

Most existing studies on green advertising focus on their effect on consumers' evaluation of the ad or the advertised product, such as consumer attitudes to the ad (Jiménez and Yang 2010), the credibility of the ad (Jäger and Weber 2020), or emotional responses (Amatulli et al. 2019) as antecedents of consumer behavior. In contrast, the effect of green advertising on corporate associations is examined less often, although consumers' responses are significantly determined by what they know about a company (e.g., Mohr et al. 2001). The perception of a supplier's corporate social or environmental engagement increases the corporate evaluation, which in turn triggers product evaluation (e.g., responses to sustainability efforts in Hofenk et al. 2019; cause-related marketing in Howie et al. 2018). Moreover, perceived corporate reputation positively affects consumer trust and therefore purchase intention (see meta-analysis in Ali et al. 2015).

A green empowerment ad is focused more on the company than on the product and is therefore likely to influence corporate associations. According to Walsh and Beatty (2007), customer orientation and environmental responsibility represent two major aspects of corporate reputation. With a green empowerment ad, a company signals that it is willing to (1) react to customer wishes and (2) intensify green offerings/operations, thereby triggering both corporate associations. Further, improved corporate associations might positively influence purchase intentions. In the following sections, we discuss in further detail how green empowerment ads affect these corporate associations and thus purchase intentions compared with other ad types.

7.2.2.1 Customer Orientation

A customer-oriented firm positions the customer as the central point of strategic planning and implementation and prioritizes its capabilities to meet customers' needs (Brady and Cronin 2001; Deshpandé et al. 1999). Previous studies show that consumers' perceptions of a companies' customer orientation (CO) are actively manageable (Ruth and York 2004).

Consumer empowerment in the process of new product development is shown to increase the level of perceived CO (Fuchs et al. 2011). In contrast, a green appeal that is purely focused on the product's environmental benefits (instead of the product quality) can even lead to reduced perceptions of product quality, as consumers might infer that the company diverts resources to

reach environmental goals (Newman et al. 2014). Hence, product-focused green appeals may give consumers the impression that the company prioritizes not the consumer but the environment. Therefore, we expect that an empowerment ad has a positive effect on perceived CO but that green appeals do not:

H1: (a) Green and (b) non-green empowerment ads have a larger positive effect on perceived CO than green appeals.

Literature suggests that this greater perceived CO should further lead to more positive consumer reactions such as buying intention for products (Fuchs et al. 2011) and services (Brady and Cronin 2001). Therefore, we hypothesize that perceived CO mediates the effect of an empowerment ad on purchase intention:

H2: The positive effect of (a) green and (b) non-green empowerment ads on green purchase intention is mediated by perceived CO.

7.2.2.2 Corporate Environmental Responsibility

Previous studies report positive effects of corporate social responsibility on customer attitudes and purchase intentions (Bianchi et al. 2019; Grimmer and Bingham 2013; van Doorn et al. 2017). However, the perception of corporate environmental responsibility (CER) not only depends on the company's actual performance but can also be influenced by its communication method (Ruth and York 2004).

Green appeals can be a simple method to increase green purchase intentions as well as perceived CER. Nevertheless, these are also prone to the suspicion of "greenwashing" leading to a credibility problem (e.g., Cheng et al. 2020). People are more likely to accept a decision aid, for example, in the form of a message, if its inner working processes are explained (Herlocker et al. 2000). For instance, Pomering and Johnson (2009) suggest that consumer skepticism can be reduced (and corporate reputation increased) if the firm explicitly demonstrates the social topics in which it engages. The green empowerment ad shows that the company is aware of environmental challenges, is ready to take action, and does so in response to consumers requiring it. Therefore, green empowerment ads should be able to increase the perceived CER to a similar extent as green appeals:

H3: Green empowerment has (a) a similar positive effect on perceived CER as green appeals but (b) a larger effect compared with non-green empowerment.

H4: The positive effect of green empowerment on green purchase intention is mediated by perceived CER.

As hypothesized in H2 and H4, we expect that the effect of green empowerment on purchase intention to be mediated by two factors, CO and CER. In contrast, we expect a positive effect of green appeals on only CER, not CO. In addition, a non-green empowerment ad should only affect one of these mediating variables (CO but not CER). Extant research indicates that a blended advertising approach combining both egoistic and altruistic appeals produces more favorable responses, for instance, compared with an appeal solely based on egoistic appeals (Kareklas et al. 2014). Therefore, we assume that the two effects of green empowerment add up and generate a larger effect on purchase intention than a single strategy focusing only on ecological benefits (green appeal) or customer's self-benefits (non-green empowerment). Following this argumentation, we propose:

H5: Green empowerment ads more effectively enhance green purchase intention than (a) green appeals and (b) non-green empowerment ads.

7.2.3 Organizational Resources and CER

Adapting and investing in green production processes might require certain resources. However, especially small and medium-sized enterprises (SMEs) face restrictions in terms of resources and expertise (Wu 2017). Compared with SMEs, larger companies have more available capacities to deal with risks and unpredictability and are therefore associated with voluntary environmental activities (Greening and Gray 1994). Therefore, research shows strong evidence that available resources and firm size are significant predictors of firm environmental performance (Elsayed 2006), which seems to be reflected in consumer perceptions, as the company's size and financial performance positively affect perceived corporate social reputation (Lu et al. 2015). We assume that the amount of available resources also determines whether consumers perceive the company as able to adapt to their green demands. Consumers can only feel truly empowered to affect corporate decisions on further green investments if they believe the company's resource situation realistically allows for making these investments. Therefore, to investigate whether the level of available resources moderates how consumers perceive an ad for a green product, we hypothesize the following:

H6: Perceived corporate resources moderate the effect of green empowerment on perceived CER.

Figure 3 summarizes the hypothesized effects of three experimental ad types (green empowerment, non-green or general empowerment, and green appeal) in a conceptual model.

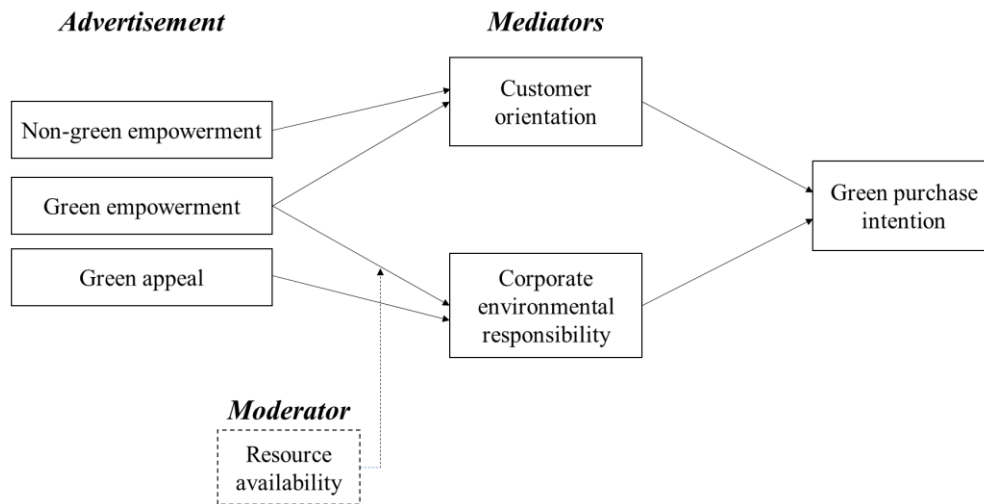


Figure 3: Conceptual model

7.3 Study 1: Green Empowerment Ad versus Green Appeal

Study 1 served to test the effectiveness of a green empowerment ad against a green appeal as well as the mediation of the effect via company evaluations. We then further compared both ads with a control group to assess the extent to which they can improve consumers' company ratings and purchase intention.

7.3.1 Method

Stimuli. The green empowerment ad was designed to indicate the impact of consumers' buying decision on the green product offering and production manners of the company. The ad explicitly addressed consumer buying power and its effect on changing companies and the environment: *"Use your power to move green production: By buying environment-friendly products, you can set a signal that you require us to offer more green products and to intensify environment-friendly operations. Every consumer can actively exercise buying power to influence the supplier and therefore the environment."* The green appeal, in contrast, focused on the consumers' positive environmental impact by purchasing the product: *"Help improve the environment: By buying environment-friendly products, you can make a step forward to reduce pollutants and to improve environmental quality. Every consumer can take care of the environment."* The control group received neutral information not related to any environmental effects (see the Appendix A1). We conducted single interviews with six Chinese graduate students to optimize the wording of the stimuli.

Procedure. We tested our hypotheses H1a, H2a, H3a, H4, and H5a in a survey-based online experiment with a between-subjects design (*ad type*: green empowerment vs. green appeal vs. control). We randomly assigned participants to one of the experimental conditions. They were asked to imagine they were shopping for organic rice in an online marketplace and received some information about the product. Then, participants were directed to carefully read an advertisement message containing the experimental stimulus, which appeared for at least 10 seconds. To recall the ad, participants were asked to write down the main ideas of the ad. The survey captured participants' attitudes toward the ad and product perceptions. Next, we measured perceived power as a manipulation check, followed by the CO and CER perceptions of the company. Then, participants indicated their purchase intention for the product. The last part of the survey captured purchase habits in daily life, message familiarity and comprehensibility, and sociodemographics.

Measures. Multi-item scales have higher reliability and validity (Diamantopoulos et al. 2012; Sarstedt and Wilczynski 2009); therefore, we used established multi-item scales in our questionnaire: attitude toward the ad (three items; Severn et al. 1990), product perception (two items; Grant et al. 2004), perceived power (three items modified based on Fuchs et al. 2010; Spreitzer 1995), CO (four items adapted from Blocker et al. 2011; Walsh and Beatty 2007), CER (three items adapted from Turker 2009; Walsh and Beatty 2007), purchase intention (two items; Dodds et al. 1991), and social desirability (four items adapted from Crowne and Marlowe 1960). Further, we used self-developed single-item-measures for measuring purchase habits (online and green purchase frequency), message familiarity, and comprehensibility as control variables (see Appendix A2 for a full list of items and related constructs). The questionnaire was composed in English and translated into Mandarin Chinese using the iterative approach, which strives for conceptual equivalence rather than literal translation (Douglas and Craig 2007). All constructs showed satisfactory reliability levels (Cronbach's $\alpha > 0.70$) as well as high factor loadings (> 0.70 ; Appendix A2), except for the social desirability scale (Cronbach's $\alpha = 0.55$), which is nonetheless within the Marlowe-Crowne Scale acceptable range of between 0.50 and 0.75 (Loo and Loewen 2004).

Sample. In total, we recruited 311 Chinese consumers through an online survey platform (Weidiaochoa.com). Participants received a monetary reward as an incentive. We excluded 20 respondents who answered the questionnaire more than two times faster than the average respondent did, as an indicator for cases containing meaningless data (Leiner 2013). This

resulted in a final sample of 291 respondents (sample size per group: $n_{\text{GreenPower}} = 103$, $n_{\text{GreenAppeal}} = 96$, $n_{\text{Control}} = 92$), with 65% female respondents and age ranging between 16 and 55 years ($M = 28.0$ years, $SD = 6.32$ years). The majority (85%) held a university degree.

Manipulation check and descriptive statistics. The manipulation check confirmed that respondents experienced a higher degree of power over the company's decisions after reading the green empowerment ad than after reading both the green appeal and control group ads ($M_{\text{GreenPower}} = 4.96$, $M_{\text{GreenAppeal}} = 4.24$, $M_{\text{Control}} = 3.94$, $F(2, 288) = 13.37$, $p < 0.001$). In addition, results were not confounded by group differences on nonmanipulated variables: Message familiarity did not differ significantly across the three groups ($M_{\text{GreenPower}} = 4.81$, $M_{\text{GreenAppeal}} = 4.59$, $M_{\text{Control}} = 4.52$; $F(2, 288) = 1.15$, $p = 0.31$), and the same applies to ad comprehensibility (low mean scores indicating high comprehensibility: $M_{\text{GreenPower}} = 3.14$, $M_{\text{GreenAppeal}} = 2.72$, $M_{\text{Control}} = 2.97$; $F(2, 288) = 1.81$, $p = 0.16$). However, attitudes toward the ads differ: Participants evaluated the green empowerment advertisement and the green appeal more positively than the control group ad. We observed no significant differences between the green empowerment ad and the green appeal: $M_{\text{GreenPower}} = 5.06$, $M_{\text{GreenAppeal}} = 5.01$, $M_{\text{Control}} = 4.42$; $F(2, 288) = 6.67$, $p < 0.01$. Further, participants evaluate the product better in the empowerment group than in the control group ($M_{\text{GreenPower}} = 5.43$, $M_{\text{GreenAppeal}} = 5.22$, $M_{\text{Control}} = 4.88$; $F(2, 288) = 4.43$, $p = 0.01$).

7.3.2 Results

7.3.2.1 Effects of Green Empowerment on Corporate Evaluations and Purchase Intention

We performed three analyses of variance (ANOVAs) with post hoc tests to test the effect of ad type on CO, CER, and purchase intention (see Table 10). We found significant main effects of the ad type on all outcome variables. Participants indicated higher CO after reading the green empowerment ad than after the green appeal and the control group ad (in support of H1a). For perceived environmental responsibility, we found a significant difference between the green empowerment ad and the control group ad but not to the green appeal (confirming H3a). The green appeal also significantly increases environmental responsibility compared with the control group ad. We confirmed that the green empowerment ad has a more positive effect on purchase intention than the other two groups, in support of H5a. The green appeal did not significantly improve CO or purchase intention (compared with the control group).

Table 10: Effects of ad type on CO, CER and purchase intention (ANOVAs)

<i>M</i>	Sign. group differences		<i>F</i>	Hypothesis
<i>CO</i>				
Green power:	5.46	Green power > Green appeal/Control	8.57***	H1a: ✓
Green appeal:	4.95	Green appeal > Control		
Control:	4.80			
<i>CER</i>				
Green power:	5.53	Green power > Control	13.99***	H3a: ✓
Green appeal:	5.27	Green appeal > Control		
Control:	4.70			
<i>Purchase intention</i>				
Green power:	5.43	Green power > Green appeal/Control	8.83***	H5a: ✓
Green appeal:	4.82			
Control:	4.65			

Note(s): † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; ANOVAs with Scheffé post hoc tests ($p < 0.05$); CO = customer orientation; CER = corporate environmental responsibility.

7.3.2.2 Mediation effects of corporate evaluations

To better understand the direct and indirect effects of ad type on green purchase intention, we conducted a parallel mediation analysis using PROCESS model 4 (95% percentile bootstrap confidence intervals with 5,000 resamples; Hayes 2018). We added purchase habits and social desirability to the model as covariates.

The green empowerment ad positively affects both CO and CER ($b = 0.62 / 0.80$, $p < 0.001$; Table 11). In contrast, the green appeal only drives CER ($b = 0.61$, $p < 0.001$; Table 11), again confirming H1a and H3a. Our data show that CER has the largest significant effect on purchase intention ($b = 0.39$, $p < 0.001$), followed by CO ($b = 0.21$, $p < 0.05$). From the two ads, only green empowerment has a marginally significant positive effect on purchase intention ($b = 0.29$, $p < 0.10$; confirming H5a). In line with Bissing-Olson et al. (2016) and Milfont et al. (2006), we considered purchase habits and social desirability as well, finding that purchase habits including online purchase and green purchase frequency also lead to higher purchase intention, while social desirability did not affect any of the variables.

The mediation analysis confirms the indirect effect of the green empowerment ad through both mediators, CO and CER. As a mediated effect exists via CO ($b = 0.13$, $p < 0.05$; confirming H2a) and CER ($b = 0.31$, $p < 0.05$; Table 12; confirming H4), as well as a marginally significant direct effect on purchase intention (see Table 11), we can confirm a partially mediated effect (Zhao et al. 2010). The effect of the green appeal is fully mediated by CER. Further, the total effect of the green empowerment on purchase intention is highly significant ($b = 0.73$, $p < 0.001$; *total effect = direct effect + indirect effects via CO and CER*; see Hayes 2018), whereas

the green appeal has no significant total effect ($b = 0.26, p > 0.10$), which lends further support to H5a.

Table 11: Regression coefficients and significance levels for the parallel mediation analysis

	CO	CER	Purchase Intention
Green power	0.62 *** (0.16)	0.80 *** (0.15)	0.29 † (0.17)
Green appeal	0.19 (0.16)	0.61 *** (0.15)	-0.02 (0.17)
CO			0.21 * (0.10)
CER			0.39 *** (0.09)
Online purchase	0.15 *** (0.04)	0.12 ** (0.04)	0.17 *** (0.04)
Green purchase	0.22 *** (0.05)	0.23 *** (0.05)	0.20 ** (0.06)
Social desirability	0.15 (0.11)	0.15 (0.12)	-0.00 (0.11)
Constant	2.61 *** (0.40)	2.60 *** (0.40)	-0.16 (0.38)
R^2	0.27	0.29	0.56
F	18.28	22.77	55.33

Note(s): † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; heteroscedasticity-consistent standard error estimators (HC3) in parentheses; baseline: control group; CO = customer orientation; CER = corporate environmental responsibility.

Table 12: Confidence intervals for the mediation analysis (relative indirect effects on purchase intention)

	Indirect effects via CO			Indirect effects via CER		
	b	LB	UB	b	LB	UB
Green power	0.13*	0.01	0.29	0.31*	0.16	0.51
Green appeal	0.04	-0.02	0.14	0.24*	0.10	0.42
Hypothesis	H3: ✓			H5: ✓		

Note(s): * significant (percentile 95% CI, $n = 5,000$ bootstrap samples; LB = lower bound, UB = upper bound); CO = customer orientation; CER = corporate environmental responsibility.

In summary, we can conclude from Study 1 that the green empowerment ad consistently outperforms both the control group and the green appeal. Both green empowerment and green appeal increase perceived environmental responsibility of the company, but the green empowerment leads to significantly greater perceptions of CO and affects purchase intention. Study 1 shows the effects of green empowerment on consumer response variables and

significant mediators. Study 2 focuses on the moderating effect of corporate resources and extends previous experimental conditions with a general, non-green empowerment ad.

7.4 Study 2: Green and Non-green Empowerment and the Moderating Effect of Perceived Corporate Resources

Study 1 showed that CER is an important mediator driving purchase intentions. As expected, we also found the CER perceptions were increased as much by the green empowerment ad as by the green appeal. The former performed better because it also increased CO and the positive effects via CO and CER were additive. We proposed that this addition of effects should lead to an advantage over not only green appeals but also non-green empowerment ads only focusing on a company's CO (see H3b and H5b). Therefore, we conducted a second study aiming to (a) replicate the effect of a green empowerment ad in a different sample, (b) test both green and non-green empowerment ads, and (c) examine potential differences for companies with high vs. low resource availability.

7.4.1 Method

We employed a 4 (*ad type*: green empowerment vs. non-green empowerment vs. green appeal vs. control) \times 3 (*company type*: high resources vs. low resources vs. control) full factorial between-subjects design.

Stimuli and procedure. First, respondents saw the same product information as in Study 1. Then, they viewed the Study 1 stimuli for the green empowerment ad, the green appeal ad, and the control group. We added a non-green empowerment ad, which emphasizes the consumers' power to influence suppliers' production without explicitly mentioning eco-friendliness: "*Use your power to move production: By making product choices, you can set a signal that you require us to offer more of the chosen products and to intensify related operations. Every consumer can actively exercise buying power to influence the supplier.*" Regarding the company size, two groups received information about the company's high vs. low resource availability through indicators such as turnover, number of employees, and technological advancement (Appendix A1), while the control group received neutral information. A pretest ($n = 215$) confirmed that information about the companies' size (turnover: 91.4b Yuan/ 914,000 Yuan; number of employees: 323,000/ 30) or technological advancement ("highly innovative technologies" vs. "technologies of long tradition") is sufficient to influence perceived resource availability: Large companies with high technological advancement were viewed as having the

highest level of perceived resource availability ($M = 6.23$), followed by large companies with low technological advancement ($M = 6.06$). Small companies were perceived to have significantly fewer available resources ($M_{\text{high-tech}} = 3.89$; $M_{\text{low-tech}} = 3.48$). Large companies differed significantly from small companies in perceived resource availability ($F(3, 211) = 75.97$; $p < 0.001$) and perceived company size ($F(3, 211) = 193.25$; $p < 0.001$). For the main study, we employed the two company descriptions which differed most (large companies with high technological advancement; small companies with low technological advancement).

Measures. We applied the same measures as in Study 1 and used self-developed manipulation checks for perceived resource availability (single-item for company size, 2 items for resource availability). We added a measure of the perception of product quality as a third item for product evaluation (Grant et al. 2004). All constructs showed satisfactory reliability levels (Cronbach's alpha > 0.80) as well as high factor loadings (> 0.70 ; Appendix A2), except for the social desirability scale (Cronbach's alpha = 0.55), which is still an acceptable rate according to Loo and Loewen (2004).

Sample. We collected data from 530 Chinese consumers, recruited through the same online survey platform used in Study 1 (Weidiao.com). Participants received a monetary reward as incentive. We excluded 73 respondents who did not pass an attention check requiring a certain answer (see Paas et al. 2018), resulting in a sample of 457 respondents. The sample consists of 66.3% female respondents (average age: $M = 27.32$ years, $SD = 6.4$ years). Participants' education level was high: 87.5% held a university degree.

Manipulation checks and descriptive statistics. The manipulation check confirms that respondents experienced a higher degree of power over the company's decisions after reading the green/non-green empowerment ads compared with both the green appeal and control group ad ($M_{\text{GreenPower}} = 4.82$, $M_{\text{Power}} = 4.74$, $M_{\text{GreenAppeal}} = 4.07$, $M_{\text{Control}} = 3.90$, $F(3, 453) = 10.98$, $p < 0.001$). Further, company size and resource availability reached highest scores in the high resource condition, followed by the control and the low-resource group, with significant differences between all three groups (company size: $M_{\text{High}} = 5.98$, $M_{\text{Low}} = 3.68$, $M_{\text{Control}} = 5.13$, $F(2, 454) = 105.74$, $p < 0.001$; resource availability: $M_{\text{High}} = 5.71$, $M_{\text{Low}} = 4.28$, $M_{\text{Control}} = 5.19$, $F(2, 454) = 43.06$, $p < 0.001$). As in Study 1, we find that the attitude toward the green appeal is more positive than toward the control group ad, but we observed no significant differences between the other three ads: $M_{\text{GreenPower}} = 5.21$, $M_{\text{Power}} = 5.05$, $M_{\text{GreenAppeal}} = 5.32$, $M_{\text{Control}} = 4.43$, $F(3, 453) = 8.32$, $p < 0.001$). Participants evaluated product quality better in the empowerment

group than in the control group ($M_{\text{GreenPower}} = 5.54$, $M_{\text{Power}} = 5.48$, $M_{\text{GreenAppeal}} = 5.42$, $M_{\text{Control}} = 5.04$; $F(3, 453) = 3.67$, $p = 0.01$).

7.4.2 Results

7.4.2.1 Effects of Green Empowerment on Corporate Evaluations and Purchase Intention

We applied two-way ANOVAs to test the effects of ad type and company resources on CO, CER, and purchase intention. We observed significant main effects of both the ad type and resource availability on CO (see Table 13). Both empowerment ads ($M_{\text{Green}} = 5.59$, $M_{\text{Non-Green}} = 5.78$) significantly increase CO compared with the green appeal ($M_{\text{GA}} = 5.13$; Table 13). The effect of the empowerment ads is significantly larger compared with the green appeal, which confirms H1a (as in Study 1) and H1b. In contrast, low company resources have a negative effect, significantly reducing the CO perception compared with the control group ($M_{\text{Low}} = 5.16$ vs. $M_{\text{Control}} = 5.62$; Table 13; also see Appendix A3).

For CER, we find a significant main effect of ad type and an interaction effect with company resources (see Table 13). As expected (H3a and H3b), the green empowerment increases CER compared with the control and the non-green empowerment ads, but we observed no significant difference compared with the green appeal. Hence, results from Study 1 regarding the effect of green empowerment on CER (H3a) are replicated. Further, the significant interaction effect confirms H6. A simple main effects analysis shows that the effect of the green empowerment on CER is significantly larger in the high resource group (compared with the low resource group, $p < 0.05$; $F(2, 445) = 4.67$, $p < 0.05$; see Figure 4), but not compared with the control group. In contrast, the green appeal has the same effect for all resource groups ($F(2, 445) = 0.05$, $p > 0.10$). Further, the simple main effects analysis shows that for high-resource companies there are significant differences between ad types ($F(3, 445) = 8.48$, $p < 0.001$). Both green empowerment ad and green appeal perform well: CER was rated significantly higher for these ad types than the non-green empowerment ad ($p < 0.05$) and the control group ($p < 0.001$). In contrast, for low-resources companies, the green appeal is most effective and leads to significantly higher CER ratings than all other ads ($F(3, 445) = 7.30$, $p < 0.001$; green appeal vs. green/non-green empowerment: $p < 0.05$, green appeal vs. control: $p < 0.001$; see Figure 4). Thus, the green appeal improves CER independently from the company's resources, whereas the green empowerment effect disappears in the low resource group.

Regarding purchase intention, we find a marginally significant direct effect of the ad type and a significant effect of company resources but no interaction (see Table 13). The green empowerment ad increases purchase intention marginally significantly compared with the control group. Descriptively, we observed differences compared with the non-green empowerment ad and the green appeal, but they are too small to approach significance. Therefore, H5a and H5b cannot be confirmed in Study 2. In general, consumers are less willing to buy from smaller companies with lower resource availability (see Table 13 and Appendix A3).

Table 13: Effects of ad type and company resources on CO, CER, and purchase intention (two-way ANOVAs)

	<i>M</i>		Sign. group differences	<i>F</i>	Hypothesis
<i>CO</i>					
Ad	Green power:	5.59	Green power > Green appeal	7.26***	H1a: ✓
	Power:	5.78	Power > Green appeal/ Control		H1b: ✓
	Green appeal:	5.13			
	Control:	5.20			
Resources	Control:	5.62	Control > Low	4.90**	
	High:	5.42			
	Low:	5.16			
Ad*				0.60	
Resources					
<i>CER</i>					
Ad	Green power:	5.44	Green power > Power/ Control	16.49***	H3a: ✓
	Power:	4.80	Green appeal > Power/ Control		H3b: ✓
	Green appeal:	5.76			
	Control:	4.68			
Resources	Control:	5.29	--	3.01†	
	High:	5.18			
	Low:	4.98			
Ad*				2.29*	H6: ✓
Resources					
<i>Purchase intention</i>					
Ad	Green power:	5.31	Green power > Control†	2.55†	H5a: ×
	Power:	5.12			H5b: ×
	Green appeal:	4.95			
	Control:	4.77			
Resources	Control:	5.21	Control/ High > Low	4.17*	
	High:	5.17			
	Low:	4.73			
Ad*				0.37	
Resources					

Note(s): † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-way ANOVAs with Scheffé post hoc tests ($p < 0.05$); CO = customer orientation; CER = corporate environmental responsibility.

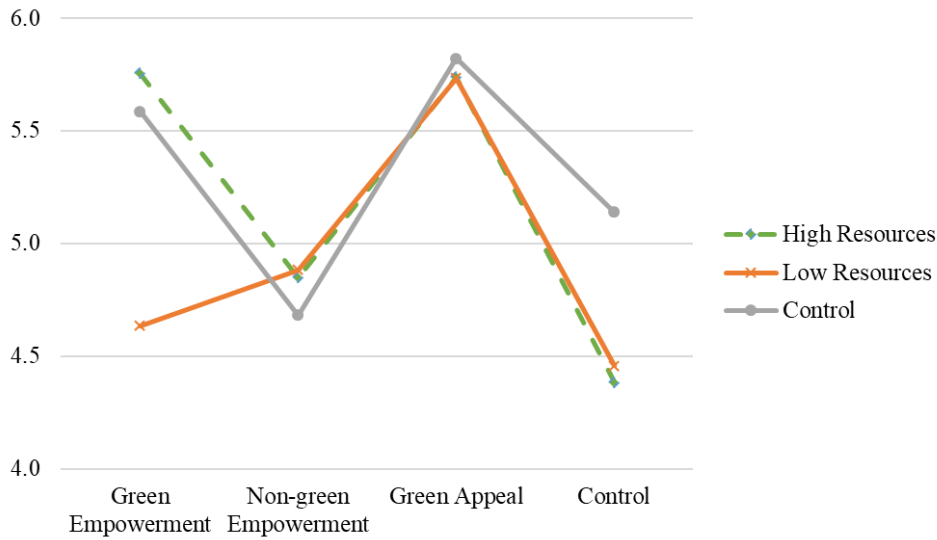


Figure 4: Means for CER

7.4.2.2 Mediation Effects of Corporate Evaluations

The results from a parallel mediation analysis are largely comparable to Study 1. The green empowerment ad influences both CO ($b = 0.36, p < 0.05$) and CER ($b = 0.70, p < 0.001$; Table 14). The non-green empowerment ad only increases CO ($b = 0.54, p < 0.001$), and the green appeal only increases CER ($b = 1.19, p < 0.001$; Table 14). Again, both CO and CER have significant positive effects on purchase intention ($b = 0.33/0.40, p < 0.001$), while the ads have no significant direct influence on purchase intention. Further, the effect of the green appeal is mediated by CER ($b = 0.47$; Table 15), and the effect of the green empowerment is fully mediated by the two mediators, CO and CER ($b = 0.12/0.28$; Table 15; Zhao, Lynch, & Chen, 2010), which confirms H2a and H4 (similar to Study 1). Moreover, CO mediates the non-green empowerment ad effect ($b = 0.17$; Table 15), supporting H2b.

The total effect of green empowerment ad on purchase intention is significant ($b = 0.47, p < 0.01$; *total effect = direct effect + indirect effects via CO and CER*; see Hayes, 2017) and slightly larger compared with the green appeal ($b = 0.37, p < 0.5$) and the non-green empowerment ad ($b = 0.33, p < 0.5$).

Table 14: Regression coefficients and significance levels for the parallel mediation analysis

	CO	CER	Purchase Intention
Green power	0.36 * (0.15)	0.70 *** (0.16)	0.08 (14)
Power	0.54 *** (0.14)	0.04 (0.18)	0.15 (0.13)
Green appeal	0.03 (0.14)	1.19 *** (0.16)	-0.12 (0.14)
CO			0.33 *** (0.06)
CER			0.40 *** (0.06)
Online purchase	0.05 † (0.03)	0.15 *** (0.04)	0.10 *** (0.03)
Green purchase	0.26 *** (0.04)	0.18 *** (0.05)	0.20 *** (0.04)
Social desirability	0.38 *** (0.08)	0.36 *** (0.10)	0.07 (0.07)
Constant	2.15 *** (0.31)	1.77 *** (0.39)	-0.55 † (0.30)
R^2	0.27	0.27	0.59
F	28.22	27.57	97.19

Note(s): † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; heteroscedasticity-consistent standard error estimators (HC3) in parentheses; baseline: control group; CO = customer orientation; CER = corporate environmental responsibility.

Table 15: Confidence intervals for the mediation analysis (relative indirect effects on purchase intention)

	Indirect effects via CO				Indirect effects via CER			
	b	LB	UB	Hypothesis	b	LB	UB	Hypothesis
Green power	0.12*	0.02	0.24	H2a: ✓	0.28*	0.14	0.44	H4: ✓
Power	0.17*	0.07	0.30	H2b: ✓	0.01	-0.13	0.15	
Green appeal	0.01	-0.08	0.10		0.47*	0.31	0.65	

Note(s): * significant (percentile 95% CI, $n = 5,000$ bootstrap samples; LB = lower bound, UB = upper bound); CO = customer orientation; CER = corporate environmental responsibility.

7.4.2.3. Moderated Mediation by Company Resources

Previous results indicate an interaction of the ad type with company resources to produce an effect on CER. To determine whether the mediation effects are moderated, we additionally conducted a moderated mediation analysis using PROCESS model 7 (95% percentile bootstrap confidence intervals with 5,000 resamples; Hayes 2018). The omnibus test confirms that a significant interaction occurs between Ad*Resource for the effect on CER ($R^2_{\text{change}} = 0.03$; $p < 0.01$; in line with H6), while no interaction occurs between Ad*Resource for the effect on CO ($R^2_{\text{change}} = 0.01$; $p > 0.10$). Specifically, for the effect on CER, there are three positive, significant interaction terms: Green Power*High Resources ($b = 0.80$; $p < 0.05$), Power*Low Resources ($b = 0.96$; $p < 0.05$), and Green Appeal*Low Resources ($b = 1.01$; $p < 0.01$).

Table 16: Relative conditional indirect effects of ad type (moderated mediation analysis)

	Indirect effect via CER		
	Green Empowerment Ad	Non-Green Empowerment Ad	Green Appeal
Control	0.15	-0.20	0.27*
High Resources	0.47*	0.08	0.48*
Low Resources	0.12	0.18	0.67*
<i>Index of moderated mediation (I_{MM})</i>			
I_{MM} : High (vs. Control)	0.32*	0.28	0.20
I_{MM} : Low (vs. Control)	-0.02	0.38*	0.39*

Note(s): * significant (percentile 95% CI; n = 5,000 bootstrap samples); CER = corporate environmental responsibility.

Table 16 shows that the mediation effects via CER differ in the high versus low resources group and the control group without company information. The mediation effect of the green power ad is only significant in the high resources group ($b = 0.47$). The difference between conditional indirect effects is significant as well (high resources vs. control; $I_{MM} = 0.32$; $p < 0.05$; Table 16). Further, the analysis shows significant mediation effects of the green appeal in all groups, ranging from $b = 0.27$ (control group) to $b = 0.67$ (low resources; Table 16). The mediation effect is significantly larger in the low resources group than in the control group ($I_{MM} = 0.39$; $p < 0.05$; Table 16). In contrast, the mediation effects of the non-green empowerment ad via CER are small and remain nonsignificant for all groups. Overall, the analysis supports the conclusion that the mediation effects of CER are moderated by the resource conditions.

In summary, Study 2 shows that a green empowerment ad outperforms both a non-green empowerment ad and a green appeal, as it is able to simultaneously increase consumers'

perceptions of CO and CER, which is in line with Study 1. In addition, Study 2 shows that company resources also influence ad effectiveness: The effect of the green empowerment ad on CER is diminished for small companies with low resource availability.

7.5 Discussion

7.5.1 Theoretical and Managerial Implications

In two experimental studies, we investigate a new approach for advertising eco-friendly products that effectively increases consumers' beliefs about their power over the company's (pro-environmental) activities. Empowered individuals show improved perceptions of the company's CO and CER. In contrast, consumers do not feel empowered by a green appeal, which is often used in advertising practice, and perceptions of CO are not enhanced. Furthermore, a non-green empowerment ad, though it increases consumers' power beliefs, does not contribute to the perception of environmental responsibility. In contrast, a green empowerment ad achieves a simultaneous, complementary effect on two important dimensions of corporate evaluation, CO and CER, which in turn drive purchase intentions. Thus, both green appeals and non-green empowerment ads are less effective because they can only impact a single dimension.

This research extends the existing literature on green advertising by showing the applicability of empowerment elements in the communication for environmentally sustainable products. Findings support the results of previous studies on consumer empowerment in the product design process (Fuchs et al. 2010), in that empowerment has positive effects on CO and purchase intention. The present article emphasizes the importance of corporate evaluations as mediators between green advertisements and consumers' purchase intentions, supplementing extant research that focuses on consumers' product evaluations (e.g., Grimmer and Woolley 2014; Ramirez et al. 2015) and their ability to perform a certain behavior (White et al. 2011).

Further, we show that perceived CO as a buyer's benefit and perceived CER as a public benefit can coexist without negative interference. This finding indicates the evaluation mechanism in individuals' minds that strives to optimize several factors of a supplier's performance at the same time, for which the needs for corporate resources could be in conflict. It is likely that green appeals signal to the consumer that a company uses most of its attention and resources to become more eco-friendly, while neglecting customer needs.

Interestingly, the CO focus of the green empowerment ad might also alleviate negative connotations of other, purely self-benefit-oriented appeals. For instance, Bolderdijk et al. (2013) show that consumers prefer to see themselves as green rather than greedy; hence, economic incentives (“save money”) can backfire in environmental campaigns. In contrast, consumers’ expectation that companies should be customer oriented seems more socially acceptable.

Newman et al. (2014) argue that explicitly emphasizing a product’s environmental benefits negatively affects product quality evaluation because consumers perceive that resources are deducted from product quality to enhance sustainability. We could not confirm this. In both studies, the product ratings did not differ significantly between the three investigated ad types, although we acknowledge results probably depend on the advertised product category. Newman et al. (2014) examined ads for cleaning products, whose primary product property is a strong cleaning performance. Luchs et al. (2010) show that consumers associate sustainable products with gentleness-related attributes, so if the primary product property is strength-related (e.g., cleaning performance), nonsustainable products might be preferred. Sustainable food consumption is, however, mainly driven by health and taste perceptions (see, e.g., Hughner et al. 2007), which fit the “gentleness” associated with sustainability in general (Luchs et al. 2010). Therefore, emphasizing sustainable product attributes probably does not have a negative effect on the perceived product quality here. However, a pure focus on environmental aspects does not seem advisable, supporting Newman et al.’s (2014) recommendations. The focus of the consumer in classic green appeals seems to be entirely directed toward sustainability as a buying motive, whereby other potentially important factors such as the company’s CO no longer have any influence. The present study proves CO to be a decisive additional driver for purchasing decisions that should be addressed in advertisements.

Concerning companies’ resources, we find that consumers tend to consider low-source or small companies as less customer-oriented and are less likely to buy their products, in line with Lu et al. (2015). Furthermore, small companies benefit less from green empowerment ads, as the perception of CER is not improved. The promise of adapting to green demand is associated with significant investment on the part of the company. Consumers seem to share the belief that SMEs are more restricted in terms of resources and expertise and, thus, have more difficulty becoming environmentally friendly (Wu 2017). In contrast, green appeals do not focus on a company’s proposed environmental investments in the future (when it is unsure whether they

can be achieved) but on the current environmental benefit of the product. Therefore, green appeals affect CER perceptions in the same way, for both high- and low- resource companies.

For managers, we recommend that a small company should use green empowerment ads only if it can credibly signal to customers that it is actually able to manage these changes. Large companies can easily capitalize on their size as well as highlight their level of resources and expertise to further support the effectiveness of green empowerment ads.

With respect to the cultural dimension, our study took place in China, which is representative of a centralized system with a higher level of power distance (e.g., Spencer-Oatey 1997) and shows that the suggested empowerment approach performs well, even if stronger beliefs in hierarchy exist. For more egalitarian contexts (e.g., Western countries; Schwartz 2007), an empowerment approach could possibly reach even better performance, as individuals likely see more balanced power relations with companies as desirable. Future research should investigate this possibility, as we discuss further in the “Limitations and future research” section.

Overall, our results suggest that companies should apply the principles of a green empowerment ad, as a companies’ perceived CO and CER can be triggered simultaneously, which leads to the largest total positive effects on consumers’ purchase intentions. Although a non-green empowerment ad can also affect perceived CO at a similar level, the green version has the potential to additionally contribute to image differentiation or the establishment of a green reputation. The possibility of boosting purchase intention based on a green empowerment ad applies across company sizes and resource capacities. However, if the primary goal of smaller companies is to increase perceived CER in specific cases, green appeals serve to achieve this effect.

7.5.2 Limitations and Future Research

Several limitations should be addressed in future research. Both studies presented herein deliver results based on survey data, which might be affected by the intention–behavior gap (e.g., Sudbury-Riley and Kohlbacher 2016). In the future, actual behavioral data should be collected to evaluate the practical relevance of the green empowerment approach.

Furthermore, people might change their perceptions of power over a company and their evaluations of the company’s CO as they have repetitive interactions with it (e.g. Park and Reber 2008). We used fictitious company examples, so results might differ in a more realistic

setting with known brands and previous product experience. Overall, future research should uncover the long-term effects of continuous customer-oriented green advertising.

We conducted our study in a Chinese context, which represents specific political and cultural features. Previous studies indicate that the mechanism of how certain beliefs affect Chinese consumers' purchase intentions is comparable to studies in Western countries (Thøgersen and Zhou 2012). However, future studies should investigate whether potential cross-country differences in people's desire for power and environmental values might affect the effectiveness of green empowerment. In addition, our sample consists of predominantly younger and more-educated people. Older respondents and those with no university degree are necessary to make representative conclusions.

We tested the empowerment ad only for the organic food product category. Future studies should be replicate ours with a wider range of products to identify potential category effects such as product involvement (McDonald et al. 2009; Zhou et al. 2012). The more involved with or committed the consumer is to buying a specific product, the more power he or she would want to influence the product design and offering (Bügel et al. 2011). Further research is required to systematically analyze which product categories would benefit most from empowerment ads.

As outlined previously, a green empowerment ad contains a cost-intensive promise (investments in eco-friendly production) and might be primarily associated with a high-resource company. The high performance of combining an empowerment ad with resource information could be caused by consumer perceived fit of messages (e.g., message-congruency; Kuipers and La Heij 2008). Future research should test whether message congruency drives the effects of company resources on advertisement effectiveness. Further, researchers should develop measures achieving the benefit of green empowerment ads for both small and large companies.

References

- Akhavannasab S, Dantas DC, Senecal S (2018) Consumer empowerment in consumer–firm relationships: Conceptual framework and implications for research. *AMS Rev* 8:214–227. <https://doi.org/10.1007/s13162-018-0120-4>
- Ali R, Lynch R, Melewar TC, Jin Z (2015) The moderating influences on the relationship of corporate reputation with its antecedents and consequences: A meta-analytic review. *J Bus Res* 68:1105–1117. <https://doi.org/10.1016/j.jbusres.2014.10.013>
- Amatulli C, Angelis M de, Peluso AM, Soscia I, Guido G (2019) The Effect of Negative Message Framing on Green Consumption: An Investigation of the Role of Shame. *J Bus Ethics* 157:1111–1132. <https://doi.org/10.1007/s10551-017-3644-x>
- Anderson C, Galinsky AD (2006) Power, optimism, and risk-taking. *Eur J Soc Psychol* 36:511–536. <https://doi.org/10.1002/ejsp.324>
- Atkinson L, Rosenthal S (2014) Signaling the Green Sell: The Influence of Eco-Label Source, Argument Specificity, and Product Involvement on Consumer Trust. *J Advert* 43:33–45. <https://doi.org/10.1080/00913367.2013.834803>
- Berens G, Riel CBM van, Bruggen GH van (2005) Corporate Associations and Consumer Product Responses: The Moderating Role of Corporate Brand Dominance. *J Mark* 69:35–48. <https://doi.org/10.1509/jmkg.69.3.35.66357>
- Bianchi E, Bruno JM, Sarabia-Sanchez FJ (2019) The impact of perceived CSR on corporate reputation and purchase intention. *EJMBE* 28:206–221. <https://doi.org/10.1108/EJMBE-12-2017-0068>
- Bissing-Olson MJ, Fielding KS, Iyer A (2016) Experiences of pride, not guilt, predict pro-environmental behavior when pro-environmental descriptive norms are more positive. *J Environ Psychol* 45:145–153. <https://doi.org/10.1016/j.jenvp.2016.01.001>
- Blocker CP, Flint DJ, Myers MB, Slater SF (2011) Proactive customer orientation and its role for creating customer value in global markets. *J Acad Mark Sci* 39:216–233. <https://doi.org/10.1007/s11747-010-0202-9>
- Bolderdijk JW, Steg L, Geller ES, Lehman PK, Postmes T (2013) Comparing the effectiveness of monetary versus moral motives in environmental campaigning. *Nature Clim Change* 3:413–416. <https://doi.org/10.1038/nclimate1767>
- Brady MK, Cronin JJ (2001) Customer Orientation: Effects on Customer Service Perceptions and Outcome Behaviors. *J Serv Res* 3:241–251.

<https://doi.org/10.1177/109467050133005>

- Buerke A, Straatmann T, Lin-Hi N, Müller K (2017) Consumer awareness and sustainability-focused value orientation as motivating factors of responsible consumer behavior. *Rev Manag Sci* 11:959–991. <https://doi.org/10.1007/s11846-016-0211-2>
- Bügel MS, Verhoef PC, Buunk AP (2011) Customer intimacy and commitment to relationships with firms in five different sectors: Preliminary evidence. *J Retail Consum Servi* 18:247–258. <https://doi.org/10.1016/j.jretconser.2010.11.005>
- Chang H, Zhang L, Xie G-X (2015) Message framing in green advertising: The effect of construal level and consumer environmental concern. *Int J Advert* 34:158–176. <https://doi.org/10.1080/02650487.2014.994731>
- Chang T-IS, Zhu W (2011) Enhancing corporate reputation for market expansion in China: Customer orientation and the mediating effect of product and service quality. *J Strateg Mark* 19:153–170. <https://doi.org/10.1080/0965254X.2011.557738>
- Cheng Z-H, Chang C-T, Lee Y-K (2020) Linking hedonic and utilitarian shopping values to consumer skepticism and green consumption: The roles of environmental involvement and locus of control. *Rev Manag Sci* 14:61–85. <https://doi.org/10.1007/s11846-018-0286-z>
- Crowne DP, Marlowe D (1960) A new scale of social desirability independent of psychopathology. *J Consult Psychol* 24:349–354. <https://doi.org/10.1037/h0047358>
- Deshpandé R, Farley JU, Webster FE (1999) Corporate Culture, Customer Orientation, and Innovativeness in Japanese Firms: A Quadrad Analysis. *J Mark* 57:23–37. <https://doi.org/10.1177/002224299305700102>
- Diamantopoulos A, Sarstedt M, Fuchs C, Wilczynski P, Kaiser S (2012) Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. *J Acad Mark Sci* 40:434–449. <https://doi.org/10.1007/s11747-011-0300-3>
- Dodds WB, Monroe KB, Grewal D (1991) Effects of Price, Brand, and Store Information on Buyers' Product Evaluations. *J Mark Res* 28:307–319. <https://doi.org/10.2307/3172866>
- Doorn J van, Onrust M, Verhoef PC, Bügel MS (2017) The impact of corporate social responsibility on customer attitudes and retention—the moderating role of brand success indicators. *Mark Lett* 28:607–619. <https://doi.org/10.1007/s11002-017-9433-6>
- Douglas SP, Craig CS (2007) Collaborative and Iterative Translation: An Alternative Approach to Back Translation. *J Int Mark* 15:30–43.

<https://doi.org/10.1509/jimk.15.1.030>

- Elsayed K (2006) Reexamining the Expected Effect of Available Resources and Firm Size on Firm Environmental Orientation: An Empirical Study of UK Firms. *J Bus Ethics* 65:297–308. <https://doi.org/10.1007/s10551-006-6402-z>
- Fuchs C, Schreier M (2010) Customer Empowerment in New Product Development. *J Prod Innov Manage* 28:17–32. <https://doi.org/10.1111/j.1540-5885.2010.00778.x>
- Fuchs C, Prandelli E, Schreier M (2010) The Psychological Effects of Empowerment Strategies on Consumers' Product Demand. *J Mark* 74:65–79. <https://doi.org/10.1509/jmkg.74.1.65>
- Galinsky AD, Gruenfeld DH, Magee JC (2003) From Power to Action. *J Pers Soc Psychol* 85:453–466. <https://doi.org/10.1037/0022-3514.85.3.453>
- Grant SJ, Malaviya P, Sternthal B (2004) The Influence of Negation on Product Evaluations. *J Consum Res* 31:583–591. <https://doi.org/10.1086/425093>
- Greening DW, Gray B (1994) Testing a Model of Organizational Response to Social and Political Issues. *Acad Manage J* 37:467–498. <https://doi.org/10.5465/256697>
- Grimmer M, Bingham T (2013) Company environmental performance and consumer purchase intentions. *J B Res* 66:1945–1953. <https://doi.org/10.1016/j.jbusres.2013.02.017>
- Grimmer M, Woolley M (2014) Green marketing messages and consumers' purchase intentions: Promoting personal versus environmental benefits. *J Mark Commun* 20:231–250. <https://doi.org/10.1080/13527266.2012.684065>
- Guoyou Q, Saixing Z, Chiming T, Haitao Y, Hailiang Z (2013) Stakeholders' Influences on Corporate Green Innovation Strategy: A Case Study of Manufacturing Firms in China. *Corp Soc Responsib Environ Manag* 20:1–14. <https://doi.org/10.1002/csr.283>
- Hartikainen H, Roininen T, Katajajuuri J-M, Pulkkinen H (2014) Finnish consumer perceptions of carbon footprints and carbon labelling of food products. *J Clean Prod* 73:285–293. <https://doi.org/10.1016/j.jclepro.2013.09.018>
- Hayes AF (2018) Introduction to mediation, moderation, and conditional process analysis: A regression-based approach, Second edition. Methodology in the social sciences. The Guilford Press, New York, London
- Herlocker JL, Konstan JA, Riedl J (2000) Explaining collaborative filtering recommendations. Kellogg W (ed) Proceedings of the 2000 ACM conference on Computer supported cooperative work. ACM, New York, NY, pp. 241–250.

- <https://doi.org/10.1145/358916.358995>
- Hofenk D, Birgelen M van, Bloemer J, Semeijn J (2019) How and When Retailers' Sustainability Efforts Translate into Positive Consumer Responses: The Interplay Between Personal and Social Factors. *J Bus Ethics* 156:473–492. <https://doi.org/10.1007/s10551-017-3616-1>
- Howie KM, Yang L, Vitell SJ, Bush V, Vorhies D (2018) Consumer Participation in Cause-Related Marketing: An Examination of Effort Demands and Defensive Denial. *J Bus Ethics* 147:679–692. <https://doi.org/10.1007/s10551-015-2961-1>
- Hughner RS, McDonagh P, Prothero A, Shultz CJ, Stanton J (2007) Who are organic food consumers?: A compilation and review of why people purchase organic food. *J Consum Behav* 6:94–110. <https://doi.org/10.1002/cb.210>
- Ito K, Zhang S (2016) Willingness to Pay for Clean Air: Evidence from Air Purifier Markets in China. NBER Working Paper No. 22367.
- Jäger A-K, Weber A (2020) Can you believe it? The effects of benefit type versus construal level on advertisement credibility and purchase intention for organic food. *J Clean Prod* 257:120543. <https://doi.org/10.1016/j.jclepro.2020.120543>
- Jiménez M, Yang KCC (2010) How Guilt Level Affects Green Advertising Effectiveness? *J Creat Commun* 3:231–254. <https://doi.org/10.1177/097325861000300301>
- Kareklas I, Carlson JR, Muehling DD (2014) “I Eat Organic for My Benefit and Yours”: Egoistic and Altruistic Considerations for Purchasing Organic Food and Their Implications for Advertising Strategists. *J Advert* 43:18–32. <https://doi.org/10.1080/00913367.2013.799450>
- Keltner D, Gruenfeld DH, Anderson C (2003) Power, approach, and inhibition. *Psychol Rev* 110:265–284. <https://doi.org/10.1037/0033-295X.110.2.265>
- King RP, Venturini L (2005) Demand for Quality Drives Changes in Food Supply Chains. In: Regmi A, Gehlhar M (eds) *New Directions in Global Food Markets*. Electronic Report from the Economic Research Service, pp 18–31. <https://www.ers.usda.gov/publications/pub-details/?pubid=42591>. Accessed 22 April 2020.
- Kong Y, Zhang L (2012) When does green advertising work? The moderating role of product type. *J Mark Commun* 20:197–213. <https://doi.org/10.1080/13527266.2012.672335>
- Leiner DJ (2013) Too Fast, Too Straight, Too Weird: Post Hoc Identification of Meaningless Data in Internet Surveys. *SSRN Electron J*. <https://doi.org/10.18148/srm/2019.v13i3.7403>

- Lenzen M, Murray J, Sack F, Wiedmann T (2007) Shared producer and consumer responsibility — Theory and practice. *Ecol Econ* 61:27–42.
<https://doi.org/10.1016/j.ecolecon.2006.05.018>
- Li D, Cao C, Zhang L, Chen X, Ren S, Zhao Y (2017) Effects of corporate environmental responsibility on financial performance: The moderating role of government regulation and organizational slack. *J Clean Prod* 166:1323–1334.
<https://doi.org/10.1016/j.jclepro.2017.08.129>
- Liu X, Wang C, Shishime T, Fujitsuka T (2012) Sustainable consumption: Green purchasing behaviours of urban residents in China. *J Sustain Dev* 20:293–308.
<https://doi.org/10.1002/sd.484>
- Loo R, Loewen P (2004) Confirmatory Factor Analyses of Scores From Full and Short Versions of the Marlowe–Crowne Social Desirability Scale. *J Appl Soc Psychol* 34:2343–2352. <https://doi.org/10.1111/j.1559-1816.2004.tb01980.x>
- Luchs MG, Naylor RW, Irwin JR, Raghunathan R (2010) The Sustainability Liability: Potential Negative Effects of Ethicality on Product Preference. *J Mark* 74:18–31.
<https://doi.org/10.1509/jmkg.74.5.018>
- Lu Y, Abeysekera I, Cortese C (2015) Corporate social responsibility reporting quality, board characteristics and corporate social reputation: Evidence from China. *Pacific Account Rev* 27:95–118. <https://doi.org/10.1108/PAR-10-2012-0053>
- Manor J (2004) Democratisation with Inclusion: Political reforms and people’s empowerment at the grassroots. *J Human Dev* 5:5–29. <https://doi.org/10.1080/14649880310001660193>
- McDonald S, Oates C, Thyne M, Alevizou P, McMorland L-A (2009) Comparing sustainable consumption patterns across product sectors. *Int J Consum Stud* 33:137–145.
<https://doi.org/10.1111/j.1470-6431.2009.00755.x>
- Milfont TL, Duckitt J, Cameron LD (2006) A Cross-Cultural Study of Environmental Motive Concerns and Their Implications for Proenvironmental Behavior. *Environ Behav* 38:745–767. <https://doi.org/10.1177/0013916505285933>
- Mohr LA, Webb DJ, Harris KE (2001) Do Consumers Expect Companies to be Socially Responsible? The Impact of Corporate Social Responsibility on Buying Behavior. *J Consum Aff* 35:45–72. <https://doi.org/10.1111/j.1745-6606.2001.tb00102.x>
- Nan X, Heo K (2007) Consumer Responses to Corporate Social Responsibility (CSR) Initiatives: Examining the Role of Brand-Cause Fit in Cause-Related Marketing. *J Advert* 36:63–74. <https://doi.org/10.2753/JOA0091-3367360204>

- Newman GE, Gorlin M, Dhar R (2014) When Going Green Backfires: How Firm Intentions Shape the Evaluation of Socially Beneficial Product Enhancements. *J Consum Res* 41:823–839. <https://doi.org/10.1086/677841>
- Nilssen R, Bick G, Abratt R (2019) Comparing the relative importance of sustainability as a consumer purchase criterion of food and clothing in the retail sector. *J Brand Manag* 26:71–83. <https://doi.org/10.1057/s41262-018-0113-5>
- Paas LJ, Dolnicar S, Karlsson L (2018) Instructional Manipulation Checks: A longitudinal analysis with implications for MTurk. *Int J Res Mark* 35:258–269. <https://doi.org/10.1016/j.ijresmar.2018.01.003>
- Park H, Reber BH (2008) Relationship building and the use of Web sites: How Fortune 500 corporations use their Web sites to build relationships. *Public Relat Rev* 34:409–411. <https://doi.org/10.1016/j.pubrev.2008.06.006>
- Parsa HG, Lord KR, Putrevu S, Kreeger J (2015) Corporate social and environmental responsibility in services: Will consumers pay for it? *J Retail Consum Serv* 22:250–260. <https://doi.org/10.1016/j.jretconser.2014.08.006>
- Pierce JL, Kostova T, Dirks KT (2003) The State of Psychological Ownership: Integrating and Extending a Century of Research. *Rev Gen Psychol* 7:84–107. <https://doi.org/10.1037/1089-2680.7.1.84>
- Pomering A, Johnson LW (2009) Constructing a corporate social responsibility reputation using corporate image advertising. *Australas Mark J (AMJ)* 17:106–114. <https://doi.org/10.1016/j.ausmj.2009.05.006>
- Ramirez E, Jiménez FR, Gau R (2015) Concrete and abstract goals associated with the consumption of environmentally sustainable products. *Eur J Mark* 49:1645–1665. <https://doi.org/10.1108/EJM-08-2012-0483>
- Rucker DD, Galinsky AD, Dubois D (2012) Power and consumer behavior: How power shapes who and what consumers value. *J Consum Psychol* 22:352–368. <https://doi.org/10.1016/j.jcps.2011.06.001>
- Ruth JA, York A (2004) Framing information to enhance corporate reputation: The impact of message source, information type, and reference point. *J Bus Res* 57:14–20. [https://doi.org/10.1016/S0148-2963\(02\)00270-9](https://doi.org/10.1016/S0148-2963(02)00270-9)
- Saeed BB, Afsar B, Hafeez S, Khan I, Tahir M, Afridi MA (2019) Promoting employee's proenvironmental behavior through green human resource management practices. *Corp Soc Responsib Environ Manag* 26:424–438. <https://doi.org/10.1002/csr.1694>

- Sarstedt M, Wilczynski P (2009) More for less? A comparison of single-item and multi-item measures. *DBW* 69:211–227
- Schwartz SH (2007) Cultural and Individual Value Correlates of Capitalism: A Comparative Analysis. *Psychol Inq* 18:52–57. <https://doi.org/10.1080/10478400701388963>
- Severn J, Belch GE, Belch MA (1990) The Effects of Sexual and Non-Sexual Advertising Appeals and Information Level on Cognitive Processing and Communication Effectiveness. *J Advert* 19:14–22. <https://doi.org/10.1080/00913367.1990.10673176>
- Spencer-Oatey H (1997) Unequal Relationships in High and Low Power Distance Societies: A Comparative Study of Tutor-Student Role Relations in Britain and China. *J Cross Cult Psychol* 28:284–302. <https://doi.org/10.1177/0022022197283005>
- Spreitzer GM (1995) An Empirical Test of a Comprehensive Model of Intrapersonal Empowerment in the Workplace. *Am J Community Psychol* 23:601–629. <https://doi.org/10.1007/BF02506984>
- Sudbury-Riley L, Kohlbacher F (2016) Ethically minded consumer behavior: Scale review, development, and validation. *J Bus Res* 69:2697–2710. <https://doi.org/10.1016/j.jbusres.2015.11.005>
- Tariq S, Jan FA, Ahmad MS (2016) Green employee empowerment: A systematic literature review on state-of-art in green human resource management. *Qual Quant* 50:237–269. <https://doi.org/10.1007/s11135-014-0146-0>
- Thøgersen J, Zhou Y (2012) Chinese consumers' adoption of a 'green' innovation – The case of organic food. *J Mark Manag* 28:313–333. <https://doi.org/10.1080/0267257X.2012.658834>
- Turker D (2009) Measuring Corporate Social Responsibility: A Scale Development Study. *J Bus Ethics* 85:411–427. <https://doi.org/10.1007/s10551-008-9780-6>
- Walsh G, Beatty SE (2007) Customer-based corporate reputation of a service firm: Scale development and validation. *J Acad Mark Sci* 35:127–143. <https://doi.org/10.1007/s11747-007-0015-7>
- White K, Macdonnell R, Dahl DW (2011) It's the Mind-Set that Matters: The Role of Construal Level and Message Framing in Influencing Consumer Efficacy and Conservation Behaviors. *J Mark Res* 48:472–485. <https://doi.org/10.1509/jmkr.48.3.472>
- Wu G-C (2017) Effects of Socially Responsible Supplier Development and Sustainability-Oriented Innovation on Sustainable Development: Empirical Evidence from SMEs. *Corp Soc Responsib Environ Manag* 24:661–675. <https://doi.org/10.1002/csr.1435>

- Yang X, Weber A (2019) Who can improve the environment—Me or the powerful others? An integrative approach to locus of control and pro-environmental behavior in China. *Resour Conserv Recycl* 146:55–67. <https://doi.org/10.1016/j.resconrec.2019.03.005>
- Zhao X, Lynch JG, Chen Q (2010) Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis. *J Consum Res* 37:197–206. <https://doi.org/10.1086/651257>
- Zhou Y, Poon P, Huang G (2012) Corporate Ability and Corporate Social Responsibility in a Developing Country: The Role of Product Involvement. *J Glob Mark* 25:45–56. <https://doi.org/10.1080/08911762.2012.697385>

Appendices

A1: Stimuli (Studies 1 and 2)

Group	Message
<i>Ad type</i>	
Green empowerment	“Use your power to move green production: By buying environment-friendly products, you can send a signal that you require us to offer more green products and to intensify environment-friendly operations. Every consumer can actively exercise buying power to influence the supplier and therefore the environment.”
Non-green empowerment (only Study 2)	“Use your power to move production: By making product choices, you can send a signal that you require us to offer more of the chosen products and to intensify related operations. Every consumer can actively exercise buying power to influence the supplier.”
Green appeal	“Help improve the environment: By buying environment-friendly products, you can make a step forward to reduce pollutants and to improve environmental quality. Every consumer can take care of the environment.”
Control	“The product information comes from the platform.”
<i>Company type (only Study 2)</i>	
High resource availability	“Our company reached an annual turnover of 91.4 billion Yuan in 2018. We employ over 323,000 people in total. We apply highly innovative technologies in our manufacturing and deliver high-end products to our customers.”
Low resource availability	“Our company reached an annual turnover of 914,000 Yuan in 2018. We employ over 30 people in total. We apply manufacturing technologies of long traditions and deliver high-quality products to our customers.”
Control	“This is the end of the page.”

Note(s): Messages shown were translated into Mandarin Chinese.

A2: Item statistics and related constructs (Study 1 and Study 2)

	Construct (Source)	Items	Scale	Study 1				Study 2			
				Mean	SD	Factor loading	CA	Mean	SD	Factor loading	CA
	Attitude toward the ad (Severn et al. 1990)	Boring/interesting	seven-point	4.76	1.50	0.92	0.90	4.92	1.72	0.92	0.91
		Unfavorable/favorable	semantic	4.93	1.47	0.94		4.98	1.69	0.95	
		Unbelievable/believable	differential	4.84	1.52	0.88		5.08	1.57	0.88	
	Product evaluation (Grant et al. 2004)	Bad/good		5.24	1.29	—	—	5.36	1.40	0.95	0.93
		Dislike/like		5.13	1.43	—		5.25	1.48	0.94	
		The product appears to be of high/low quality.		—	—	—		5.49	1.23	0.91	
Manipulation check	Perceived power (Adapted from Fuchs et al. 2010; Spreitzer 1995)	I can influence to some extent how the product (rice) is produced by this company.	1 = “strongly disagree”; 7 = “strongly agree”	4.42	1.56	0.93	0.92	4.33	1.71	0.90	0.88
		I see that I have some control in determining what kind of products will be produced by this company.		4.31	1.66	0.93		4.33	1.77	0.91	
		I have some influence in determining which products will be sold by this company.		4.47	1.61	0.92		4.43	1.67	0.89	
Mediators	CO	This company... ...Treats customers	—“—	5.34	1.32	0.78	0.87	5.54	1.34	0.79	0.82

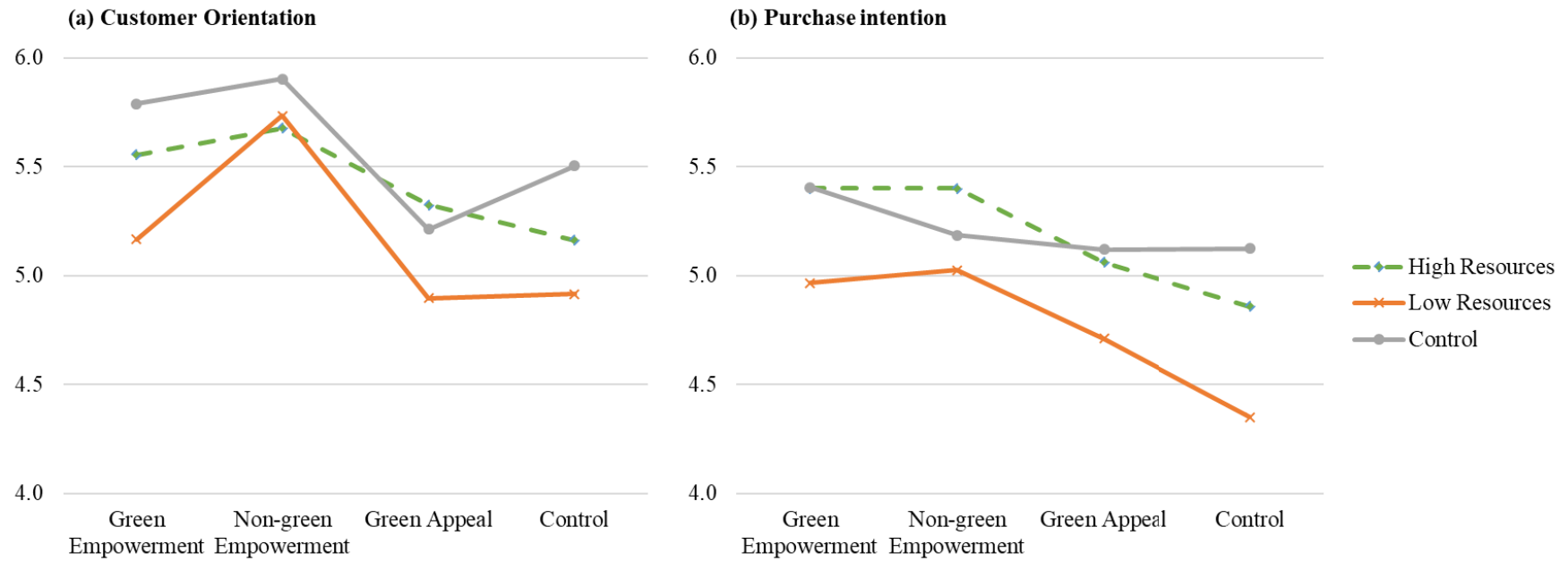
	Construct (Source)	Items	Scale	Study 1				Study 2			
				Mean	SD	Factor loading	CA	Mean	SD	Factor loading	CA
	(Adapted from Blocker et al. 2011; Walsh and Beatty 2007)	courteously.									
		...Is concerned about customer needs.		5.15	1.38	0.88		5.48	1.44	0.88	
		...Is willing to accommodate my requests.		5.00	1.40	0.88		—	—	—	
		...Sees customer interest as priority.		4.87	1.54	0.85		5.21	1.45	0.89	
	CER (Adapted from Turker 2009; Walsh and Beatty 2007)	This company...	—“—								
		...Seems to be environmentally responsible.		5.41	1.36	0.89	0.78	5.36	1.55	0.93	0.87
		...Would try to minimize its negative impact on the natural environment.		5.55	1.23	0.91		5.47	1.59	0.93	
		...Would reduce its profits to ensure a clean environment.		4.60	1.56	0.72		4.67	1.70	0.82	
	Dependent variable	The likelihood of purchasing the product is...	1 = “very low”; 7 =	4.98	1.40	—	—	5.08	1.49	0.95	0.95
		My purchase intention the product is...	“very high”	4.98	1.48	—		5.06	1.53	0.96	
		The probability that I consider buying the product is: ...		—	—	—		5.01	1.55	0.95	
Controls / covariates	Purchase habits (self-developed)	During the last year... ...How often have you bought rice online?	1 = “not often at all”; 7 = “very	3.84	1.90	—	—	4.02	2.08	—	—

Construct (Source)	Items	Scale	Study 1				Study 2			
			Mean	SD	Factor loading	CA	Mean	SD	Factor loading	CA
	...How often have you bought environment-friendly products?	often"	4.95	1.46	—		5.25	1.49	—	
Message familiarity/ comprehensibility (self-developed)	The message appeared familiar to me.	1 = "strongly disagree"; 7 =	4.65	1.37	—	—	—	—		
	The message confused me when reading it.	"strongly agree"	2.95	1.55	—		—	—		
Social desirability (Adapted from Crowne and Marlowe 1960)	I am always willing to admit it when I make a mistake.	1 =	3.99	0.78	0.50	0.55	4.17	0.71	0.64	0.55
	I am sometimes irritated by people who ask favors of me. ^R	"disagree"; 5 = "agree"	3.23	1.05	0.75		—	—	—	
	I have never been irked when people expressed ideas very different from my own.		3.25	1.07	0.61		3.54	1.09	0.77	
	There have been occasions when I took advantage of someone. ^R		3.50	1.10	0.72		—	—	—	
	I am always courteous, even to people who are disagreeable.		—	—	—		3.95	0.91	0.76	
Manipulation checks (Study 2)	Company size (self-developed)	Based on the description, what do you think about the size of the company? The company appears to be: ...	1 = "very small"; 7 = "very large"	—	—	—	—	4.91	1.64	—
	Resource availability	In general, I think that this	1=strongly	—	—	—	—	5.22	1.48	—

Construct (Source)	Items	Scale	Study 1				Study 2			
			Mean	SD	Factor loading	CA	Mean	SD	Factor loading	CA
(self-developed)	company's resources are probably very rich. I believe that this company has rich resources for its production and operations.	disagree; 7=strongly agree	—	—	—		4.88	1.62	—	

Note(s): CA = Cronbach's alpha. ^R Reverse coded items (recoded before analysis). Factor loadings are derived from principal component analyses.

A3: Group means for CO and purchase intention (Study 2)



8. Article III

When People Can Be Green and Greedy – A New Perspective of Recycling Rewards and Motivation Crowding-out in Germany, the USA and China

Under Review in: Journal of Business Research

Note: In accordance with the journal's author rights, the version published here is the first submitted manuscript. If the paper is accepted and published, it will be available on the Journal Homepage: <https://www.journals.elsevier.com/journal-of-business-research>.

Abstract

Previous research report conflicting results for the effectiveness of economic incentives compared to environmental appeals for promoting pro-environmental behavior and has largely neglected the possibility of combining both approaches. Further, most experimental studies are limited to single countries or smaller geographical areas and do not account for possible country differences. Based on online experiments in three countries ($N_{\text{Germany}} = 322$, $N_{\text{USA}} = 305$, $N_{\text{China}} = 361$), this research aims at investigating the possible benefits of combining economic incentives and environmental appeals. We tested a monetary reward for recycling that can be only redeemed for eco-friendly products, which we call a “green reward,” and compared it to a standard reward (redeemable for any product of choice) and a green appeal (highlighting the environmental impact of individuals’ choices). In China, green rewards significantly increased internalized and introjected motivation, while the latter contributed to an individual’s recycling intentions. In the USA, rewards improved recycling intentions mainly via extrinsic motivation. In Germany, green appeals appeared to be the most effective strategy. In the USA, but not Germany and China, the restrictions in the use of money in the green reward reduced individuals’ perceived autonomy support. Hence, this research finds differences between countries in the occurrence of “crowding-out” of internalized motivation and shows under what circumstances these effects could be compensated. Our findings suggest that policymakers and marketers should recognize the potential of designing incentives with an environmental purpose, which at least under some conditions is able to neutralize earlier identified negative effects of economic incentives on people’s motivations and behavioral intentions to recycle.

Keywords: Economic incentive, self-determination theory, autonomy support, recycling behavior, eco-friendly purchase.

8.1 Introduction

Short product lifecycles in current production and consumption systems and low recycling rates at global level have led to severe waste problems, resource depletion and environmental pollution (e.g. Kumar et al., 2017; Singh et al., 2014). Without a significant system change, the global annual waste volume is anticipated to increase from 2.01 billion tons in 2018 to 3.40 billion tons by 2050 (World Bank, 2018). To reach common conservation goals and increase recycling rates, the engagement of individual consumers is necessary. Previous research has empirically tested a variety of intrinsic and extrinsic motivators to promote individuals' pro-environmental practices (e.g. Bolderdijk & Steg, 2015; Green & Peloza, 2014; Steinhorst et al., 2015). However, the existing evidence regarding the effectiveness of interventions to engage private consumers, such as environmental appeals and economic incentives, is insufficient and inconsistent. In addition to the intended incentive effect, small economic incentives can generate a "foot-in-the-door" effect, which can result in spillover effects on other behaviors (Lanzini & Thøgersen, 2014; Souchet & Girandola, 2013). However, economic incentives may also crowd out individuals' intrinsic motivation (Frey & Oberholzer-Gee, 1997). Information means such as environmental appeals often succeed at increasing individuals' interest in a topic or behavior, which can in the long-term build intrinsic motivation with a potential for driving actual behavior but can also remain an interest only (Harackiewicz et al., 1998). Overall, the relative effectiveness of appeals to environmental responsibility and economic incentives still needs further investigation. Especially, experimental research exploring the possibilities in combining both intervention types and benefit from their complementary advantages is rare. There are a few studies examining the effects of combining these interventions types (e.g. Kareklas et al., 2014), but to the best of our knowledge the present study is the first to examine whether and how economic incentives can be designed in such a way that they do not undermine (or even contribute to) intrinsic environmental motivation.

Actual recycling rates vary a lot by country (EEB, 2019). Linked to this, there are big differences in the availability of recycling options, people's perceptions of behavior control with regard to recycling (Morren & Grinstein, 2016), and in cultural values that affect individuals' intention to engage in recycling (Crociata et al., 2015). For example, Germany has reached a high recycling rate of municipal waste (60% according to UBA, 2020), even though 49% of residents admit to not pay attention to disposing waste in the correct type of containers (Statista, 2020). In the USA, recycling rates for major waste categories are below 50% (EPA,

2017). There is less focus on organized recycling of household waste in developing and emerging economies, but this is changing. For example, on May 1, 2020, Beijing as the one of the first cities in China introduced household waste sorting into four major categories (CNGT, 2020). The new household waste system is expected to be implemented nationwide by 2025 (CPG, 2019). Despite the huge variation in recycling across countries, most experimental recycling studies are limited to a single country, often the USA or European countries (e.g. Asensio & Delmas, 2015; Evans et al., 2013; Kaiser et al., 2020; Kong & Zhang, 2014). Hence, there is a lack of research on recycling in developing and emerging economies and in particular research applying a comparative perspective allowing an assessment of the generality of findings across socio-economic contexts. Notably, there is a lack of recycling research comparing China and developed countries. This is especially problematic given that China is not only the world's most populous country, but also one of the biggest economies, accounting for 35 of the 90 billion tons of global material consumption (Wang et al., 2019).

Across countries, it is an ongoing challenge to get individuals to source-separate their waste, and municipalities, waste companies and academics constantly attempt to develop new, innovative solutions, including solutions based on economic incentives. For instance, in selected residential areas of Beijing, smart recycling bins have been introduced, which allow residents points for delivered recyclables that they can exchange against daily supplies (Global Times, 2019). A similar concept has been implemented in the Finnish town Lahti, where people can earn small rewards in a mobile app when they bike and thereby reduce emissions (European Commission, 2020). However, the effectiveness of such innovative economic incentives still remains to be investigated.

To contribute to the identified research gaps with regard to the possibility of avoiding crowding-out effects of economic incentives and comparative, cross-country research on recycling interventions, we test a monetary reward for recycling activities, which is designated for the purchase of eco-friendly products (called “green reward” in the present study), compared to a standard reward (with no restrictions on the type of products one can acquire) and to an information-only intervention (a “green” appeal). Compared to extant research, this study provides new evidence on the effects of an incentive design that targets different aspects of individuals’ motivation, including both internalized, eco-oriented motivation and extrinsic, ego-oriented motivation, while also attempting to counter the motivation crowding-out effect of economic incentives (cf., Frey, 2012). We also investigate the potential negative effect on

individuals' autonomy perceptions of an incentive system restraining participants' freedom to use a recycling reward for whatever they want. We compare the effectiveness of the studied interventions in Germany, the USA and China in order to cross-validate findings and investigate their generality.

8.2 Theoretical Foundation and Hypotheses

8.2.1 Self-determination Theory and Pro-environmental behaviors

Within self-determination theory, a main distinction is between internalized and non-internalized motivation (e.g. Ryan & Deci, 2000b; Schösler et al., 2014; Thøgersen, 2003). Ryan and Deci (2002) make a finer distinction between a continuum of multiple motivation and regulation types, from amotivation through external regulation, introjected, identified, and integrated regulation to intrinsic motivation. While behavior that is regulated by intrinsic, integrated or identified motivation are categorized as internalized, regulation by introjected and external motivation are considered non-internalized (Osbaldeston & Sheldon, 2003). When intrinsically motivated, people practice a behavior because they find it interesting or enjoyable in itself, while integrated and identified regulation occur when the behavior is recognized as personally important. External regulation refers to practicing a behavior because it leads to desired outcomes, such as verbal praise or monetary rewards (Osbaldeston & Sheldon, 2003). The behavior regulation is introjected when individuals perform the behavior in order to avoid feeling guilt or shame (Ryan & Deci, 2000).

Many studies support the proposition that strengthening internalized motivation is an effective means to promote pro-environmental behavior (e.g. Bolderdijk et al., 2013; Ku et al., 2012; Schuhwerk & Lefkoff-hagius, 1995; Schwartz et al., 2015; Steinhorst & Matthies, 2016). At the same time, a meta-analysis confirmed the positive effects of economic incentives on energy conservation behaviors found in many studies (Delmas et al., 2013). Based on self-determination theory, previous research has criticized the use of economic incentives for undermining intrinsic motivation (Deci & Ryan, 1985) or causing so called *motivation crowding-out* (Frey, 1997). Frey defined several components that are relevant for an individual's support for a specific project. While economic benefits, external monetary compensation and perception of one's civic duty are expected to have positive effects, economic costs and crowding-out of intrinsic motivation have negative effects. Note, though, that motivation crowding-out does not necessarily result in the ineffectiveness of monetary

rewards, but the crowding-out has negative effects on intention and behavior, which reduces the effect of the economic incentive and might eventually dominate the outcome. However, some studies did not find this effect. For example, Eisenberger et al. (1999) found positive effects of rewards on individuals' self-reported interest and intrinsic motivation and Thøgersen (2003) found a positive effect of a weight-based garbage fee on personal norms for recycling.

A possible reason could be that rewards reduce intrinsic motivation only for highly intrinsically motivated activities (Cameron et al., 2001; Deci et al., 2001). Gagné and Deci (2005) acknowledge the need for external motivation for many activities, which are not intrinsically interesting. For instance, most people might not particularly enjoy sorting recyclables into the correct bins. In such cases, an initial enactment would take place due to the perception of a contingency between the behavior and a desired consequence (e.g. rewards) (Gagné & Deci, 2005). Some studies indicate that the removal of extrinsic rewards also removes behaviors that were previously incentivized (Frey & Stutzer, 2012; Lehman & Geller, 2004). For these activities, internalization of the regulation is required for the behavioral pattern to remain the same after removing extrinsic rewards. Internalization refers to the process when people adopt values, attitudes or regulations so that the external regulation of a behavior transforms into an internal regulation and the external contingency is no longer required (Gagné & Deci, 2005). The process of internalization can, but need not be, stepwise through the stages introjection and identification to full integration (Ryan & Deci, 2002).

Supplementing the perspectives on motivation crowding-out and internalization of external regulation, Vansteenkiste et al. (2007) suggested the concept of *specialized goal patterns* and that the co-existence of a task orientation (reflected by an environmental appeal) and an ego-approach orientation (embodied in a reward) may yield different or specialized effects. This implies that, communicating environmental benefits of a task such as recycling might contribute parts of the intention to recycle and an economic incentive might contribute another part. For example, Kareklas et al. (2014) showed that the combination of both environmental and monetary appeals is more effective than only using monetary appeals.

According to this line of research, when an economic incentive is used, it should ideally be integrated with communicating environmental goals to counter potential motivation crowding-out effects. Especially, economic incentives may be utilized to promote initial interest in a non-enjoyable pro-environmental behavior, which might then be targeted for internalization in the next step. A green reward contains both an economic incentive (reward) and an environmental

appeal (condition for eco-friendly purchase). The eco-friendly purchase, which is enacted when using a green reward, signals environmental conservation as the superior goal behind both recycling and earning the reward. Thus, we expect the green reward to counter for the crowding-out effect and potentially activate internalized environmental motivation due to the linking of the reward to the acquisition of pro-environmental products, similarly to a green appeal. Further, the economic incentive incorporated in a green reward would in itself be able to increase recycling intention and thereby recycling behavior (Cheung et al., 1999), since people who are not intrinsically motivated to recycle or consider waste sorting unenjoyable would still be extrinsically motivated by the incentive. Overall, we expect a green reward to activate different, specialized motivational patterns. In contrast, a standard reward is not expected to contribute to internalized motivation. A reward (irrespective of type) is expected to increase external motivation, as obtaining the reward becomes a desired outcome of the recycling behavior. In addition, people may experience guilt (introjected motivation) if they do not recycle even in the presence of a reward for doing so. Based on this reasoning, we hypothesize:

H1: Both (a) a green reward and (b) a green appeal increase internalized motivation compared to a standard reward.

H2: Both (a) a green reward and (b) a standard reward increase introjected motivation to recycle compared to a green appeal.

H3: Both (a) a green reward and (b) a standard reward increase extrinsic motivation compared to a green appeal.

A parallel motivation is expected following the assumption that multiple divergent motives can simultaneously drive environmental behavioral intentions (Vansteenkiste et al., 2007). As discussed previously, the promotional effects of both internalized and non-internalized motivation on behavioral intention are supported in the literature.

H4: (a) Internalized motivation, (b) introjected motivation, and (c) extrinsic motivation to recycle all are positively related to recycling intentions.

8.2.2 Perceived Autonomy Support

Autonomy is widely defined as the experience of independence and willingness, which contrasts the feelings of being externally control or forced (Chen et al., 2015). In the framework of self-determination theory, scholars argue that people need to experience satisfaction of basic needs including relatedness, competence and autonomy with respect to a behavior as a

prerequisite for internalizing its regulation (Deci & Ryan, 2000; Ryan et al., 1995). The degree of satisfaction of the need for autonomy plays an important role in determining the extent to which external regulation can be internalized. Studies have investigated the interaction of intrinsic and extrinsic goals with an autonomy-supportive or controlling social environment (e.g. Vansteenkiste et al., 2007). Significant effects of the perception of autonomy on the self-determination of motivation and behavioral intentions have been shown in several studies (e.g. Cooke et al., 2016; Gagné, 2003; Grønhøj & Thøgersen, 2017).

Restricting the spending of a monetary reward to eco-friendly products might trigger perceptions of lacking a free choice in individuals (Lavergne et al., 2010). A person's own product preferences and perceived importance of environmental issues would appear to be disrespected.

H5: A green reward decreases perceived autonomy support compared to (a) a standard reward, (b) a green appeal.

H6: Perceived autonomy support has a positive effect on (a) internalized motivation and (b) intention to recycle.

8.2.3 Country Effects

Source-separation of household waste for recycling has been an established practice in Germany for decades. While the USA also has a long recycling history, recycling is not yet as pervasive as in Germany. In these countries, most people have internalized waste sorting as a social norm to a higher extent than in countries where the collection of source-separated household waste for recycling is still in an early phase (Thøgersen, 2006). In countries where a high level of internalized motivation to recycle exists, extrinsic rewards are more likely to be either ineffective or to negatively affect recycling due to the crowding-out of internalized motivation. The stronger individuals believe that a specific behavior is important and the more they accept it as their moral obligation, the more they are likely to feel distracted from their original motivation by rewards. Hence, these crowding-out effects seem more likely to occur among Germans and Americans, who are more likely to have internalized their regulation of recycling behavior, compared to Chinese. Furthermore, despite the rising living standards in China, there still exists a significant income gap between China and countries such as Germany and the USA. For people in China, compared to those in high-income countries, monetary gain may therefore be a stronger determinant of individual choices and they may respond more favorably to interventions offering a reward. Thus, Chinese are expected to have greater

internalized motivation and improved recycling intentions in the presence of a reward compared to people in economically more developed countries.

H7: Both green and conventional rewards have a more positive effect on internalized motivation and intentions to recycle in China compared to (a) Germany and (b) the USA.

A cross-national study in eight countries found that Asians report lower perceived autonomy in various aspects of life compared to non-Asians (Church et al., 2013), whereas perceived autonomy generates similar effects on well-being across countries (Chen et al., 2015; Church et al., 2013). When individuals are satisfied with their level of autonomy in a country, they might also expect to maintain it, whereas a decrease in autonomy support might cause adverse effects. In comparison, if individuals are less satisfied with the previous level of autonomy in the country, as appears to be the case in many Asian countries, including China, they may not perceive another somewhat restrictive policy as anything out of the ordinary and therefore not experience any significant amount of additional dissatisfaction. On this background, we expect Chinese (compared to Germans and Americans) to have lower expectations of autonomy support and to be less negatively affected by interventions with inbuilt restrictions on free choice.

H8: A green reward has a detrimental effect on perceived autonomy support compared to a standard reward to a higher extent in (a) Germany and (b) the USA than in China.

In Figure 5, the hypothesized effects are graphically illustrated.

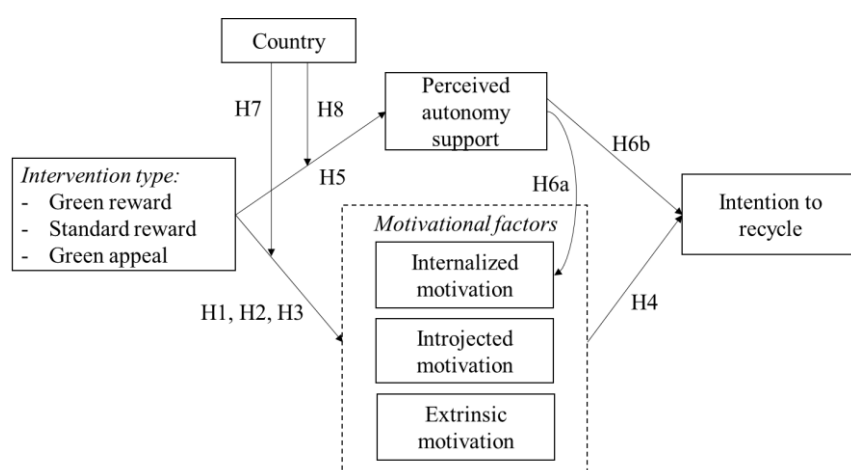


Figure 5: Conceptual model

8.3 Methods

8.3.1 Sample

We conducted an online survey in three countries: Germany, the USA and China. The questionnaire was programmed using an established online tool Unipark. In Germany, participants were recruited using the service from an online panel called Respondi, which has been applied by many scholars (Urquhart et al., 2017; Weyrich et al., 2020). In China, participants were recruited via WeidiaoCha, a professional survey platform, where participants receive a small incentive for completing the survey. Extant research articles indicate the sufficiency of collected data via this platform in different fields (e.g. Ge and Gretzel, 2017; Kaluza *et al.*, 2019; Zheng, 2019). Further, based on evidence on response quality of crowdsourcing platforms in the USA (Smith et al., 2016), we acquired survey data in the USA via Amazon Mechanical Turk (MTurk). To ensure data quality, we only acquired participants who have gained the qualification of Master (based on several official evaluation criteria of the provider) and have an approval rate of 95%. MTurk Masters are more likely to remain attentive during tasks, provide higher reliability scores and demonstrate lower rates of socially desired responses compared to less qualified workers (Peer et al., 2014).

We collected 332 usable questionnaires in Germany, 305 in the USA and 361 in China during July 2020. Two pre-tests were carried out in each country to improve the questionnaire and control its internal validity (please see items and scales described in section 3.3). The questionnaire was composed in English and translated into German and Mandarin Chinese using an iterative approach, which strives for conceptual rather than literal equivalence (Douglas & Craig, 2007).

In Germany/the USA/China, 55.1% / 52.8% / 60.4% of the participants are females. The sample in Germany is representative in terms of sex, age (18 years old and older) and place of residence in 16 federal states (Statistisches Bundesamt, 2020). The average age class is 40 to 49 years. 34.6% of participants are younger than 40 years old, while 59.4% are between 40 and 69 years old. In China, a sample was requested that represents the actual distribution of age and place of residence among all 31 provinces of the mainland according to features from China Statistical Yearbook 2019 (NBSC, 2019), but in the final sample women are slightly overrepresented. The average age class is 30 to 39 years. 45% of participants are younger than 40 years and 50.6% are between 40 and 69 years old. Finally, in the USA, we also requested a sample that is representative in terms of sex and age (IMF, 2019; US Census Bureau, 2019a, 2019b), except of participants younger than 20 and older than 70 years. The average age class is 30 to 39 years.

41.6% of participants are younger than 40 years, while 57.1% are older but younger than 70 years. This sample covers 43 of 50 US states and has a distribution that is similar to the actual distribution, except that Pennsylvania, Texas and New Jersey are slightly underrepresented.

8.3.2 Stimuli

We conducted a survey-based online experiment with a between-subjects design where participants were randomly assigned to one of four conditions: green reward, standard reward, green appeal and control group. The former two conditions introduce a recycling program in which residents can gain a monetary reward for the recyclables they deliver. The difference between the two lies in the redeem process: while the green reward can only be spent on eco-friendly products, no *green* restriction is given to the usage of the standard reward. Instructions for gaining and using the reward were presented in a text, which is additionally visualized by a procedure infographic (see stimuli in Appendix A1). To ensure that the introduced program appears realistic to participants, the stimulus was adjusted for each country to give a familiar example from people's living environment that can serve to illustrate the recycling program. Further, to indicate realistic amounts of recycled waste, we referred to official numbers from ministries and other reliable sources about private waste volume in major waste categories (Germany: UBA, 2018; DBT, 2019; USA: EPA, 2016, 2020; China: MEE, 2019; BJNEWS, 2018). For setting the size of the rewards, we referred to current market prices acquired from the private sector in China that operates a pay-by-weight system toward individuals. The prices paid per category and kilogram were calculated for the average monthly volume for the Chinese context in RMB Yuan first. To account for the varying purchasing power in different countries, the reference prices were adjusted according to the Big Mac Index of Germany and the USA in relation to that of China (IMF/The Economist, 2020).

For example, in the green reward condition, the following text was shown to the US participants: "Inspired by California's redemption fee ("California Refund Value"), the authorities have decided to launch a new recycling program in your city that rewards you for the amount of waste materials you separate for recycling. A new, smart recycling system will serve to collect the recyclables and to assign the reward. If your individual household waste in the last month contained, for example, 15 kg of paper, 4 kg of plastics, 2 kg of glass and 3 kg of metals (e.g. cans and lids), you would receive 8.12 US dollars when delivering these materials. You can spend the reward on eco-friendly products of your choice in one of the collaborating online stores, such as EarthChoice. Here, you can buy, for example, organic food, toilet paper made

of recycled paper or eco-labelled dishwasher soap.” At the end of the stimulus, a screenshot of an eco-friendly online store was shown covering a variety of daily supplies, which can be bought using the reward. Product prices were indicated based on actual market prices in each country. The stimulus in the standard reward condition is similar but refers to an online store that sells conventional products, for which a matching screenshot was shown.

In the green appeal condition, the same introduction was shown as in the reward conditions describing the recycling program and giving the same example of the monthly recycling volume. Next, participants read an appeal that encourages them to engage in recycling for environmental and social reasons: “...By recycling your household waste, you can help conserve resources, reduce climate change and protect the environment. Everyone should do their bit to protect the environment, for the sake of nature and future generations.” All three experimental conditions were consistent in their style and length of text as well as graphic design.

To increase the comparability between conditions, we designed a filler task that participants were asked to do in the control group. Participants were asked to describe their current surroundings when completing the survey according to different aspects (Appendix A1). The duration of time needed to complete this task is similar to the reading time required in the other conditions.

8.3.3 Procedure and Survey Design

First, participants were asked to state frequencies of practicing pro-environmental behaviors in their daily lives using a scale from 0 to 10 times based on Thøgersen (2003), such as the purchase of eco-labeled products and the correct disposal of plastic bottles. Then participants were assigned to one of the four conditions and were asked to read the stimulus including text and images carefully, which were shown to them next (see section 3.2, Appendix A1). A manipulation check was done for the experimental conditions where participants were asked to summarize in their own words the main ideas of the recycling program that was just introduced. In terms of manipulation checks, we followed the recommendation to create some that make sense as part of the general framework of the experiment in order not to interrupt participants' experience (Hauser et al., 2018). Based on studies such as Banks & Valentino (2012), Friedman & Sutton (2013) and Clifford & Jerit (2014) that successfully applied open-ended manipulation checks, we chose the format of open-ended questions to identify the key messages from the participant's point of view after reading the stimulus.

The main questionnaire contains six parts: (1) intention to recycle, (2) motivational patterns including intrinsic, identified, introjected and external motivation, (3) perceived autonomy support, (4) items from Schwartz's PVQ value scale (universalism and power), (5) control variables including attitude toward recycling and perceived behavioral control, as well as (6) socio-demographics. To measure intention to recycle, both a general item and specified items by waste category were used. First, participants were asked to state the likelihood that they will separate recyclable waste in the future (in experimental conditions: in the recycling program) using a scale from 1 (very unlikely) to 7 (very likely). Next, participants were asked to answer this question for five specific categories of waste including plastics, paper, cardboard, glass and metals, for which examples were given, such as food packaging and bottles for plastics. After consulting extant research, including Guay et al. (2010), Reeve (2002) and Vlachopoulos & Karageorghis (2005), four motivation dimensions derived from self-determination theory (intrinsic, identified, introjected and external) were measured with three items each, adapted to fit the recycling context, e.g.: "I like recycling" (intrinsic), "I find recycling an important thing to do" (identified), "I recycle because I would feel guilty if I didn't" (introjected), "I recycle to obtain (or to save) money or other benefits" (extrinsic). The answer options were on a scale from 1 (does not match at all) to 7 (matches very well), referring to Wang et al. (2017). Next, participants were asked to evaluate the introduced recycling program. Perceived autonomy support was measured based on three items modified from Lavergne et al. (2010) and Lim & Wang (2009): e.g. "The city government gives me freedom to make my own choices with regard to the environment." With regard to individuals' basic values, we adapted items from Schwartz's PVQ value scale measuring universalism and power (three items each) developed for the European Social Survey (Schwartz, 2012). Moreover, several control variables were included, such as three items for perceived behavioral control based on Conner et al. (2000) and de Leeuw et al. (2015). Attitude toward recycling was measured using three semantic differentials from Hansla et al. (2013) and Severn et al. (1990). These items were also measured on an answer scale from 1 to 7 (1='does not match at all'; 7='matches very well').

In addition, as intrinsic and identified motivation load on one factor according to an explorative factor analysis and result in a sufficient composite reliability of 0.84 (see Table 20), these two constructs are merged into internalized motivation. Thus, we use the composites of intrinsic and identified motivation as factors of the latent variable "internalized motivation" in the structural equation model (section 4.5 to 4.7).

8.3.4 Analysis Approach

To analyze the relationships between intervention type, motivational factors, perceived autonomy support (PAS) and intention to recycle (ITR), a three-step approach was used: The first step was to identify the hypothesized direct effects of interventions on motivational factors and PAS. Analyses of variance were conducted to uncover significant means differences between experimental groups. Second, the hypothesized relationships between mediators and ITR were explored by a correlation analysis uncovering which factors could be responsible for the indirect effects of intervention type on ITR. Third, we estimated the structure of relationships between all antecedents and ITR including direct and indirect relationships based on a structural equation model. Analyses were conducted using AMOS 27.

8.4 Results

8.4.1 Data Cleaning and Manipulation Checks

Acquired data has been cleaned according to several criteria: We checked for cases with more than 15% missing values per respondent and more than 5% missing values per item. Further, we excluded straightliners from the datasets using a straightlining index of twelve main variables based on standard deviations (SD). Further, cases with extremely long or short duration of completion were cleaned (criteria: $\text{min} = \text{mean} / 2$; $\text{max} = \text{mean} + 2 \times \text{SD}$). The final samples after cleaning are $N_{\text{Germany}} = 332$, $N_{\text{USA}} = 305$, $N_{\text{China}} = 361$.

For the green reward condition, we did a two-step manipulation check: First, we confirmed if participants recognized that a reward is offered in the recycling program, as a weak manipulation check. Second, we checked if they wrote about the reward condition that it is determined for eco-friendly purchase, as a strong manipulation check. In the first step, 69 (of 75) in Germany, 79 (of 84) in the USA and 79 (of 97) in China passed the manipulation check (success rate: 88.7%). In the second step, only 31 in Germany, 58 in the USA and 36 participants in China wrote about the conditioned spending of the green reward (success rate: 48.8%). Further, in the standard reward group, we checked if participants recognized the reward, which is the case for 78 (of 92) in Germany, 69 (of 75) in the USA and 75 (of 86) participants in China (success rate: 87.7%). Moreover, 64.1% of participants in the green appeal group passed the manipulation check by indicating environmental protection or sustainability as the purpose of the recycling program: 51 (of 79) in Germany, 42 (of 64) in the USA and 55 (of 88) in China. Despite not everyone reporting the environmental aspects, we decided to keep

everyone in the sample for the following reasons. First, we cannot rule out that participants who read about the eco-friendly purchase did not consider it as part of the central message and just answered the open questions parsimoniously. Second, there is the risk that removal of participants who fail the manipulation check might lead to biases, since the treatment would no longer be evaluated based on randomly allocated groups (e.g. Aronow et al., 2019; Kotzian et al., 2020). Thus, to enable future replication and comparison of studies, we report results based on the full sample, but we conduct additional analyses only using participants who passed the manipulation check for comparison (see section 4.7).

8.4.2 Individual-level Characteristics

According to results of ANOVAs with Scheffé's post hoc test (Table 17), the level of universalism appears to be similar among individuals in three countries, while that of power differs significantly. Chinese indicate a higher level of power values compared to both Germans and Americans. Further, Germans report to practice pro-environmental behaviors in daily life more frequently than Chinese, while Americans report the lowest frequencies. Perceived behavioral control is also significantly different between countries. Highest scores are identified for Germany, followed by USA and China.

Table 17: Individual-level characteristics in three countries

	Germany		USA		China		F-statistics	Significant country differences
	Mean	SD	Mean	SD	Mean	SD		
Universalism	5.61	1.20	5.74	1.22	5.82	1.03	7.696†	-
Power	2.96	1.31	3.12	1.74	4.10	1.43	262.856**	CH > DE, CH > US
Pro-environmental behaviors	8.14	1.72	5.72	2.41	7.07	2.18	465.298**	DE > CH, DE > US, CH > US
Perceived behavioral control	5.88	1.21	5.53	1.52	4.96	1.26	75.601**	DE > CH, DE > US, CH < US

Note(s): ** $p < 0.01$, * $p < 0.05$; † $p < 0.10$; DE = Germany, US = USA, CH = China.

To account for potential effects caused by socio-demographic features, we computed several ANOVAs and Scheffé's post hoc tests with sex, age and place of residence as independent variables and intention to recycle, four motivational patterns, perceived autonomy support and attitude toward recycling as dependent variables. In Germany, sex (female vs male) and age have significant positive effects on attitude toward recycling ($p < 0.05$), while intrinsic motivation increases with age. In the USA, place of residence significantly affects perceived autonomy support. We found no significant effects of socio-demographic variables on dependent variables in China.

8.4.3 Analyses of Variance

A series of ANOVAs was used to identify possible differences between experimental groups in intentions to recycle, motivational patterns, perceived autonomy support and attitude toward recycling. In advance, we found significant differences for all these variables between three countries ($p < 0.01$). Therefore, we analyzed the effects of interventions by country. Based on ANOVAs with Scheffé's post hoc test (Table 18), among German participants the green appeal lowered perceived autonomy support compared to the control group. Moreover, German participants offered a green reward were more extrinsically motivated compared to the control group. In the USA, both reward conditions led to a higher level of extrinsic motivation compared to the control group. Also among Chinese participants, both reward conditions positively affect extrinsic motivation compared to the control group. In addition, the standard reward led to higher intrinsic motivation compared to the control group and a green reward led to higher extrinsic motivation than a green appeal. To sum up, mean comparisons suggest that intrinsic motivation, extrinsic motivation, and perceived autonomy support could mediate the effects of experimental manipulations on intentions to recycle.

Table 18: Means of motivational patterns in three countries

	Intrinsic motivation			Identified motivation			Introjected motivation			Extrinsic motivation		
	DE	US	CH	DE	US	CH	DE	US	CH	DE	US	CH
Green reward	5.76	5.17	5.85	6.40	5.90	6.35	5.29	4.74	5.31	3.95	3.51	4.14
Standard reward	5.64	5.17	5.98	6.21	6.03	6.21	5.09	4.79	5.21	3.83	3.48	3.93
Green appeal	5.68	5.47	5.79	6.50	6.20	6.27	5.19	4.90	5.36	3.17	3.16	3.49
Control group	5.45	5.13	5.39	6.30	5.94	6.04	5.28	4.64	5.02	3.38	2.61	3.25
F	0.83	0.65	3.42*	1.16	0.57	1.48	0.27	0.23	1.08	4.44**	4.83**	7.00**

Note(s): ** $p < 0.01$, * $p < 0.05$; DE = Germany, US = USA, CH = China; see results for internalized motivation in Appendix A3.

Table 19: Means of perceived autonomy support, attitude toward recycling and intention to recycle in three countries

	Perceived autonomy support			Attitude toward recycling			Intention to recycle		
	DE	US	CH	DE	US	CH	DE	US	CH
Green reward	4.85	4.96	5.45	6.05	6.13	6.64	6.56	5.99	6.09
Standard reward	4.62	4.88	5.47	6.14	6.30	6.56	6.47	6.21	6.17
Green appeal	4.15	5.11	5.11	6.42	6.24	6.47	6.65	6.14	6.29
Control group	5.11	5.34	5.36	6.25	6.35	6.43	6.56	5.58	5.86
F	4.60**	4.83**	1.18	1.65	0.57	1.02	0.56	2.79*	3.65*

Note(s): ** $p < 0.01$, * $p < 0.05$; DE = Germany, US = USA, CH = China.

8.4.4 Correlations

Results of correlation analyses based on CFA in AMOS show that all latent variables, which are expected to mediate the relationship between interventions and intention to recycle, significantly correlate with intention to recycle, except external motivation in Germany and China (see Appendix A2). Besides, all other latent variables significantly correlate with each other in each country, while external motivation shows inconsistent correlations across countries. These results suggest keeping all latent variables in the structural equation model, since external motivation seems to have the potential to explain intentions to recycle in the USA.

8.4.5 Reliability and Validity

The reliability and validity analysis of multi-item constructs was conducted based on CFA, using Gaskin and Lim's AMOS plugin to calculate construct reliability (CR) and average variance extracted (AVE). In all three countries, construct reliability for all latent variables is higher than 0.70, except for extrinsic motivation in Germany (CR = 0.67) (Table 20). Further, the AVE values of all constructs are above the 0.50 threshold level in the USA. In Germany, the AVE value of extrinsic motivation only reaches 0.42 but all other constructs show above-threshold values. In China, both extrinsic motivation and intention to recycle have AVE values between 0.40 and 0.50, while all other constructs show AVE values above 0.50. According to Fornell and Larcker (1981), the average variance extracted is a more conservative estimate of the validity of measurement model and "on the basis of p_n (composite reliability) alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error" (p. 46). This is compatible with more recent methodological suggestions such as Cheung & Wang (2017). Based on the composite

reliabilities above the acceptable level of 0.60 (Fornell & Larcker, 1981), the convergent validities of the constructs are deemed adequate.

In terms of discriminant validity, we found one slight breach of the strong criterion that the square root of AVE is larger than the correlation rates between each construct and other constructs (Fornell & Larcker, 1981). We found that the square root of the AVE for internalized motivation (0.80) and introjected motivation (0.79) is slightly smaller than the correlation between the two constructs (0.81) in China. For all other constructs and countries, discriminant validity is sufficient. Hence, we judge that our constructs possess acceptable construct and discriminant validity.

Table 20: Evaluation of the measurement model

	Germany		USA		China	
	CR	AVE	CR	AVE	CR	AVE
Internalized motivation	0.84	0.72	0.86	0.75	0.78	0.64
Introjected motivation	0.84	0.63	0.90	0.74	0.83	0.62
Extrinsic motivation	0.67	0.42	0.76	0.51	0.70	0.45
Perceived autonomy support	0.87	0.70	0.83	0.63	0.83	0.63
Attitude toward recycling	0.91	0.78	0.92	0.80	0.80	0.57
Intention to recycle	0.91	0.66	0.93	0.72	0.78	0.42

Note(s): CR = composite reliability, AVE = average variance extracted.

8.4.6 Metric Invariance

To assess the measurement invariance across three countries, a multi-group CFA analysis was conducted. Model 1 is the unconstrained or freely distributed model and provides an acceptable model fit according to the threshold for CFI of 0.90 (Bentler & Bonett, 1980; Hair et al., 2010; Awang, 2012), for RMSEA of 0.05 and χ^2 /df of 3. Thus, the model possesses configural invariance. In the next step, all factor loadings were constrained to be equal across the three samples (Model 2). The model fit deteriorated slightly according to several criteria. To assess partial metric invariance, which is sufficient for comparing structural regression weights (Steenkamp & Baumgartner, 1998), an additional model M3 was conducted that constrains at least one factor loading per latent variable to be equal across countries in addition to the one that is fixed to 1. The fit improves compared to M2 and is only slightly worse than for M1, which indicates an acceptable partial metric invariance.

Table 21: Measurement invariance and model comparison

Model	χ^2 (df)	χ^2 /df	CFI	RMSEA (90% CI)	$\Delta\chi^2 \Delta$ (df)	Δ CFI	Δ RMSEA	Comparison
Model 1: Configural invariance	1546.592 (563)	2.747	0.911	0.042				
Model 2: Full metric invariance	1633.496 (589)	2.773	0.906	0.042	86.904 (26)	0.005	0.000	Model 1, 2
Model 3: Partial metric invariance	1586.251 (577)	2.749	0.909	0.042	39.659 (16)	0.002	0.000	Model 1, 3

8.4.7 Structural Equation Model

Our structural equation model was conducted using AMOS 27 (see model fit in Table 21, Model 1). Results indicate that intervention effects differ between countries. All three interventions increase internalized motivation compared to the control group in China, while the strongest effect is found for a green appeal (0.182), followed by a green reward (0.158) and a standard reward (0.145). In Germany and the USA, neither a green reward nor a standard reward significantly increases internalized motivation. However, a green appeal increases internalized motivation by 0.144 in Germany. Hence, *H1a* is rejected but *H1b* is accepted in Germany. Both sub-hypotheses are accepted in China, whereas they are rejected in the USA. Further, in China, only the green appeal significantly increases introjected motivation whereas the green reward generates a marginally significant effect. None of the interventions have an effect on introjected motivation in Germany and the USA. These results reject *H2*. Moreover, both reward types significantly increase external motivation in all three countries, while a green appeal leads to no significant effects. Hence, *H3a* and *H3b* are accepted across samples. The effect size for green rewards is slightly higher than that of standard rewards in each country.

Internalized motivation positively affects intentions to recycle in Germany and the USA but not in China. Introjected motivation has no effects on intentions to recycle in Germany and the USA, while it achieves a significant positive effect (0.366) in China. Further, extrinsic motivation only affects intentions to recycle in the USA (0.118), but not in Germany and China. Hence, *H4a* is accepted in Germany; *H4a* and *H4c* are accepted in the USA; *H4b* is accepted in China.

When it comes to perceived autonomy support in Germany, a green appeal generates a significant negative effect, while none of the rewards show significant effects. In contrast, in the USA, both rewards significantly decrease perceived autonomy support whereas the green

appeal only causes a marginally significant negative effect ($p < 0.10$). No significant effects are identified in China. Hence, *H5a* is rejected in all countries, while *H5b* is accepted in the USA. Since the green reward reduces perceived autonomy support in the USA, *H8a* is rejected and *H8b* is accepted in this sample. Perceived autonomy support enhances the level of internalized motivation in all three countries, with an especially strong effect in China (0.449). However, perceived autonomy support has no direct effect on intentions to recycle in all countries, which means that all of this effect is mediated through internalized motivation. Hence, *H6a* is accepted but *H6b* is rejected. The attitude toward recycling is marginally increased by the green reward in China.

We also calculated standardized total effects of intervention types on intentions to recycle in the three countries. In Table 22, it is shown that a green appeal has the strongest total effect on intentions to recycle in both Germany and the USA, but nearly matched by the standard reward in the USA. In comparison, a green reward is only effective in China, where it is most effective, closely followed by a green appeal and a standard reward. Both reward types lead to larger effect sizes in China than in the other two countries, which is consistent with *H7a* and *H7b*. Overall, as shown by the R square values in Table 23, the model explains a small to moderate share of the variance in intentions to recycle ($R^2_{DE/US/CH}$: 0.325/0.465/0.381) (Fornell & Larcker, 1981). A small amount of variance is also explained for internalized motivation in China.

As previously indicated, we run the structural equation model again with samples that only consist of participants who passed the manipulation check according to the strong criterion (see section 4.1). In Germany and China, standardized total effects of intervention type on intention to recycle remain similar. In the USA, the standardized total effect of a standard reward and a green appeal also remain similar but that of a green reward improves to 0.061. However, the structure of relationships is comparable, as a green reward still affects intention to recycle via extrinsic but not internalized motivation. In addition, we included the strong criterion of manipulation check as a dummy variable and a control variable for all latent constructs into the model with the full sample (as suggested in Kotzian et al., 2020); standardized total effects remain similar to the results in Table 23 for all countries.

Table 22: Structural equation model of intervention type, motivational patterns, autonomy perception and intention to recycle

IV	DV	Germany		USA		China	
		β	p	β	p	β	p
Green reward	INL-MO	0.094	0.181	0.048	0.516	0.158	*
	INJ-MO	0.002	0.973	0.039	0.591	0.131	†
	EX-MO	0.244	***	0.216	***	0.209	***
	PAS	-0.089	0.176	-0.146	*	0.057	0.409
	ATR	-0.080	0.245	-0.086	0.232	0.119	†
Standard reward	INL-MO	0.027	0.700	0.083	0.254	0.145	*
	INJ-MO	-0.041	0.573	0.068	0.344	0.090	0.190
	EX-MO	0.221	***	0.177	***	0.170	***
	PAS	-0.123	†	-0.164	*	0.065	0.341
	ATR	-0.040	0.566	-0.013	0.860	0.088	0.219
Green appeal	INL-MO	0.144	*	0.132	†	0.182	**
	INJ-MO	-0.006	0.934	0.072	0.307	0.139	*
	EX-MO	0.035	0.487	0.028	0.487	0.029	0.487
	PAS	-0.215	***	-0.130	†	-0.066	0.339
	ATR	0.069	0.318	-0.037	0.604	0.042	0.56
INL-MO	ITR	0.483	***	0.700	***	0.198	0.216
INJ-MO	ITR	-0.110	0.238	-0.105	0.467	0.366	*
EX-MO	ITR	-0.010	0.872	0.118	*	-0.072	0.249
PAS	INL-MO	0.263	***	0.206	***	0.449	***
PAS	ITR	0.017	0.751	0.015	0.771	0.023	0.731
ATR	ITR	0.387	***	0.275	***	0.262	***

Note(s): *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.10$; INL-MO = internalized motivation; INJ-MO = introjected motivation; EX-MO = extrinsic motivation; PAS = perceived autonomy support; ATR = attitude toward recycling; ITR = Intention to recycle; Model fit indices: χ^2 (df) = 1546.592 (563); χ^2 /df = 2.747; CFI = 0.911; RMSEA = 0.042.

Table 23: Total effects of intervention type on intention to recycle

	Germany	USA	China
Green reward	-0.001	0.008	0.102
Standard reward	-0.018	0.042	0.080
Green appeal	0.066	0.058	0.088

Table 24: R square of latent variables

	Germany	USA	China
Internalized motivation	0.076	0.050	0.228
Introjected motivation	0.002	0.005	0.016
Extrinsic motivation	0.062	0.045	0.042
Perceived autonomy support	0.032	0.024	0.015
Attitude toward recycling	0.016	0.006	0.011
Intention to recycle	0.325	0.465	0.381

8.5 Discussion

As we expected, green rewards for a specific pro-environmental behavior (such as recycling of household waste) that are designed to reach another pro-environmental goal (such as eco-friendly shopping) can achieve positive effects on people's internalized motivation in some countries, such as China. It appears that in the specific socio-economic context of China, the well-known crowding-out effect such as discussed by Frey (2012) is not an issue when employing this kind of incentive design. However, at least in the presented experiment, a similar effect was reached by the non-incentivized approach of a pure environmental appeals, which had a stronger effect on recycling in the two developed economies, in line with previous literature (e.g. Bolderdijk & Steg, 2015; Schwartz et al., 2015). The economic rewards had no internalized motivation effect in Germany but only environmental appeals did. The differences between China and the other countries can be explained by the prior status of internalization of recycling behaviors. In China, recycling intentions seem to be guided by introjected motivation whereas they are guided by internalized motivation in Germany and the USA. Especially Germans might have widely identified and integrated the importance of recycling. Therefore, Germans might be more prone to crowding-out effects compared to residents of countries who are just beginning to consider recycling. Recycling intentions in the USA are more influenced by rewards, which suggests that a significant part of people here still has not internalized recycling motivation. Also, it appears here that constraining the reward to green products creates a boomerang effect in the USA, perhaps due to psychological reactance against the constraint on freedom to choose. Hence, there seems to be a more divided picture in the USA where probably specialized programs should be considered for people at different stages of internalization (e.g. in regard of divergence between US states; USPIRG, 2019).

The more positive response to economic incentives in China could also be due to people's lower incomes compared to the other countries (Cummins, 2000). Another possible reason is that individuals see the system as a performance-contingent reward, which in some studies has been

shown to increase internalized motivation, since people care about doing the task well (competence valuation) (Harackiewicz & Sansone, 1991). In addition, according to Kehr (2004), the undermining effect does not occur if rewards do not deactivate implicit motives related to the task enjoyment.

It appears that environmental appeals are able to provoke introjection in Chinese people's minds, which mediates a significant effect on recycling intention. In contrast to our hypothesis, Chinese were more likely to feel guilty for not recycling in the presence of environmental appeals than in the other countries. Possibly, because these appeals were newer to Chinese individuals, they aroused negative feelings about their contributions to the environment and future generations being insufficient, which in turn motivate recycling intentions. When rewards are given in combination with purchase activities, people might be distracted from these feelings of guilt, perhaps less pronounced for a green reward, as practices in the favor of the environment are still present. When people are already more familiar with recycling and the related environmental, social impact, such as in Germany and the USA, environmental appeals appear to not change their previous levels of introjection. In sum, the differences between China and the other two countries suggest that Chinese might be at the stage of introjection of an external regulation, while Germans and Americans might be at more progressed stages of internalization, as discussed previously.

Opposed to our expectation and previous findings of Steinhilber et al. (2015) and Kaiser et al. (2020), external motivation does not predict behavioral intention in Germany and China. This finding underlines the importance of internalized motivation as a leading driver of recycling intention. An important reservation in this connection is that the measurement of people's extrinsic motivation or financial interests might be affected by the social desirability bias (e.g. Bennett et al., 2011) suggesting that extrinsic rewards or ego-approach goals might be more effective at influencing actual behaviors than it appears from the numbers (Harackiewicz et al., 2002).

The specialized motivational patterns described in Vansteenkiste et al. (2007) is not supported for Germans and Chinese, as individuals' recycling intentions appear to either depend on internalized motivation or introjected motivation. However, in the USA, both internalized and external motivation are significant predictors of recycling intentions, suggesting a mixed approach as discussed.

Furthermore, it is a potentially important finding that restricting rewards for recycling activities to a spending on eco-friendly products does not lower people's perceptions of autonomy support in Germany and China. In China, such a program seems to be the most effective one promoting both recycling and eco-friendly shopping simultaneously. Companies and governmental authorities could consider creating joint programs to target both goals. In Germany, although environmental appeals lead to the highest recycling intention, they negatively affect individuals' perceived autonomy support. When using environmental appeals, authorities in Germany should consider people's desire for more choices of how to engage in pro-environmental activities, as well as counter a possible reactance effect (Kavvouris et al., 2020). Unfulfilled satisfaction of autonomy needs seems to backfire individuals' internalized motivations as the strongest driver of recycling intentions. Logically, the lack of change in perceived autonomy support caused by intervention type in China supports our expectation that Chinese would not see the verbal call to environmental conservation or the restrictive spending of rewards as risks for their autonomy, considering the presence of mostly government-guided environmental management. Further, our results in the USA are compatible with the conceptualization that states the controlling nature of extrinsic rewards (Ryan & Deci, 2000a). Even though literature suggests basic needs to be equal between countries (Vansteenkiste et al., 2020), individuals' responses to restrictive policies require country-specific investigations.

8.6 Conclusion and Future Research

Overall, our findings support the use of green rewards in China, where it seems to produce the highest recycling intention but also a higher level of internalized motivation, which is beneficial for long-term effects on behaviors (Frey & Stutzer, 2012). In Germany, it seems more effective to use environmental appeals only and, in the USA, both environmental appeals and (unrestricted) rewards seem to be useful means to promote recycling.

This study contributes to previous research on pro-environmental behaviors specifically in the recycling domain based on a self-determination approach. Our findings suggest that the motivation crowding-out effect can be compensated to some extent in a socio-economic context, in which the previous level of internalization of a behavior is low, through rewards with a pro-environmental character. Many studies on self-determination theory consider intrinsic and extrinsic motivator separately but might need to explore possibilities where extrinsic rewards can be utilized to engage more people to fulfill environmental tasks but still develop

internalized patterns of motivation. Moreover, our results contribute to demonstrate significant differences between countries in people's responses to intrinsic and extrinsic motivators and the role autonomy support perception.

This research has several limitations, which need to be tackled by further investigations. Our samples only represent three countries according to their cultural features and household recycling capabilities. Results need to be validated for further countries, for example, in emerging countries such as India that are less government-led compared to China (Zurbrügg et al., 2004). Furthermore, the intention-behavior gap needs to be closed by validating the effects of applied stimuli for actual behaviors (Carrington et al., 2014). From a methodological perspective, this study chose an open-ended format to minimize the biased intervention of manipulation checks. This procedure is well supported by extant research, but it makes comparison to studies using close-ended questions more difficult (e.g. Krosnick, 1999). Moreover, although a sufficient level of construct validity is reached according to Fornell & Larcker (1981), the average variance extracted values for extrinsic motivation could be further improved by developing items that achieve equally good reliabilities across countries.

Furthermore, it would be interesting to test the design principle of a green reward for other combinations of pro-environmental behaviors to verify potential effects of different behaviors. For instance, behaviors of different degrees of difficulty could be considered to see whether rewarding a difficult behavior and associating it with a subsequent easier behavior is more effective or vice versa (Green-Demeirs et al., 1997). In addition, future research needs to account for the long-term effects after the ease of rewards (Kaiser et al., 2020). In this case, both recycling and eco-friendly purchase intentions and behaviors need to be observed. It would be crucial to assess the effectiveness of green rewards by weighing the potential benefits on promoting both types of pro-environmental behaviors as well as the adverse effects such as the motivation crowding-out.

References

- Asensio, O. I., & Delmas, M. A. (2015). Nonprice incentives and energy conservation. *Proceedings of the National Academy of Sciences of the United States of America*.
<https://doi.org/10.1073/pnas.1401880112>
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological bulletin*, 88(3), 588.
<https://doi.org/10.1037/0033-2909.88.3.588>
- BJNEWS. (2018). Garbage Siege: Where did the 100 kilograms of domestic garbage produced per person per year go? | Rational Numbers (垃圾围城：每人每年制造的100多公斤生活垃圾，去了哪里？|有理数).
<http://www.bjnews.com.cn/graphic/2018/10/12/510494.html> (accessed 24.10.2020).
- Bolderdijk, J. W., & Steg, L. (2015). Promoting sustainable consumption: The risks of using financial incentives. In *Handbook of research on sustainable consumption*. Edward Elgar Publishing.
- Bolderdijk, J. W., Steg, L., Geller, E. S., Lehman, P. K., & Postmes, T. (2013). Comparing the effectiveness of monetary versus moral motives in environmental campaigning. *Nature Climate Change*, 3(4), 413–416. <https://doi.org/10.1038/nclimate1767>
- Cameron, J., Banko, K. M., & Pierce, W. D. (2001). Pervasive negative effects of rewards on intrinsic motivation: The myth continues. *The Behavior Analyst*, 24(1), 1-44.
<https://doi.org/10.1007/BF03392017>
- Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2014). Lost in translation: Exploring the ethical consumer intention–behavior gap. *Journal of Business Research*, 67(1), 2759-2767. <https://doi.org/10.1016/j.jbusres.2012.09.022>
- Central People's Government (CPG). (2019). Notice of the Ministry of Housing and Urban-Rural Development and other departments on the comprehensive implementation of domestic waste classification in cities at prefecture-level and above across the country (住房和城乡建设部等部门关于在全国地级及以上城市全面开展生活垃圾分类工作的通知). http://www.gov.cn/xinwen/2019-06/11/content_5399088.htm (accessed 23.10.2020).
- CGTN. (2020). Beijing to enforce waste sorting from May 1.
<https://news.cgtn.com/news/2020-04-30/Beijing-to-enforce-waste-sorting-from-May-1-Q6JaWE4vni/index.html> (accessed 20.10.2020).
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., ...

- & Ryan, R. M. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and emotion*, 39(2), 216-236.
<https://doi.org/10.1007/s11031-014-9450-1>
- Cheung, S. F., Chan, D. K. S., & Wong, Z. S. Y. (1999). Reexamining the theory of planned behavior in understanding wastepaper recycling. *Environment and behavior*, 31(5), 587-612. <https://doi.org/10.1177/00139169921972254>
- Church, A. T., Katigbak, M. S., Locke, K. D., Zhang, H., Shen, J., de Jesús Vargas-Flores, J., ... & Mastor, K. A. (2013). Need satisfaction and well-being: Testing self-determination theory in eight cultures. *Journal of Cross-Cultural Psychology*, 44(4), 507-534.
<https://doi.org/10.1177/0022022112466590>
- Conner, M., Sheeran, P., Norman, P., & Armitage, C. J. (2000). Temporal stability as a moderator of relationships in the theory of planned behaviour. *British Journal of Social Psychology*, 39(4), 469-493. <https://doi.org/10.1348/014466600164598>
- Cooke, A. N., Fielding, K. S., & Louis, W. R. (2016). Environmentally active people: the role of autonomy, relatedness, competence and self-determined motivation. *Environmental Education Research*, 22(5), 631–657. <https://doi.org/10.1080/13504622.2015.1054262>
- Crociata, A., Agovino, M., & Sacco, P. L. (2015). Recycling waste: Does culture matter?. *Journal of Behavioral and Experimental Economics*, 55, 40-47.
<https://doi.org/10.1016/j.socec.2015.01.005>
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*.
<https://doi.org/10.1007/BF02310555>
- Cummins, R. A. (2000). Personal income and subjective well-being: A review. *Journal of Happiness Studies*, 1(2), 133-158. <https://doi.org/10.1023/A:1010079728426>
- De Leeuw, A., Valois, P., Ajzen, I., & Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions. *Journal of environmental psychology*, 42, 128-138. <https://doi.org/10.1016/j.jenvp.2015.03.005>
- Deci, E. L., Koestner, R., & Ryan, R. M. (2001). Extrinsic rewards and intrinsic motivation in education: Reconsidered once again. *Review of educational research*, 71(1), 1-27.
<https://doi.org/10.3102/00346543071001001>
- Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of research in personality*, 19(2), 109-134.
[https://doi.org/10.1016/0092-6566\(85\)90023-6](https://doi.org/10.1016/0092-6566(85)90023-6)

- 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(4), 227-268.
https://doi.org/10.1207/S15327965PLI1104_01
- Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological bulletin*, 125(6), 627. <https://doi.org/10.1037/0033-2909.125.6.627>
- Deutscher Bundestag (DBT). (2019). Import duties on primary aluminum (Importzölle auf Primäraluminium). <http://dipbt.bundestag.de/dip21/btd/19/123/1912388.pdf> (accessed 24.10.2020).
- Delmas, M. A., Fischlein, M., & Asensio, O. I. (2013). Information strategies and energy conservation behavior: A meta-analysis of experimental studies from 1975 to 2012. *Energy Policy*, 61, 729-739. <https://doi.org/10.1016/j.enpol.2013.05.109>
- Diener, E., & Biswas-Diener, R. (2002). Will money increase subjective well-being?. *Social indicators research*, 57(2), 119-169. <https://doi.org/10.1023/A:1014411319119>
- Douglas, S. P., & Craig, C. S. (2007). Collaborative and Iterative Translation: An Alternative Approach to Back Translation. *Journal of International Marketing*, 15(1), 30-43.
<https://doi.org/10.1509/jimk.15.1.030>
- Eisenberger, R., Pierce, W. D., & Cameron, J. (1999). Effects of reward on intrinsic motivation - Negative, neutral, and positive: Comment on Deci, Koestner, and Ryan (1999). In *Psychological Bulletin*. <https://doi.org/10.1037/0033-2909.125.6.677>
- EU. (2020). CitiCAP: App rewards residents of Lahti, Finland for greener transport choices. https://ec.europa.eu/regional_policy/en/projects/Finland/citicap-app-rewards-residents-of-lahti-finland-for-greener-transport-choices (accessed 20.10.2020).
- European Environmental Bureau (EEB). (2019). Recycling – who really leads the world? <https://eeb.org/publications/83/waste-and-recycling/84241/report-on-global-recycling-rates.pdf> (accessed 23.10.2020).
- European Commission (2020). CitiCAP: App rewards residents of Lahti, Finland for greener transport choices. https://ec.europa.eu/regional_policy/en/projects/Finland/citicap-app-rewards-residents-of-lahti-finland-for-greener-transport-choices (accessed 20.10.2020).
- Evans, L., Maio, G. R., Corner, A., Hodgetts, C. J., Ahmed, S., & Hahn, U. (2013). Self-interest and pro-environmental behaviour. *Nature Climate Change*, 3(2), 122-125.
<https://doi.org/10.1038/nclimate1662>
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables

and measurement error: Algebra and statistics.

- Frey, B. S. (1999). Institutions and morale: the crowding-out. *Economics, values, and organization*, 437. <https://doi.org/10.1017/cbo9781139174855.019>
- Frey, B. S., & Oberholzer-Gee, F. (1997). The cost of price incentives: An empirical analysis of motivation crowding-out. *The American economic review*, 87(4), 746-755. <https://doi.org/10.2307/2951373>
- Frey, B. S., & Stutzer, A. (2012). Environmental morale and motivation. In *The Cambridge Handbook of Psychology and Economic Behaviour*. <https://doi.org/10.1017/cbo9780511490118.017>
- Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and emotion*, 27(3), 199-223. <https://doi.org/10.1023/A:1025007614869>
- Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), 331–362. <https://doi.org/10.1002/job.322>
- Ge, J., & Gretzel, U. (2017). The role of humour in driving customer engagement. In *Information and communication technologies in tourism 2017* (pp. 461-474). Springer, Cham. https://doi.org/10.1007/978-3-319-51168-9_33
- Global Times. (2019). Face recognition helps Beijing's garbage sorting. <http://www.globaltimes.cn/content/1157585.shtml> (accessed 24.10.2020).
- Green-Demeirs, I., Pelletier, L. G., & Ménard, S. (1997). The impact of behavioural difficulty on the saliency of the association between self-determined motivation and environmental behaviours. *Canadian Journal of Behavioural Science*, 29(3), 157–166. <https://doi.org/10.1037/0008-400x.29.3.157>
- Green, T., & Peloza, J. (2014). Finding the right shade of green: The effect of advertising appeal type on environmentally friendly consumption. *Journal of Advertising*, 43(2), 128–141. <https://doi.org/10.1080/00913367.2013.834805>
- Grønhøj, A., & Thøgersen, J. (2017). Why young people do things for the environment: The role of parenting for adolescents' motivation to engage in pro-environmental behaviour. *Journal of Environmental Psychology*, 54(Supplement C), 11-19: <https://doi.org/10.1016/j.jenvp.2017.09.005>.
- Guay, F., Chanal, J., Ratelle, C. F., Marsh, H. W., Larose, S., & Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology*, 80(4), 711-735.

- <https://doi.org/10.1348/000709910X499084>
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). Multivariate Data Analysis: A Global Perspective. In *Multivariate Data Analysis: A Global Perspective*.
- Hansla, A., Gärling, T., & Biel, A. (2013). Attitude toward environmental policy measures related to value orientation. *Journal of Applied Social Psychology*, 43(3), 582-590.
<https://doi.org/10.1111/j.1559-1816.2013.01038.x>
- Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why?. *Educational psychologist*, 33(1), 1-21. https://doi.org/10.1207/s15326985ep3301_1
- Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational Psychology*. <https://doi.org/10.1037/0022-0663.94.3.638>
- Harackiewicz, J. M., & Sansone, C. (1991). Goals and intrinsic motivation: You can get there from here. *Advances in motivation and achievement*, 7, 21-49.
- IMF. (2019). US population by gender. <https://www.statista.com/statistics/737923/us-population-by-gender/> (accessed 24.10.2020).
- IMF/The Economist. (2020). The Big Mac index.
<https://www.economist.com/news/2020/01/15/the-big-mac-index> (accessed 24.10.2020).
- Kaiser, F. G., Henn, L., & Marschke, B. (2020). Financial rewards for long-term environmental protection. *Journal of Environmental Psychology*, 101411.
<https://doi.org/10.1016/j.jenvp.2020.101411>
- Kaluza, A. J., Schuh, S. C., Kern, M., Xin, K., & van Dick, R. (2020). How do leaders' perceptions of organizational health climate shape employee exhaustion and engagement? Toward a cascading-effects model. *Human Resource Management*, 59(4), 359-377. <https://doi.org/10.1002/hrm.22000>
- Kareklas, I., Carlson, J. R., & Muehling, D. D. (2014). "I eat organic for my benefit and yours": Egoistic and altruistic considerations for purchasing organic food and their implications for advertising strategists. *Journal of advertising*, 43(1), 18-32.
<https://doi.org/10.1080/00913367.2013.799450>
- Kavvouris, C., Chrysochou, P., & Thøgersen, J. (2020). "Be Careful What You Say": The role of psychological reactance on the impact of pro-environmental normative appeals. *Journal of Business Research*, 113, 257-265.
<https://doi.org/10.1016/j.jbusres.2019.10.018>

- Kehr, H. M. (2004). Integrating implicit motives, explicit motives, and perceived abilities: The compensatory model of work motivation and volition. *Academy of management review*, 29(3), 479-499. <https://doi.org/10.5465/AMR.2004.13670963>
- Kong, Y., & Zhang, L. (2014). When does green advertising work? The moderating role of product type. *Journal of Marketing Communications*, 20(3), 197-213. <https://doi.org/10.1080/13527266.2012.672335>
- Ku, H.-H., Kuo, C.-C., Wu, C.-L., & Wu, C.-Y. (2012). Communicating green marketing appeals effectively: The role of consumers' motivational orientation to promotion versus prevention. *Journal of Advertising*, 41(4), 41–50. <https://doi.org/10.2753/JOA0091-3367410403>
- Kumar, A., Holuszko, M., & Espinosa, D. C. R. (2017). E-waste: an overview on generation, collection, legislation and recycling practices. *Resources, Conservation and Recycling*, 122, 32-42. <https://doi.org/10.1016/j.resconrec.2017.01.018>
- Lanzini, P., & Thøgersen, J. (2014). Behavioural spillover in the environmental domain: An intervention study. *Journal of Environmental Psychology*, 40, 381–390. <https://doi.org/10.1016/j.jenvp.2014.09.006>
- Lavergne, K. J., Sharp, E. C., Pelletier, L. G., & Holtby, A. (2010). The role of perceived government style in the facilitation of self-determined and non self-determined motivation for pro-environmental behavior. *Journal of Environmental Psychology*, 30(2), 169–177. <https://doi.org/10.1016/j.jenvp.2009.11.002>
- Bennett, R., Kerrigan, F., O'Reilly, D., Lee, Z., & Sargeant, A. (2011). Dealing with social desirability bias: An application to charitable giving. *European Journal of Marketing*. <https://doi.org/10.1108/03090561111119994>
- Lehman, P. K., & Geller, E. S. (2004). Behavior analysis and environmental protection: Accomplishments and potential for more. *Behavior and social issues*, 13(1), 13-33. <https://doi.org/10.5210/bsi.v13i1.33>
- Lim, B. C., & Wang, C. J. (2009). Perceived autonomy support, behavioural regulations in physical education and physical activity intention. *Psychology of Sport and Exercise*, 10(1), 52-60. <https://doi.org/10.1016/j.psychsport.2008.06.003>
- Ministry of Ecology and Environment of People's Republic of China (MEE). (2019). Solid waste in large and medium cities nationwide in 2019 Annual report on pollution prevention (2019年全国大、中城市固体废物污染环境防治年报) <http://www.mee.gov.cn/ywgz/gtfwyhxppl/gtfw/201912/P020191231360445518365.pdf>

(accessed 24.10.2020).

- Morren, M., & Grinstein, A. (2016). Explaining environmental behavior across borders: A meta-analysis. *Journal of Environmental Psychology*, 47, 91–106.
<https://doi.org/10.1016/j.jenvp.2016.05.003>
- National Bureau of Statistics of China (NBSC). (2019). China Statistical Yearbook 2019.
<http://www.stats.gov.cn/tjsj/ndsj/2019/indexch.htm> (accessed 24.10.2020).
- Osbaldiston, R., & Sheldon, K. M. (2003). Promoting internalized motivation for environmentally responsible behavior: A prospective study of environmental goals. *Journal of environmental psychology*, 23(4), 349-357. [https://doi.org/10.1016/S0272-4944\(03\)00035-5](https://doi.org/10.1016/S0272-4944(03)00035-5)
- Reeve, J. (2002). Self-Determination Theory Applied to Educational Settings. In *Handbook of Self-Determination Research*.
- Ryan, R., Deci, E., & Grolnick, W. (1995). Autonomy, relatedness, and the self: Their relation to development and psychopathology. *Ariel*.
- Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 54-67. <https://doi.org/10.1006/ceps.1999.1020>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, 55(1), 68.
<https://doi.org/10.1037/0003-066X.55.1.68>
- Deci, E. L., & Ryan, R. M. (2002). Overview of self-determination theory: An organismic dialectical perspective. *Handbook of self-determination research*, 3-33.
- Schösler, H., de Boer, J., & Boersema, J. J. (2014). Fostering more sustainable food choices: Can Self-Determination Theory help?. *Food Quality and Preference*, 35, 59-69.
<https://doi.org/10.1016/j.foodqual.2014.01.008>
- Schuhwerk, M. E., & Lefkoff-Hagius, R. (1995). Green or non-green? Does type of appeal matter when advertising a green product?. *Journal of advertising*, 24(2), 45-54.
<https://doi.org/10.1080/00913367.1995.10673475>
- Schwartz, D., Bruin, W. B. De, Fischhoff, B., Lave, L., Schwartz, D., & Lave, L. (2015). Advertising energy saving programs: The Potential Environmental Cost of Emphasizing Monetary Savings. *Journal of Experimental Social Psychology*, 21(2), 158.
- Schwartz, S. H. (2012). A Proposal for Measuring Value Orientations across Nations. In *Core ESS Questionnaire*.

- Severn, J., Belch, G. E., & Belch, M. A. (1990). The effects of sexual and non sexual advertising appeals and information level on cognitive processing and communication effectiveness. *Journal of Advertising*, 19(1), 14–22.
<https://doi.org/10.1080/00913367.1990.10673176>
- Singh, J., Laurenti, R., Sinha, R., & Frostell, B. (2014). Progress and challenges to the global waste management system. *Waste Management & Research*, 32(9), 800-812.
<https://doi.org/10.1177/0734242X14537868>
- Smith, S. M., Roster, C. A., Golden, L. L., & Albaum, G. S. (2016). A multi-group analysis of online survey respondent data quality: Comparing a regular USA consumer panel to MTurk samples. *Journal of Business Research*, 69(8), 3139-3148.
<https://doi.org/10.1016/j.jbusres.2015.12.002>
- Souchet, L., & Girandola, F. (2013). Double foot-in-the-door, social representations, and environment: application for energy savings. *Journal of Applied Social Psychology*, 43(2), 306-315. <https://doi.org/10.1111/j.1559-1816.2012.01000.x>
- Statista. (2019). Survey on waste behavior in Germany 2017 (Umfrage zum Abfallverhalten in Deutschland 2017).
<https://de.statista.com/statistik/daten/studie/716680/umfrage/umfrage-zum-abfallverhalten-in-deutschland/> (accessed 26.10.2020).
- Statistisches Bundesamt. (2020). Population census (Bevölkerung Zensus). <https://www-genesis.destatis.de/genesis/online?operation=statistic&levelindex=0&levelid=1603733554251&code=12111#abreadcrumb> (accessed 26.10.2020).
- Steenkamp, J.-B. E. M., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, 25, 78-90.
- Steinhorst, J., & Klöckner, C. A. (2018). Effects of monetary versus environmental information framing: Implications for long-term pro-environmental behavior and intrinsic motivation. *Environment and Behavior*, 50(9), 997-1031.
<https://doi.org/10.1177/0013916517725371>
- Steinhorst, J., Klöckner, C. A., & Matthies, E. (2015). Saving electricity - For the money or the environment? Risks of limiting pro-environmental spillover when using monetary framing. *Journal of Environmental Psychology*, 43, 125–135.
<https://doi.org/10.1016/j.jenvp.2015.05.012>
- Steinhorst, J., & Matthies, E. (2016). Monetary or environmental appeals for saving electricity?—Potentials for spillover on low carbon policy acceptability. *Energy Policy*,

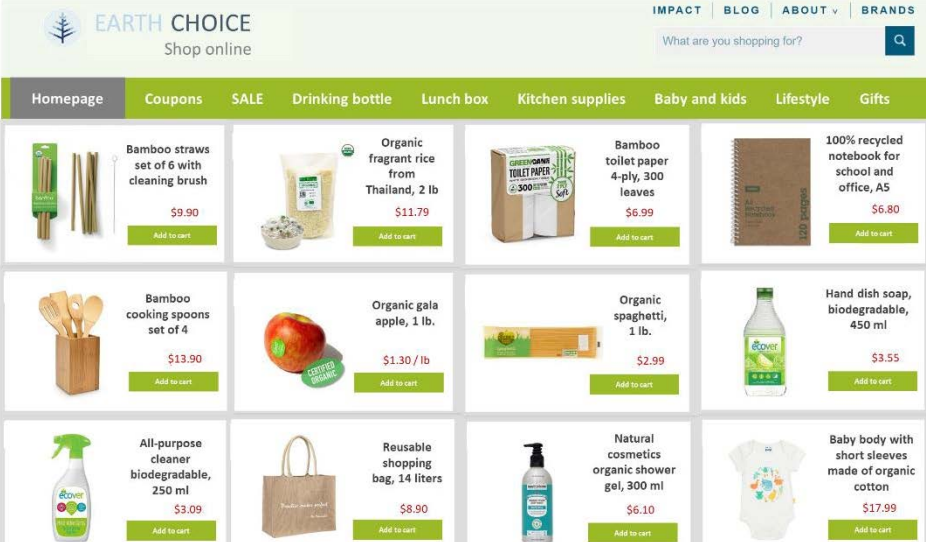
- 93, 335-344. <https://doi.org/10.1016/j.enpol.2016.03.020>
- Thøgersen, J. (2003). Monetary incentives and recycling: Behavioural and psychological reactions to a performance-dependent garbage fee. *Journal of Consumer Policy*, 26(2), 197-228. <https://doi.org/10.1023/a:1023633320485>
- Thøgersen, J. (2006). Norms for environmentally responsible behaviour: An extended taxonomy. *Journal of environmental Psychology*, 26(4), 247-261. <https://doi.org/10.1016/j.jenvp.2006.09.004>
- Thøgersen, J. (2018). Frugal or green? Basic drivers of energy saving in European households. *Journal of Cleaner Production*, 197, 1521-1530. <https://doi.org/10.1016/j.jclepro.2018.06.282>
- Tijs, M. S., Karremans, J. C., Veling, H., de Lange, M. A., van Meegeren, P., & Lion, R. (2017). Saving water to save the environment: Contrasting the effectiveness of environmental and monetary appeals in a residential water saving intervention. *Social influence*, 12(2-3), 69-79. <https://doi.org/10.1080/15534510.2017.1333967>
- Urquhart, J., Potter, C., Barnett, J., Fellenor, J., Mumford, J., Quine, C. P., & Bayliss, H. (2017). Awareness, concern and willingness to adopt biosecure behaviours: public perceptions of invasive tree pests and pathogens in the UK. *Biological Invasions*, 19(9), 2567-2582. <https://doi.org/10.1007/s10530-017-1467-4>
- Umweltbundesamt (UBA). (2018). Packaging consumption in Germany buy very high (Verpackungsverbrauch in Deutschland weiterhin sehr hoch). <https://www.umweltbundesamt.de/presse/pressemitteilungen/verpackungsverbrauch-in-deutschland-weiterhin-sehr> (accessed 24.10.2020).
- Umweltbundesamt. (UBA) (2020). Indicator: Recycling municipal waste. <https://www.umweltbundesamt.de/en/indicator-recycling-municipal-waste#at-a-glance> (accessed 20.10.2020).
- US Census Bureau. (2019a). Population of the US by sex and age. <https://www.statista.com/statistics/241488/population-of-the-us-by-sex-and-age/> (accessed 20.10.2020).
- US Census Bureau. (2019b). Population in the federal states of the US. <https://www.statista.com/statistics/183497/population-in-the-federal-states-of-the-us/> (accessed 20.10.2020).
- US Environmental Protection Agency. (EPA) (2016). National Overview: Facts and Figures on Materials, Wastes and Recycling. <https://www.epa.gov/facts-and-figures-about->

- materials-waste-and-recycling/national-overview-facts-and-figures-materials (accessed 24.10.2020).
- US Environmental Protection Agency (EPA). (2017). Advancing Sustainable Materials Management: 2017 Fact Sheet. https://www.epa.gov/sites/production/files/2019-11/documents/2017_facts_and_figures_fact_sheet_final.pdf (accessed 20.10.2020).
- US Environmental Protection Agency (EPA). (2020). Recycling Basics. <http://static1.squarespace.com/static/546d61b5e4b049f0b10b95c5/t/553020c7e4b00a1eb5c4ed0c/1429217479138/Why-Recycle.pdf> (accessed 24.10.2020).
- US PIRG. (2019). The State of Recycling National Survey https://uspirg.org/sites/pirg/files/reports/Trash-In-America/The-State-of-Recycling-National-Survey_111319.pdf (accessed 20.10.2020).
- Vansteenkiste, M., Matos, L., Lens, W., & Soenens, B. (2007). Understanding the impact of intrinsic versus extrinsic goal framing on exercise performance: The conflicting role of task and ego involvement. *Psychology of Sport and Exercise*, 8(5), 771–794. <https://doi.org/10.1016/j.psychsport.2006.04.006>
- Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. In *Motivation and Emotion*. <https://doi.org/10.1007/s11031-019-09818-1>
- Vlachopoulos, S. P., & Karageorghis, C. I. (2005). Interaction of external, introjected, and identified regulation with intrinsic motivation in exercise: relationships with exercise enjoyment. *Journal of Applied Biobehavioral Research*, 10(2), 113-132. <https://doi.org/10.1111/j.1751-9861.2005.tb00007.x>
- Wang, H., Schandl, H., Wang, G., Ma, L., & Wang, Y. (2019). Regional material flow accounts for China: Examining China's natural resource use at the provincial and national level. *Journal of Industrial Ecology*, 23(6), 1425-1438. <https://doi.org/10.1111/jiec.12933>
- Wang, Q. J., Knoeferle, K., & Spence, C. (2017). Music to make your mouth water? Assessing the potential influence of sour music on salivation. *Frontiers in Psychology*, 8, 638. <https://doi.org/10.3389/fpsyg.2017.00638>
- Weyrich, P., Scolobig, A., Walther, F., & Patt, A. (2020). Do intentions indicate actual behaviour? A comparison between scenario-based experiments and real-time observations of warning response. *Journal of Contingencies and Crisis Management*, 28(3), 240-250. <https://doi.org/10.1111/1468-5973.12318>

- World Bank. (2018). WHAT A WASTE 2.0. <http://datatopics.worldbank.org/what-a-waste/> (accessed 20.10.2020).
- Awang Z. (2012). Analyzing the Moderating. A Handbook on Structural Equation Modeling (SEM) Using Amos.
- Zheng, L. (2019). Preference for male facial masculinity as a function of mental rotation ability in gay and bisexual men, but not in heterosexual men and women in China. *Frontiers in psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.02419>
- Zurbrügg, C., Drescher, S., Patel, A., & Sharatchandra, H. C. (2004). Decentralised composting of urban waste—an overview of community and private initiatives in Indian cities. *Waste management*, 24(7), 655-662. <https://doi.org/10.1016/j.wasman.2004.01.003>

Appendices

A1: Exemplary stimuli in the USA

Green reward	
	<p>“Inspired by California’s redemption fee (“California Refund Value”), the authorities have decided to launch a new recycling program in your city that rewards you for the amount of waste materials you separate for recycling. A new, smart recycling system will serve to collect the recyclables and to assign the reward. If your individual household waste in the last month contained, for example, 15 kg of paper, 4 kg of plastics, 2 kg of glass and 3 kg of metals (e.g. cans and lids), you would receive 8.12 US dollars when delivering these materials. You can spend the reward on eco-friendly products of your choice in one of the collaborating online stores, such as EarthChoice. Here, you can buy, for example, organic food, toilet paper made of recycled paper or eco-labelled dishwasher soap.”</p>
	

Standard
reward

GET REWARDED FOR RECYCLING

RECYCLE



REDEEM



REWARD



**START EARNING REWARDS TODAY AND
SHOP IN ONLINE STORES.**

“Inspired by California’s redemption fee (“California Refund Value”), the authorities have decided to launch a new recycling program in your city that rewards you for the amount of waste materials you separate for recycling. A new, smart recycling system will serve to collect the recyclables and to assign the rewards. If your household waste in the last month contained, for example, 15 kg of paper, 4 kg of plastic, 2 kg of glass and 3 kg of metals (e.g. cans and lids), you would receive 8.12 US dollars when delivering these materials. You can spend the reward on products of your choice in one of the collaborating online stores, such as ClickChoice. For example, you can buy food products, toilet paper or hygiene products.”















CLICK CHOICE
Shop online

[IMPACT](#) | [BLOG](#) | [ABOUT](#) v | [BRANDS](#)

What are you shopping for?



Homepage	Coupons	SALE	Drinking bottle	Lunch box	Kitchen supplies	Baby and kids	Lifestyle	Gifts
	Multicolor flexible straws, 50 ct \$4.34 Add to cart		Fragrant rice from Thailand, 2 lb \$7.80 Add to cart		Toilet paper 4-ply, 1000 leaves \$4.99 Add to cart		Notebook for school and office, A5 \$3.80 Add to cart	
	Cooking spoons set of 4 \$11.99 Add to cart		Gala apple, 1 lb. \$1.09 / lb Add to cart		Spaghetti, 1 lb. \$1.30 Add to cart		Hand dish soap, 450 ml \$3.20 Add to cart	
	All-purpose cleaner, 250 ml \$1.97 Add to cart		Plastic shopping bag, 14 liters \$0.05 Add to cart		Hydrating shower gel, 300 ml \$4.99 Add to cart		Baby body with short sleeves \$13.99 Add to cart	

Green appeal	<div> <h2>PROTECT THE ENVIRONMENT</h2> <div> <div> RECYCLE  </div> <div> RESOURCE  </div> <div> NATURE  </div> </div> <h3>RECYCLING MAKES A DIFFERENCE.</h3> <p>“The authorities have decided to launch a new recycling program in your city to increase the recycling of household waste materials. In a month, an average person wastes, among others, 15 kg of paper, 4 kg of plastic, 2 kg of glass and 3 kg of metals (e.g. cans and lids) that can be recycled. By recycling your household waste, you can help conserve resources, reduce climate change and protect the environment. Everyone should do their bit to protect the environment, for the sake of nature and future generations.”</p> </div>
Control condition	<p>“Now we would like to know something about your surroundings when completing this questionnaire. Please describe, in your own words, the room or space that you are sitting in, including (a) the lightening, (b) the temperature and (c) the noise level. Please describe these and other aspects of your surroundings that you find important in the box below.”</p>

A2: Correlation table

	Germany					
	INL-MO	INJ-MO	EX-MO	PAS	ATR	ITR
INL-MO	0.848					
INJ-MO	0.686***	0.796				
EX-MO	0.212**	0.405***	0.65			
PAS	0.243***	0.160**	0.103	0.835		
ATR	0.638***	0.474***	0.176*	0.181**	0.882	
ITR	0.543***	0.321***	0.07	0.160**	0.530***	0.812
	USA					
INL-MO	0.868					
INJ-MO	0.775***	0.863				
EX-MO	0.223**	0.419***	0.715			
PAS	0.194**	0.150*	-0.027	0.793		
ATR	0.671***	0.423***	-0.014	0.258***	0.895	
ITR	0.721***	0.507***	0.219**	0.182**	0.605***	0.849
	China					
INL-MO	0.799					
INJ-MO	0.807***	0.786				
EX-MO	-0.132†	-0.062	0.668			
PAS	0.445***	0.358***	-0.06	0.791		
ATR	0.618***	0.460***	-0.008	0.308***	0.753	
WTR	0.606***	0.551***	-0.104	0.300***	0.439***	0.645

Note(s): † $p < 0.100$, * $p < 0.050$, ** $p < 0.010$, *** $p < 0.001$; INL-MO = internalized motivation; INJ-MO = introjected motivation; EX-MO = extrinsic motivation; PAS = perceived autonomy support; ATR = attitude toward recycling; ITR = intention to recycle.

A3: Means of internalized motivation in three countries

	Internalized motivation		
	DE	US	CH
Green reward	6.08	5.54	6.10
Standard reward	5.92	5.60	6.10
Green appeal	6.09	5.84	6.03
Control group	5.88	5.54	5.72
F	0.80	0.61	2.70*

Note(s): ** $p < 0.01$, * $p < 0.05$; DE = Germany, US = USA, CH = China.

9. Article IV

Potential Consequences of COVID-19 for Sustainable Meat Consumption – The Role of Food Safety Concerns and Responsibility Attributions

Published in: British Food Journal

Note: In accordance with the journal's author rights, the version published here is the accepted manuscript. You can find the published article here: Yang, X. (2021). Potential consequences of COVID-19 for sustainable meat consumption: the role of food safety concerns and responsibility attributions. British Food Journal, 123(2), 455-474. <https://doi.org/10.1108/BFJ-04-2020-0332>

Abstract

While coping with severe damages of the ongoing Coronavirus outbreak worldwide, this study enlightens the potential effects of the pandemic on young adults' willingness to avoid game meat consumption as well as to purchase animal welfare products. In a structural equation model (N=234), food safety concerns and perceived responsibility for a future change of individuals, marketers, and the government as predictors are related to behavioral intentions. Further, two antecedents of food safety concern including risk perception and anxiety related to COVID-19 are tested. Using a Chinese sample, results show that food safety concern - triggered by risk perception and anxiety - negatively affects willingness to buy animal welfare products. Perceived responsibility of marketers' change positively relates to people's willingness to avoid game meat and to buy animal welfare products, while the latter is also positively related to perceived governmental responsibility. Consumers demand marketers' improvements of safety and hygiene standards as a necessary condition for adopting sustainable consumption behaviors. Animal welfare products have the potential to pronounce the demanded level of product safety, while the game meat market needs to be prepared for necessary adaptations for coping with the adverse effects of COVID-19. This article adds knowledge to the behavioral consequences of a viral hazard in the context of sustainable food choices, while relating those to attribution theories and food safety concerns.

Keywords: Responsibility attribution, food safety concern, pandemic effects, sustainable meat.

9.1 Introduction

The Coronavirus (COVID-19) has called for the status of a worldwide emergency. While online sources and initial scientific evidences already attempt to provide knowledge about the impact of COVID-19 on people's health (e.g. Xu *et al.*, 2020), potential effects on consumers' behavioral patterns have been little discussed and empirically investigated yet. Cohen (2020) suggests that policy makers should ensure that the Coronavirus outbreak contributes to a transition into more sustainable consumption. Taking the fish market in Wuhan into account where the virus is assumed to originate from (Sun *et al.*, 2020), the question arises whether and how the viral hazard causes effects on individuals' anticipated food purchase behaviors. Certain geographical regions in China have been recorded for celebrating dog meat festivals or consuming delicacies such as rare game meat products (The Economist, 2018). In 2003, the spread of SARS-COV-2 also originated from a Southern province in China that has been related to the human consumption and handling of *Paguma larvata* (Peeri *et al.*, 2020). This background might raise the world's attention on searching for the root of the problem, in other words, on the question: Who is responsible for the occurrence of a pandemic in the kind of COVID-19? Among different stakeholders (consumers, marketers, and governmental authorities), who is supposed to reconsider and modify their previous behaviors or operations? From looking for the answer, implications could be derived to prevent the outbreak of a similar pandemic in the future.

The Sustainable Food System Programme of the One Planet Network states on the increase of scientifically evidenced emerging infectious disease outbreaks (such as swine flu and Ebola etc.), as well as encourages global discussion on its relationship with food consumption (SFS, 2020). Food safety concerns might have raised after the outbreak of COVID-19, especially for Chinese outdoor or local food markets. Chinese consumers have dealt with several drastic food scandals such as the milk powder contamination in 2008 (Pei *et al.*, 2011), while the place of origin of COVID-19 could have caused more worries about the safety and hygiene standards of local food suppliers or retailers. In contrast, sustainable products are associated with a high level of quality and safety (Harper & Makatouni, 2002). For instance, Chinese consumers perceive organic food products to promote health due to the chemical-free production signaling a sense of safety guarantee (Xie *et al.*, 2015).

To counteract the perceived lack of product safety, it is likely that consumers would consider sustainable product choices after being concerned with apparently insufficient food market management in China. According to the 3rd World Conference on Farm Animal Welfare, first insights into Chinese consumers' willingness to buy animal welfare product were provided (WCFAW, 2019). Since May 2014, the official authorities of China Association of Standardization have published documents on Farm Animal Welfare Requirements for major categories including pigs, cattle, sheep, and (laying) hens (CAS, 2014-2017). Until now, several studies have documented Chinese organizations' efforts to introduce the concept of animal welfare, while the International Cooperation Committee of Animal Welfare commits to harmonizing with international standards (Bayne et al., 2015; Sinclair et al., 2020). However, there exists a lack of literature on assessing the quality and implementation of standards as well as the compatibility with international schemes. Scholars point out the early stage of development for farm animal welfare in China and call for a systematic catalogue of related literature (Sinclair et al., 2020; You et al., 2014). Another potential response to COVID-19 could be the avoidance of consuming high-risk products (such as game meat from local food markets). It is known that people adopt mitigation and avoidance behaviors to cope with risks such as foodborne diseases (e.g. Yeung, Yee and Morris, 2010), or, in other fields, natural hazards (e.g. Cheng *et al.*, 2017).

Until now, the literature still lacks investigation of the pandemic effects on sustainable consumption attitudes and intentions as individuals' responses to cope with food safety concerns. The assignment of responsibility for a food-related global crisis to the currently reached extent and its consequences on people's consumption patterns have not been enlightened yet. This article tackles the above-discussed questions and research gaps. It aims (a) to measure individuals' food safety concern driven by general risk perception and health anxiety related to COVID-19, (b) to understand people's responsibility perceptions for themselves, the marketers, and the government for a hazard as COVID-19, and therefore (c) to relate these determinants to sustainable consumption patterns including game meat avoidance and consumer willingness to buy animal welfare products.

9.2 Theoretical Foundation and Hypotheses

9.2.1 Food Safety Concern

9.2.1.1 Antecedents of Food Safety Concern

A variety of risks is associated with food safety concerns such as BSE (Bovine spongiform encephalopathy), E.coli bacteria, and genetic modifications of food (Frewer, 2000). Concern refers to the subjective risk assessment instead of the technical or objective level of risk estimates. Risk characteristics such as involuntary, catastrophic, and uncontrolled crucially increase risk perceptions (Slovic, 1992). Further, perceived risk is measured in various dimensions including psychological, social, financial, physical, performance-, and time-related (Stone & Grønhaug, 1993). The perceived risk or threat can occur cognitively and affectively (Griffin et al., 1999). Some literature suggests the cognitive assessment of a disease-related risk (e.g. Napper, Fisher and Reynolds, 2012). Other studies recognize the affective or intuitive procedures of risk assessment (e.g. Janssen et al., 2011). To capture cognitive and emotional patterns of perceived risk that could potentially affect individuals' food-related concerns, both effects are tested:

H1: Risk perception of COVID-19 increases food safety concern.

H2: Anxiety about COVID-19 increases food safety concern.

9.2.1.2 Food Safety Concern and Sustainable Consumption

Individuals' responses to food safety concern have been broadly investigated (e.g. Anater, McWilliams and Latkin, 2011). The psychological processes can be divided into three parts: (i) pre-decisional processes, (ii) core perceptions of the risk, (iii) responsive decision-making. First, information on a potential food-related risk is received, heeded, and interpreted (Fiske, 2008). Then, the risk perception contributes to the development of safety concern about specific food products. At last, this concern needs to reach a threshold level to motivate a behavioral change (Crosby & Stephens, 1987).

Food safety concerns exist regarding residues in food products from chemical sprays, fertilizers or other consequences of the producing methods (Michaelidou & Hassan, 2008; Zanolli & Naspetti, 2002). These concerns positively affect people's attitudes and purchase intentions, for example, for organic food (Michaelidou & Hassan, 2008). Similarly, the lack of confidence in food safety increases individuals' likelihood to buy certified meat products (Angulo & Gil, 2007). Harper and Makatouni (2002) show that food safety concerns are the main motives for organic food purchase compared to ethical concerns and animal welfare standards, as also shown in more recent studies (e.g. Cembalo *et al.*, 2016). Consumers are likely to use animal welfare standards as a significant indicator to evaluate other product attributes such as safety

and health effect. Another study shows that Chinese consumers value both food safety and animal welfare attributes while suggesting a significant interaction effect of both on willingness to buy pork (Lai et al., 2018). You *et al.* (2014) suggest that more than half of the Chinese consumers are willing to pay more for high-welfare animal products. The importance of food safety concerns as a motivator of sustainable purchase is supported in China especially because people have a high degree of food safety awareness (Xie et al., 2015).

H3: Food safety concern positively affects consumers' game meat avoidance (a) and willingness to buy animal welfare products (b).

9.2.2 Responsibility Attribution

9.2.2.1 Crisis and Responsibility Attribution

The Attribution Theory by Bernard Weiner indicates people's need to seek for the causes of an event, especially when the event is associated with unexpected and negative consequences (Weiner, 1985). These are also the key traits of crises. Logically, people would be eager to identify the cause of a crisis that leads to making attributions (Coombs, 2007a).

Previous findings show people's responsibility attribution of crises to companies or situational factors that, in return, affect behavioral consequences (McDonald & Hartel, 2000). An organization is assessed to be responsible for a crisis when individuals think that the crisis is controllable by the organization. Therefore, once people assume that the organization has not exercised control over the crisis properly, blame can occur (Coombs, 2007b). Similarly, responsibility can be also attributed to governmental institutions. Patterns related to others' responsibilities belong to the dimension of external attribution in the literature (Newcomb & Heider, 1958; Weiner, 1985).

Besides that, internal attribution or personal responsibility builds up another dimension within attributional theories (Buss & Scheier, 1976). The attribution to oneself refers to one's actions (or inactions) as a modifiable variable that can influence events happening in one's life, for example, adjustment of behaviors or establishment of personal control to avoid misfortune. In case that a bad event happens, people could develop self-blame (Thornton et al., 1988).

9.2.2.2 Responsibility Attribution and Behavioral Outcomes

Literature shows the significance of responsibility attributions on attitudinal and behavioral variables in different fields. For instance, people perceiving a higher internal locus of control are more likely to adopt pro-environmental behaviors than others at lower levels (Cleveland et

al., 2012; McCarty & Shrum, 2001). In the research on patients, people who make causal attributions to internal features such as anxiety and lifestyle practice more health behaviors than those ones making attributions to external features (stress, luck; Runions, Arnaert and Sourial, 2006). Further, internal attribution also positively influences consumer responses such as brand attitude (Yuan et al., 2016).

Individuals who assign the responsibility for the pandemic to themselves and their own behaviors (such as eating and buying game meat) would also be more likely to adopt behavioral patterns that could prevent them from suffering from a pandemic again in future. The contact with game meat products or a physical proximity to points-of-sale of fresh game meat would be associated with high risk for a viral hazard. Thus, individuals would attempt to avoid game meat consumption. Further, internally attributed people would also consider adopting other categories of products perceived to be safe as a response to the previously experienced threat. This would result in an increased willingness to buy animal welfare products.

H4: Perceived individual responsibility positively affects consumers' game meat avoidance (a) and willingness to buy animal welfare products (b).

In contrast, studies argue that external attribution patterns negatively affect brand attitude (Yuan et al., 2016) or green purchasing intentions (Wang, 2014). Strong beliefs in the controllability of others less effectively motivate the adoption of certain behaviors compared to internal control perceptions (such as pro-environmental behaviors in Kalamas, Cleveland and Laroche, 2014). However, other studies show that a sense of shared responsibility incorporating both perceived responsibility of oneself and others can reach significant positive effects on active behaviors (weight maintenance: Jeffrey, 1974; food consumption: Monge-Rojas *et al.*, 2013; pro-environmental behaviors: Yang and Weber, 2019).

When it comes to COVID-19, some consumers would possibly account for significant failures in meat processing that can be only corrected by marketers, while consumers' demand on sensible products could be seen as reasonable or at least not primarily responsible for a viral hazard. Further, in a central-guided country such as China, consumers would be likely to perceive higher governmental responsibility. In this case, improved regulations could be perceived as the major power responsible for forcing suppliers to fulfill safety standards. Other institutions (marketers, the legislative) would be expected to serve people's health safety and

life quality in addition to the individuals' own contributions. At the same time, adverse effects of external attributions could occur. Therefore, it is hypothesized:

H5: Perceived marketer responsibility positively or negatively relates to consumers' game meat avoidance (a) and willingness to buy animal welfare products (b).

H6: Perceived government responsibility positively or negatively relates to consumers' game meat avoidance (a) and willingness to buy animal welfare products (b).

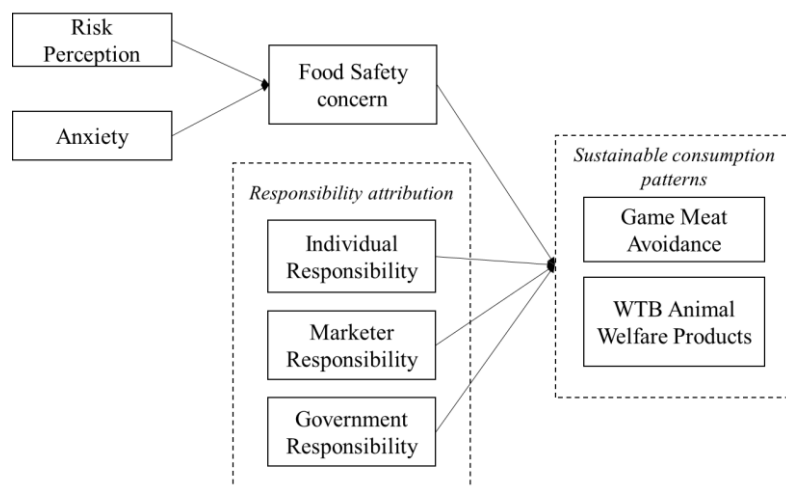


Figure 6: Conceptual model

9.3 Methods

9.3.1 Procedure

The questionnaire was programmed using an established online tool Unipark. Participants were recruited via Weidiaochoa, a professional survey platform in China, where participants received a small incentive for completing the survey. Extant research articles indicate the sufficiency of collected data via the applied platform in different fields (e.g. Ge and Gretzel, 2017; Kaluza *et al.*, 2019; Zheng, 2019). A sample of 234 participants was acquired following Jannoo's *et al.* (2014) suggestion that a large sample size increases the accuracy of estimates in PLS models. Based on the results from two pre-tests with 134 participants in total, the questionnaire was improved to enhance its internal validity (please see items and scales in Appendix A1 for the style of questionnaire). The questionnaire was composed in English and translated into Mandarin Chinese based on the iterative approach that aims to optimize the conceptual equivalence (Douglas & Craig, 2007). Data was collected from March 17 to April 5, 2020.

9.3.2 Survey Design

The survey consists of four categories of measurements: (1) independent variables: i. risk perception and assessment of anxiety, ii. food safety concerns, iii. perception of responsibility of individuals, marketers, and the government, (2) dependent variables: sustainable consumption variables including game meat avoidance and willingness to buy animal welfare products (a definition for animal welfare products is shown; see Appendix A2), (3) control variables: internal locus of control, previous purchase behaviors, and social desirability, as well as (4) socio-demographics. In addition, participants were asked to briefly describe why they would buy animal welfare products (see exemplary answers in Table 29). For the measurement of risk perception of COVID-19, items were developed based on Cheng *et al.* (2017). Risk is assessed in three dimensions: people's health, life quality, and economic situation. Health anxiety were adopted from Salkovskis *et al.* (2002) and specified for COVID-19 using three sections of statements scoring from 1 to 4 (see Appendix A1). Food safety concerns were developed based on Michaelidou & Hassan (2008). Internal locus of control items from Levenson (1974) and Guagnano (1995) were applied. Further, Crowne & Marlow (1960) was consulted for measuring social desirability. Self-developed items were used to measure responsibility perceptions, game meat avoidance, willingness to buy animal welfare products, as well as previous purchase behaviors. All measurements are based on 7-point Likert scales, except of health anxiety (please see items and scales in Appendix A1).

9.3.3 Sample

The sample of this study consists of Chinese residents from high-risk provinces such as Hubei and Guangdong, moderate-risk provinces such as Beijing and Shanghai, as well as other provinces of lower risks according to the *Chinese Center for Disease Control and Prevention* (2020). As previous studies suggest that people at younger ages and higher education levels are more likely to buy sustainable products in China (Li et al., 2016; McCarthy et al., 2016), this sample mainly represents younger and better-educated Chinese referring to *China Statistical Yearbook 2019* (Table 25; NBSC, 2019).

Table 25: Socio-demographic features

Variable	N	%
<i>Gender</i>		
Female	141	60.3%
Male	69	29.5%
<i>Age</i>		
≤ 19	15	6.4%
20-29	133	56.8%
30-39	52	22.2%
≥ 40	10	4.3%
<i>Education level</i>		
Middle school or lower	9	3.8%
High school	24	10.3%
Bachelor	155	66.2%
Master	18	7.7%
Doctor or higher	4	1.7%
<i>Province of residence¹</i>		
Guangdong	33	14.1%
Hubei	29	12.4%
Shanghai	12	5.1%
Beijing	11	4.7%
Sichuan	11	4.7%

¹ Top five provinces are shown.

Note(s): percentages of unknown answers are not listed.

9.3.4 Measurement Model

In this study, descriptive analyses are conducted using IBM SPSS Statistics 24. To test the conceptual model, a PLS-structural equation model is computed using SmartPLS 3. According to Hair et al. (2011), PLS-SEM is able to deliver a high statistical power for this study's aim of identifying key drivers in the conceptual model. The relevance of each construct, namely several responsibility dimensions and food safety concerns related to COVID-19, for explaining sustainable consumption patterns should be investigated (H3-H6). Moreover, the model serves to validate and to extend existing theoretical evidences by identifying antecedents of food safety concerns related to COVID-19 (H1-H2).

Taking Fornell & Larcker (1981)'s criteria into account, the PLS measurement model has been assessed concerning its reliability and validity (see Table 26). Indicator reliability is confirmed by indicator loadings between 0.75 and 0.95 (>0.7), except for two items of anxiety loaded at 0.69. Average variance extracted (AVE) ranges from 0.56 to 0.88 (>0.5), which supports the convergent validity of indicators. Further, as AVE of each latent construct is larger than that construct's squared correlation with other latent constructs (highest absolute r^2 -value: 0.279), discriminant validity is evidenced. The internal consistency of scales is supported by

Cronbach's alpha scores identified from 0.72 to 0.93 (>0.7 ; Cronbach, 1951), except for anxiety ($\alpha=0.60$). However, Cronbach's alpha assumes equal reliability of all indicators, which is not required by Composite Reliability (CR). For all constructs, CR exceeds the cut-off value of 0.7 (CR-range: 0.79-0.96).

To detect a possible social desirability bias in single source studies, especially for self-reported measurements, the common method variance was computed (Podsakoff et al., 2003). According to Harman's one-factor test, a principal component analysis was conducted with all survey items (Morrison & Harman, 1961). Results show that more than one factor emerged and the largest factor explains 28.17% of the variance. Therefore, this factor does not account for the majority of the variance indicating a low threat of CMV bias.

Table 26: Evaluation of measurement model

Constructs	Indicators	Indicator loadings	CA	CR	AVE
Risk perception	RISK1	0.75	0.72	0.84	0.64
	RISK2	0.84			
	RISK3	0.80			
Anxiety	ANX1	0.86	0.60	0.79	0.56
	ANX2	0.69			
	ANX3	0.69			
Food safety concern	FSC1	0.92	0.90	0.94	0.83
	FSC2	0.94			
	FSC3	0.88			
Individual responsibility	INRESP1	0.75	0.81	0.87	0.63
	INRESP2	0.82			
	INRESP3	0.80			
	INRESP4	0.80			
Marketer responsibility	MARRESP1	0.85	0.82	0.89	0.74
	MARRESP1	0.88			
	MARRESP3	0.85			
Government responsibility	GOVRESP1	0.95	0.93	0.96	0.88
	GOVRESP2	0.95			
	GOVRESP3	0.92			
Game meat avoidance	GMA1	0.93	0.87	0.92	0.80
	GMA2	0.92			
	GMA3	0.82			
WTB animal welfare	WTBAW1	0.91	0.89	0.93	0.82
	WTBAW2	0.93			
	WTBAW3	0.88			
Internal locus of control	INLOC1	0.82	0.72	0.84	0.64
	INLOC2	0.74			
	INLOC3	0.83			

Note(s): CA = Cronbach's Alpha; CR = Composite Reliability; AVE = Average Variance Extracted.

9.3.5 Structural model

Following suggestions of Henseler et al. (2014), PLS models prioritize the predictive relevance. Hence, the current model is evaluated considering R^2 (Fornell & Larcker, 1981), Q^2 (Geisser, 1975), and path coefficients.

A weak to moderate amount of variance of endogenous latent variables is explained for game meat avoidance and willingness to buy animal welfare products (see Table 27). All Q^2 values are above zero, which suggests a predictive relevance for all endogenous variables.

Table 27: R squared and Q squared

Latent variable	R^2	Q^2
Food safety concern	0.22	0.17
Game meat avoidance	0.41	0.28
WTB animal welfare products	0.34	0.25
\emptyset	0.32	0.23

Based on a bootstrap procedure with 2,000 random samples, the significance of the estimates for hypothesized relationships is tested for 234 cases. To identify the goodness of model fit, a global criterion, which is suggested by Tenenhaus et al. (2005) and applied in several articles (e.g. Alan et al., 2016; Hew et al., 2015; Wan et al., 2014; Wang et al., 2016), is applied for the current model. It is defined as small (0.10), medium (0.25), and large (0.36) (Tenenhaus et al., 2005). The fitted model delivers a large GoF of 0.37, which is consistent with the good predictive quality assessed before.

9.4 Results

9.4.1 Descriptive Analysis and Correlations

According to participants' subjective assessment, they are moderately to better informed about COVID-19 ($M_{information} = 5.55$). Participants report a low level of anxiety ($M_{anxiety} = 2.17$), but a relatively high risk perception ($M_{risk} = 6.45$). The perceived safety concern for food products is at a moderate level ($M_{FSC} = 3.98$). Participants perceive the responsibility of individuals and marketers at a similar level, but a higher level of governmental responsibility ($M_{InResp/MarkResp} = 6.54$; $M_{GovResp} = 6.71$). Previous purchase frequencies are low for game meat and animal welfare products ($M_{GM} = 2.15$; $M_{ANP} = 3.21$). Besides, the social desirability scores reach 3.81, which is a comparable size according to previous measurements for Chinese people (Dunn & Shome, 2009).

Furthermore, perceived individual responsibility positively correlates with the perceived responsibility of the marketer and the government (see Appendix A3). However, internal locus of control is only weakly correlated with three responsibility dimensions. In addition, anxiety and food safety concerns reach a moderate correlation. All VIF values are under 5 ranging from 1.17 to 4.63, and therefore acceptable (Hair et al., 2011).

9.4.2 PLS model

Both antecedents of food safety concern (risk perception and anxiety) show significant path coefficients ($p < 0.1$; Table 28). Thus, *H1* and *H2* are accepted. Food safety concern significantly decreases consumers' willingness to buy animal welfare products, which is opposed to and therefore rejects *H3b*. The path between food safety concern and game meat avoidance is positive (*H3a*), but only marginally significant.

Within the responsibility dimensions, individual responsibility causes no significant effects on both sustainable consumption patterns rejecting paths hypothesized in *H4*. Compared to that, perceived marketer responsibility shows significant positive path coefficients for game meat avoidance and willingness to buy animal welfare products. Hence, *H5a* and *H5b* are accepted. Perceived government responsibility generates a positive effect on the willingness to buy animal welfare products that accepts *H6b*, but no further significant effect on game meat avoidance (*H6a* is rejected). Control variables accounting for previous purchase behaviors and the path IN-LOC \rightarrow WTB animal welfare are significant (following the treatment of control variables suggested in Lowry and Gaskin, 2014; Jabbour *et al.*, 2015).

In addition, a separate model is run to test the relationship between food safety concern and the three responsibility dimensions with the same latent variables and hypothesized paths by adding three paths to the model. No significant paths are found, and R square scores are only lower than 0.02. The same procedure is repeated to test internal locus of control as a predecessor of responsibility perceptions. One significant effect is found for IN-LOC \rightarrow GovResp ($p < 0.05$), but all three R squared scores are at marginal levels ($R^2 < 0.05$).

Table 28: Path coefficients and hypotheses

Path	β	Hypothesis	Decision
Antecedents of food safety concern			
Risk perception \rightarrow food safety concern	0.17**	<i>H1</i>	✓
Anxiety \rightarrow food safety concern	0.41**	<i>H2</i>	✓
Food safety concern			
FSC \rightarrow game meat avoidance	0.09 †	<i>H3a</i>	(✓)
FSC \rightarrow WTB animal welfare	-0.14*	<i>H3b</i>	×
Individual responsibility			
InResp \rightarrow game meat avoidance	0.08	<i>H4</i>	×
InResp \rightarrow WTB animal welfare	0.05		
Marketer responsibility			
MarResp \rightarrow game meat avoidance	0.29**	<i>H5</i>	✓
MarResp \rightarrow WTB animal welfare	0.21*		
Government responsibility			
GovResp \rightarrow game meat avoidance	0.19 †	<i>H6a</i>	(✓)
GovResp \rightarrow WTB animal welfare	0.24*	<i>H6b</i>	✓
Internal locus of control (control variable)			
IN-LOC \rightarrow game meat avoidance	0.11 †		
IN-LOC \rightarrow WTB animal welfare	0.20**		
Previous purchase behaviors (control variables)			
Game meat \rightarrow game meat avoidance	-0.25**		
Animal welfare \rightarrow WTB animal welfare	0.20**		

Note(s): ** $p \leq 0.01$; * $p \leq 0.05$; [†] $p \leq 0.10$; ✓ hypothesis supported; × rejected.

Table 29: Consumer motives of buying animal welfare products

Category of motive	Citation
Safety	<i>Safety guarantee</i>
	• “The safety and the living conditions of animals are guaranteed, which also means that when they become products, they also have certain guarantees and security.”
	• “I feel that the safety of animal welfare products is more guaranteed.”
	<i>Safety from source</i>
	• “Because of disease immunity”
	• “The meat quality can be guaranteed from the source. If it is safe and hygienic, I will buy it even it’s more expensive.”
	<i>Inspection, certification, and management</i>
	• “Safe, healthy and passed inspections.”
	• “Because of the official channel of sourcing” (state-controlled)
	• “Certified food is safer.”
Health and nutrition	• “Because the feeding and management is good, there are professionals in all aspects to control it, I can have peace of mind when buying it.”
	<i>Healthiness</i>
	• “I will buy it because the product will be relatively healthy and it will be relatively safe to eat.”
	• “Appropriate product standards are appreciated. These products also pay attention to health.”
	• “The meat is healthier, and you can have peace in mind when eating.”
	<i>Nutrient intake</i>
	• “I will buy, because these products have the nutrients needed for daily life”
	• “I still need to buy some meat in my life after all.”

Ethical attributes	<p><i>Guilt reduction</i></p> <ul style="list-style-type: none"> • “I would buy animal welfare products, but only the most common ones. Maybe in my heart, I feel guilty for eating some sorts of animals. In my personal perception, human consumption of pork, beef, and lamb is sufficient, and nothing else is necessary.” • “Because animal welfare products guarantee a certain meat quality, and can reduce the pain caused to the animals, so that I feel less guilty when I eat it.” • “This will reduce guilt.” • “In line with the humanitarian spirit, animals are also lives, and they have the right to better enjoy the happiness of life, even if they are born to be used by humans as food. So purchasing animal welfare products can not only reduce my inner guilt, but also provide freedom to the animals.” <p><i>Less harm to animals</i></p> <ul style="list-style-type: none"> • “Animal welfare products have very little harm to animals, and at the same time, animal welfare products can be beneficial to the human body.” • “People can eat animals, but should minimize their pain. Animals can be killed but should not be abused.” • “There is a good saying: without trading, there is no harm!” • “Because animals need to live in a comfortable and safe environment.” • “Yes, because the channel is safe and respectful towards animals.” <p><i>Human-animal relations</i></p> <ul style="list-style-type: none"> • “Protecting animals means protecting ourselves.” • “According to their own health, plus for that of animals, we must learn to live with them, so as to maintain ecological balance!” • “Promote the balanced co-existence of humans and animals” <p><i>Emotional features</i></p> <ul style="list-style-type: none"> • “(It is) more benevolent.” • “I might buy it, and I am a sentimental person.”
Environmental protection	<ul style="list-style-type: none"> • “Products, which do not violate nature and are safe, are worth buying.” • “Hygiene and environmental standards can reduce risks.” • “Buying animal welfare products does not destroy the diversity of animals!”
Quality	<ul style="list-style-type: none"> • “After the animal welfare products are tested by National Food Administration, I can buy them with confidence.” (National Food and Drug Administration) • “Fish or meat products are guaranteed, and when quality problems are found, they can be quickly traced back to avoid the expansion of quality problems.” • “Quality is guaranteed, but the price may be higher.” • “Assuring quality.”
Concern with viruses/bacteria	<ul style="list-style-type: none"> • “Because after passing through the new Coronavirus, there is also the saying that it comes from eating wild animals. Therefore, I will not buy animal welfare products, eat less animals and also protect national animals.” • “New Coronavirus may spread through animals.” • “Because of the virus, I am afraid to eat.” • “Fear of animals carrying bacteria.”
Price	<ul style="list-style-type: none"> • “This is very good, but (I) also need consider the price.” • “Probably because the price is too high.” • “The price is too high, it is not fresh enough.”
Lack of knowledge	<ul style="list-style-type: none"> • “Well ... I have no concept of welfare products.” • “I don’t know much, so I don’t have much interest to buy.”
Other	<ul style="list-style-type: none"> • “Because I don't like it” • “Never tried.”

	<ul style="list-style-type: none"> • “If it is really (animal) friendly, there is no killing.” • “I am vegetarian.”
--	---

9.5 Discussion

The current study examines three specified responsibility attributions to the individuals, the marketers, and the government with regard to prevent a future crisis similar to COVID-19 as predictors of sustainable consumption patterns. Simultaneously, this study also explains sustainable consumption patterns by analyzing food safety concerns caused by COVID-19. The fitted model in this study contributes to predict 40% of the variance of game meat avoidance and 34% of willingness to buy animal welfare products.

Consumers’ intention to avoid game meat positively relates to their responsibility perception of marketers, while food safety concern shows the tendency to increase the avoidance intention. Compared to that, consumers’ willingness to buy animal welfare products shows positive relations to perceived marketer and government responsibility. These results are in accordance with findings on pro-environmental behaviors among Chinese individuals in Yang and Weber (2019). However, people seem to have weakened desire for animal welfare products, when higher food and meat safety concern exists. Surprisingly, individuals’ responsibility perceptions specified for preventing a similar crisis in the future are unrelated to their behavioral intentions, although descriptively similar scores are reached for individuals’ and marketers’ responsibilities. Nevertheless, people’s generalized perceptions of their internal locus of control seem to play a role. Additionally, this study finds food safety concerns related to COVID-19 to be driven by people’s anxiety about a viral infection and their general (multi-dimensional) risk perceptions of the hazard.

9.5.1 Implications

Findings support the literature that the perceived responsibilities of others can cause significant effects on people’s behavioral intentions as shown in 2.2.2. Positive correlations between the responsibility dimensions emphasize the sense of common responsibility for an event such as the COVID-19 pandemic. However, findings seem to contradict previously found positive effects of internal attributions (e.g. Cleveland, Kalamas and Laroche, 2012). Taking similar descriptive results for perceived individual and marketer responsibility into account, consumers seem to resist adapting behavioral changes as the consequence of fulfilling personal responsibility. One reason could be that many consumers do not regularly buy health-critical products such as game meat. Therefore, when assessing whether to fulfil an individual duty,

average consumers mainly refer to those groups of people who have higher preferences or established habits for buying sensible products. A further reason could be that consumers who frequently buy this type of products perceive their responsibilities but resist the feelings of self-blame and consequential responses. This assumption is compatible with the self-serving bias discussed in Gioia and Sims (1985).

Furthermore, results on food safety concerns are in line with previous results to affect behavioral responses (Harper and Makatouni, 2002). However, food safety concerns seem to influence game meat avoidance to a smaller extent compared to responsibility attributions when it comes to a population that less frequently consume game meat. Moreover, if people are generally concerned with meat product safety expressed in a negative way, they potentially also have reduced buying intentions for animal welfare products. However, if people perceive an urgency for marketers and regulations to change with the aim to improve food safety in a positive way, they would consider buying animal welfare products.

Considering the antecedents of food safety concern, both individuals' risk perceptions and anxiety deliver complementary parts of the explanation. When people perceive risks of the pandemic on their lives and the economy, they also believe in a harm for food safety. Further, an individual's psychological state or negative feelings associated with the pandemic are an important driver of food safety concern. Thus, the pre-existing high level of food safety awareness among Chinese consumers shown in Xie *et al.* (2015) might have been further improved by the pandemic. In addition, since anxiety appears to be a stronger driver than risk perception, marketers and policymakers would need to pay attention to the emotional component of people's concerns. Possibly, individuals are not aware of the links between their anxiety about a potential threat to their health and their food safety concerns. Consumers would need to be provided information about whether the virus outbreak is a reason for performing more cautious food choices and which products are at low- or high-risk.

Based on these results, this article stresses the importance of external attributions for explaining after-crisis behavioral intentions in the context of sustainable consumption. This is line with our expectations for the centralized Chinese context. Food suppliers and retailers should be prepared that consumers expect them to improve their safety and hygiene standards (also see Table 29), which is supposed to reduce the risk probability of a future biological hazard from food. Nevertheless, consumers who recognize the necessity of marketers' change actions are also willing to do their part of the work. According to specific consumption patterns, game meat

sellers would be facing consumers' avoidance intentions and might need major adaptations, while the previously less explored market potential for animal welfare products can benefit from the consumers' reactions to COVID-19. The government is expected to take action with stricter regulations and inspections for meat safety. From consumer perspective, animal welfare products could be one solution that embodies their expected standards. In consequence, accelerating the establishment of animal welfare production and certification could offer an effective countermeasure against biological hazards from food/meat.

Considering these results from China, the negative effect of food safety concern on willingness to buy animal welfare products could also occur in other countries as long as food safety is one of the major purchase motives (see Cembalo *et al.*, 2016). Further, evidences show the positive effects of external responsibility attributions on behavioral intentions in reaction to food scandals such as boycotting among German consumers (Hartmann & Moeller, 2014), or purchasing organic food in South Korea (H. Kim *et al.*, 2019). Hence, perceived responsibility of marketers and the government could also trigger people's willingness to avoid game meat and to buy animal welfare products in different political systems. Overall, in response to the recent call of Cohen (2020) and further public discussion, this study enlightens the potential of the pandemic to transit meat consumption into more sustainable patterns.

9.5.2 Limitations

Several limitations should be addressed in future research. Although social desirability measurements only reach moderate levels in this study, results based on survey data might be affected by the intention-behavior gap (e.g. Sudbury-Riley & Kohlbacher, 2016). Real behavioral data should be collected to validate the expected consumer responses to the crisis. Furthermore, people's thoughts and assessments of the hazard might be different during and after the COVID-19 pandemic. Therefore, it would be important to observe the long-term effects of the pandemic on whether expected behavioral changes will occur and sustain.

This study focuses on the avoidance of game meat but people's intentions to avoid or reduce the overall meat consumption would be also important responses to the pandemic. Especially, when consumers' concerns with meat safety reach a certain threshold level, they could also consider anti-consumption practices (e.g. Malek, Umberger and Goddard, 2019). For further investigation, scholars should enlighten more generalized effects of the pandemic on people's eating habits.

Furthermore, this study mainly shows the relationships between cognitive responsibility attributions for future actions and sustainable behavioral outcomes. But there are further more spontaneous, affective variables such as anger about peers or public officials who would be blamed for causing the crisis, which could deliver other explanations on behavioral patterns (Griffin et al., 2008). Also, further experimental studies would contribute to provide ex post pandemic campaign tactics to increase sustainable consumption, for example, considering the fit between responsibility attribution and promotional message (Kong & Shen, 2011).

Moreover, current analyses are conducted for the Chinese context concerning its political and cultural features such as power distance and autonomy that might differ in Western countries (S. H. Schwartz, 1992). Even though basic human values might be stable across countries (e.g. Thøgersen and Zhou, 2012), a validation of results in other regions would be valuable. For instance, more autonomy-driven individuals could also perceive higher individual responsibility, which might affect intentions to contribute with their own behaviors significantly. Besides, younger and better-educated people are overrepresented in this study. Respondents without a university degree and at higher ages would need to be acquired.

9.6 Conclusion

This study sheds light on the relevance of food safety concern and responsibility attributions (internal, external) related to a biological hazard in the case of COVID-19 to explain reactive sustainable consumption intentions incorporating game meat avoidance and the purchase of animal welfare products. The following results could be concluded:

- Food safety concern negatively relates to consumer willingness to buy animal welfare products.
- General risk perception and health anxiety according to a pandemic positively relate to food safety concern.
- Consumers who demand performance improvement of marketers and the government (to prevent a future hazard) also tend to have a higher willingness to purchase animal welfare products.
- Consumers' intentions for game meat avoidance are in line with their demand for marketers' change actions.

This study fills the research gap of analyzing the effects of a viral disease rooted in food retail operations on consumers' anticipated adaptive behaviors in terms of sustainable consumption. For the research stream of responsibility attributions, the importance of external dimensions is underlined for a cause that is not clearly related to a mass consumption pattern with high purchase frequencies (such as for game meat).

References

- Anater, A.S., McWilliams, R. and Latkin, C.A. (2011), "Food acquisition practices used by Food-insecure individuals when they are concerned about having sufficient food for themselves and their households", *Journal of Hunger and Environmental Nutrition*, Vol. 6 No. 1, pp. 27-44, doi: 10.1080/19320248.2011.549368.
- Angulo, A.M. and Gil, J.M. (2007), "Risk perception and consumer willingness to pay for certified beef in Spain", *Food Quality and Preference*, Vol. 18 No. 8, pp. 1106-1117, doi: 10.1016/j.foodqual.2007.05.008.
- Agan, Y., Kuzey, C., Acar, M.F. and Açıkgöz, A. (2016), "The relationships between corporate social responsibility, environmental supplier development, and firm performance", *Journal of Cleaner Production*, Vol. 112, pp. 1872-1881, doi: 10.1016/j.jclepro.2014.08.090.
- Bayne, K., Ramachandra, G.S., Rivera, E.A. and Wang, J. (2015), "The evolution of animal welfare and the 3Rs in Brazil, China, and India", *Journal of the American Association for Laboratory Animal Science*.
- Buss, D.M. and Scheier, M.F. (1976), "Self-consciousness, self-awareness, and self-attribution", *Journal of Research in Personality*, Vol. 10, pp. 463-468, doi: 10.1016/0092-6566(76)90060-X.
- Cembalo, L., Caracciolo, F., Lombardi, A., Del Giudice, T., Grunert, K.G. and Cicia, G. (2016), "Determinants of individual attitudes toward animal welfare-friendly food products", *Journal of Agricultural and Environmental Ethics*, Springer Netherlands, Vol. 29 No. 2, pp. 237-254, doi: 10.1007/s10806-015-9598-z.
- Cheng, P., Wei, J., Marinova, D. and Guo, X. (2017), "Adoption of protective behaviours: residents response to city smog in hefei, China", *Journal of Contingencies and Crisis Management*, Vol. 25 No. 4, pp. 244-255, doi: 10.1111/1468-5973.12148.
- China Association for Standardization (CAS) (2014-2017), "Farm animal welfare requirement: pigs/cattle/sheep/(laying) hens", available at: <http://www.iccaw.org.cn/plus/list.php?tid57> (accessed 1 July 2020).
- Chinese Center for Disease Control and Prevention (CDC) (2020), "Distribution of new coronavirus pneumonia (新型冠状病毒肺炎疫情分布)", available at: <http://2019ncov.chinacdc.cn/2019-nCoV/> (assessed 7 April 2020).
- Cleveland, M., Kalamas, M. and Laroche, M. (2012), "It's not easy being green: exploring

- green creeds, green deeds, and internal environmental locus of control mark”, *Psychology and Marketing*, Vol. 30 No. 6, pp. 461-469, doi: 10.1002/mar.20522.
- Cohen, M.J. (2020), “Does the COVID-19 outbreak mark the onset of a sustainable consumption transition?”, *Sustainability: Science, Practice and Policy*, Taylor and Francis, Vol. 16 No. 1, pp. 1-3, doi: 10.1080/15487733.2020.1740472.
- Coombs, W.T. (2007), “Attribution Theory as a guide for post-crisis communication research”, *Public Relations Review*, Vol. 33 No. 2, pp. 135-139, doi: 10.1016/j.pubrev.2006.11.016.
- Coombs, W.T. (2007), “Protecting organization reputations during a crisis: the development and application of situational crisis communication theory”, *Corporate Reputation Review*, Vol. 10 No. 3, pp. 163-176, doi: 10.1057/palgrave.crr.1550049.
- Cronbach, L.J. (1951), “Coefficient alpha and the internal structure of tests”, *Psychometrika*, Vol. 16 No. 3, pp. 297-334, doi: 10.1007/BF02310555.
- Crosby, L.A. and Stephens, N. (1987), “Effects of relationship marketing on satisfaction, retention and proces in the life insurance indutry”, *Journal of Marketing Management*, Vol. 24 No. 4, pp. 404-411, doi: 10.2307/3151388.
- Crowne, D.P. and Marlowe, D. (1960), “A new scale of social desirability independent of psychopathology”, *Journal of Consulting Psychology*, Vol. 24 No. 4, p. 349.
- Douglas, S.P. and Craig, C.S. (2007), “Collaborative and iterative translation: an alternative approach to back translation”, *Journal of International Marketing*, Vol. 15 No. 1, pp. 30-43, doi: 10.1509/jimk.15.1.030.
- Dunn, P. and Shome, A. (2009), “Cultural crossvergence and social desirability bias: ethical evaluations by Chinese and Canadian business students”, *Journal of Business Ethics*, Vol. 85 No. 4, pp. 527-543, doi: 10.1007/s10551-008-9787-z.
- Fiske, S.T. and Taylor, S.E. (2008), *Social Cognition: From Brains to Culture*, McGraw-Hill, Boston.
- Fornell, C. and Larcker, D.F. (1981), “Structural equation models with unobservable variables and measurement error: algebra and statistics”, *Journal of Marketing*, Vol. 18 No. 3, pp. 382-388, doi: 10.1177/002224378101800313.
- Frewer, L. (2000), “Risk perception and risk communication about food safety issues”, *Nutrition Bulletin*, Vol. 25 No. 1, pp. 31-33, doi: 10.1046/j.1467-3010.2000.00015.x.
- Ge, J. and Gretzel, U. (2017), “The role of humour in driving customer engagement”, *Information and Communication Technologies in Tourism 2017*, Springer, Cham. doi:

10.1007/978-3-319-51168-933.

Geisser, S. (1975), "The predictive sample reuse method with applications", *Journal of the American Statistical Association*, Vol. 70, pp. 320-328, doi: 10.1080/01621459.1975.10479865.

Gioia, D.A. and Sims, H.P. (1985), "Self-serving bias and actor-observer differences in organizations: an empirical analysis", *Journal of Applied Social Psychology*, Vol. 15 No. 6, pp. 547-563, doi: 10.1111/j.1559-1816.1985.tb00919.x.

Griffin, R.J., Dunwoody, S. and Neuwirth, K. (1999), "Proposed model of the relationship of risk information seeking and processing to the development of preventive behaviors", *Environmental Research*, Vol. 80 No. 2, pp. S230-S245, doi: 10.1006/enrs.1998.3940.

Griffin, R.J., Yang, Z., Ter Huurne, E., Boerner, F., Ortiz, S. and Dunwoody, S. (2008), "After the flood: anger, attribution, and the seeking of information", *Science Communication*, Vol. 29 No. 3, pp. 285-315, doi: 10.1177/1075547007312309.

Guagnano, G.A. (1995), "Locus of control, altruism and agentic disposition", *Population and Environment: A Journal of Interdisciplinary Studies*, Vol. 17 No. 1, pp. 63-77, doi: 10.1007/BF02208278.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), "PLS-SEM: indeed a silver bullet", *The Journal of Marketing Theory and Practice*, Vol. 19 No. 2, pp. 139-152, doi: 10.2753/MTP1069-6679190202.

Harper, G.C. and Makatouni, A. (2002), "Consumer perception of organic food production and farm animal welfare", *British Food Journal*, Vol. 104 No. 3, pp. 287-299, doi: 10.1108/00070700210425723.

Hartmann, J. and Moeller, S. (2014), "Chain liability in multitier supply chains? Responsibility attributions for unsustainable supplier behavior", *Journal of Operations Management*, Vol. 32 No. 5, pp. 281-294, doi: 10.1016/j.jom.2014.01.005.

Henseler, J., Dijkstra, T.K., Sarstedt, M., Ringle, C.M., Diamantopoulos, A., Straub, D.W. and Ketchen, D.J. (2014), "Common beliefs and reality about PLS: comments on rönkkö and evermann (2013)", *Organizational Research Methods*, Vol. 17 No. 2, pp. 182-209, doi: 10.1177/1094428114526928.

Hew, J.J., Lee, V.H., Ooi, K.B. and Wei, J. (2015), "What catalyses mobile apps usage intention: an empirical analysis", *Industrial Management and Data Systems*, Vol. 115 No. 7, pp. 1269-1291, doi: 10.1108/IMDS-04-2016-0141.

Jabbour, C.J.C., Jugend, D., de Sousa Jabbour, A.B.L., Gunasekaran, A. and Latan, H. (2015),

- “Green product development and performance of Brazilian firms: measuring the role of human and technical aspects”, *Journal of Cleaner Production*, Vol. 87, pp. 442-451, doi: 10.1016/j.jclepro.2014.09.036.
- Jannoo, Z., Yap, B.W., Auchoybur, N. and Lazim, M.A. (2014), “The effect of nonnormality on CB-SEM and PLS-SEM path estimates”, *International Journal of Mathematical, Computational, Physical, Electrical and Computer Engineering*, Vol. 8 No. 2, pp. 285-291.
- Janssen, E., van Osch, L., de Vries, H. and Lechner, L. (2011), “Measuring risk perceptions of skin cancer: reliability and validity of different operationalizations”, *British Journal of Health Psychology*, Vol. 16 No. 1, pp. 92-112, doi: 10.1348/135910710X514120.
- Jeffrey, D.B. (1974), “A comparison of the effects of external control and self-control on the modification and maintenance of weight”, *Journal of Abnormal Psychology*, Vol. 83 No. 4, p. 404, doi: 10.1037/h0036924.
- Kalamas, M., Cleveland, M. and Laroche, M. (2014), “Pro-environmental behaviors for thee but not for me: green giants, green Gods, and external environmental locus of control”, *Journal of Business Research*, Elsevier, Vol. 67 No. 2, pp. 12-22, doi: 10.1016/j.jbusres.2013.03.007.
- Kaluza, A.J., Schuh, S.C., Kern, M., Xin, K. and van Dick, R. (2019), “How do leaders’ perceptions of organizational health climate shape employee exhaustion and engagement? Toward a cascading-effects model”, *Human Resource Management*, Vol. 59 No. 4, pp. 359-377, doi: 10.1002/hrm.22000.
- Kim, H., Jang, S.M. and Noh, G.Y. (2019), “Is it good to blame the government for food safety concerns? Attributions of responsibility, new media uses, risk perceptions, and behavioral intentions in South Korea”, *Journal of Food Safety*, Vol. 39 No. 1, p. e12570, doi: 10.1111/jfs.12570.
- Kong, Y. and Shen, F. (2011), “Impact of locus of control on health message effectiveness”, *Health Marketing Quarterly*, Vol. 28 No. 4, pp. 354-371, doi: 10.1080/07359683.2011.623114.
- Lai, J., Wang, H.H., Ortega, D.L. and Widmar, N.J.O. (2018), “Factoring Chinese consumers’ risk perceptions into their willingness to pay for pork safety, environmental stewardship, and animal welfare”, *Food Control*, Vol. 85, pp. 423-431, doi: 10.1016/j.foodcont.2017.09.032.
- Levenson, H. (1974), “Activism and powerful others: distinctions within the concept of

- internal external control”, *Journal of Personality Assessment*, Vol. 38 No. 4, pp. 377-383, doi: 10.1080/00223891.1974.10119988.
- Li, Y., Lu, Y., Zhang, X., Liu, L., Wang, M. and Jiang, X. (2016), “Propensity of green consumption behaviors in representative cities in China”, *Journal of Cleaner Production*, Vol. 133, pp. 1328-1336, doi: 10.1016/j.jclepro.2016.06.012.
- Lowry, P.B. and Gaskin, J. (2014), “Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: when to choose it and how to use it”, *IEEE Transactions on Professional Communication*, Vol. 57 No. 2, pp. 123-146, doi: 10.1109/TPC.2014.2312452.
- Malek, L., Umberger, W. and Goddard, E. (2019), “Is anti-consumption driving meat consumption changes in Australia?”, *British Food Journal*, Vol. 121 No. 1, pp. 123-138, doi: 10.1108/BFJ-03-2018-0183.
- McCarthy, B., Liu, H.B. and Chen, T. (2016), “Innovations in the agro-food system: adoption of certified organic food and green food by Chinese consumers”, *British Food Journal*, Vol. 118 No. 6, pp. 1334-1349, doi: 10.1108/BFJ-10-2015-0375.
- McCarty, J.A. and Shrum, L.J. (2001), “The influence of individualism, collectivism, and locus of control on environmental beliefs and behavior”, *Journal of Public Policy and Marketing*, Vol. 20 No. 1, pp. 93-104, doi: 10.1509/jppm.20.1.93.17291.
- McDonald, L. and Hartel, C.E. (2000), *Applying the Involvement Construct to Organisational Crises*, Faculty of Business & Economics, Monash University, Melbourne, pp. 799-803.
- Michaelidou, N. and Hassan, L.M. (2008), “The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food”, *International Journal of Consumer Studies*, Vol. 32 No. 2, pp. 163-170, doi: 10.1111/j.1470-6431.2007.00619.x.
- Monge-Rojas, R., Smith-Castro, V., Colon-Ramos, U., Aragon, M.C. and Herrera-Raven, F. (2013), “Psychosocial factors influencing the frequency of fast-food consumption among urban and rural costarican adolescents”, *Nutrition*, Vol. 29 Nos 7-8, pp. 1007-1012, doi: 10.1016/j.nut.2013.01.021.
- Morrison, D.F. and Harman, H.H. (1961), “Modern factor Analysis.”, *Journal of the American Statistical Association*, Vol. 56 No. 294, pp. 444-446, doi: 10.2307/2282293.
- Napper, L.E., Fisher, D.G. and Reynolds, G.L. (2012), “Development of the perceived risk of HIV scale”, *AIDS and Behavior*, Vol. 16 No. 4, pp. 1075-1083, doi: 10.1007/s10461-011-0003-2.

- National Bureau of Statistics of China (NBSC) (2019), China Statistical Yearbook 2019 (Age: Section 2-9; Education: 2-14), available at:
<http://www.stats.gov.cn/tjsj/ndsj/2019/indexch.htm> (accessed 1 July 2020).
- Newcomb, T. and Heider, F. (1958), “The psychology of interpersonal relations”, *American Sociological Review*, Vol. 23 No. 6, pp. 742-743, doi: 10.2307/2089062.
- Peeri, N.C., Shrestha, N., Rahman, M.S., Zaki, R., Tan, Z., Bibi, S. and Haque, U. (2020), “The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned?”, *International Journal of Epidemiology*, Vol. 49 No. 3, pp. 717-726, doi: 10.1093/ije/dyaa033.
- Pei, X., Tandon, A., Alldrick, A., Giorgi, L., Huang, W. and Yang, R. (2011), “The China melamine milk scandal and its implications for food safety regulation”, *Food Policy*, Vol. 36 No. 3, pp. 412-420, doi: 10.1016/j.foodpol.2011.03.008.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003), “Common method biases in behavioral research: a critical review of the literature and recommended remedies”, *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903, doi: 10.1037/0021-9010.88.5.879.
- Runions, S., Arnaert, A. and Sourial, R. (2006), “Causal attributions and health behavior choices among stroke and transient ischemic attack survivors”, *Journal of Neuroscience Nursing*, Vol. 38 No. 4, p. 288, doi: 10.1097/01376517-200609000-00004.
- Salkovskis, P.M., Rimes, K.A. and Warwick, H.M.C. (2002), “The health anxiety inventory: development and validation of scales for the measurement of health anxiety and hypochondriasis”, *Psychological Medicine*, Vol. 32 No. 5, pp. 843-853, doi: 10.1017/S0033291702005822.
- Schwartz, S.H. (1992), “Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries”, *Advances in Experimental Social Psychology*, Vol. 25 No. C, pp. 1-65, doi: 10.1016/S0065-2601(08)60281-6.
- Sinclair, M., Zhang, Y., Descovich, K. and Phillips, C.J. (2020), “Farm animal welfare science in china—a bibliometric review of Chinese literature”, *Animals*, Vol. 10 No. 3, p. 540, doi: 10.3390/ani10030540.
- Slovic, P. (1992), “Perception of risk: reflections on the psychometric paradigm”, in Krimsky, S. and Golding, D. (Eds), *Social Theories of Risk*, Praeger, pp. 117-152.
- Stone, R.N. and Grønhaug, K. (1993), “Perceived risk: further considerations for the marketing discipline”, *European Journal of Marketing*, Vol. 27 No. 3, pp. 39-50, doi:

10.1108/03090569310026637.

- Sudbury-Riley, L. and Kohlbacher, F. (2016), "Ethically minded consumer behavior: scale review, development, and validation", *Journal of Business Research*, The Authors, Vol. 69 No. 8, pp. 2697-2710, doi: 10.1016/j.jbusres.2015.11.005.
- Sun, P., Lu, X., Xu, C., Sun, W. and Pan, B. (2020), "Understanding of COVID-19 based on current evidence", *Journal of Medical Virology*, Vol. 92 No. 6, pp. 548-551, doi: 10.1002/jmv.25722.
- Sustainable Food System Programme (SFS) (2020), "SFS Programme statement on the COVID-19 (coronavirus) crisis and food systems", available at: <https://www.oneplanetnetwork.org/sfsprogrammestatement-covid-19-coronavirus-crisis-and-food-systems> (assessed 15 April 2020).
- Tenenhaus, M., Esposito Vinzi, V., Chatelin, Y.M. and Lauro, C. (2005), "PLS path modeling", *Computational Statistics and Data Analysis*, Vol. 48 No. 1, pp. 159-205, doi: 10.1016/j.csda.2004.03.005.
- The Economist (2018), "Asia's appetite for endangered species is relentless", available at: <https://www.economist.com/asia/2018/04/19/asias-appetite-for-endangered-species-is-relentless> (assessed 8 April 2020).
- Thøgersen, J. and Zhou, Y. (2012), "Chinese consumers' adoption of a 'green' innovation – the case of organic food", *Journal of Marketing Management*, Vol. 28 Nos 3-4, pp. 313-333, doi: 10.1080/0267257X.2012.658834.
- Thornton, B., Ryckman, R.M., Kirchner, G., Jacobs, J., Kaczor, L. and Kuehnel, R.H. (1988), "Reaction to self-attributed victim responsibility: a comparative analysis of rape crisis counselors and lay observers", *Journal of Applied Social Psychology*, Vol. 18 No. 5, pp. 409-422, doi: 10.1111/j.1559-1816.1988.tb00025.x.
- Wan, C., Shen, G.Q. and Yu, A. (2014), The role of perceived effectiveness of policy measures in predicting recycling behaviour in Hong Kong, *Resources, Conservation and Recycling*, Elsevier B.V., Vol. 83, pp. 141-151, doi: 10.1016/j.resconrec.2013.12.009.
- Wang, S.T. (2014), "Consumer characteristics and social influence factors on green purchasing intentions", *Marketing Intelligence and Planning*, Vol. 32 No. 7, pp. 738-753, doi: 10.1108/MIP-12-2012-0146.
- Wang, Y., Huscroft, J.R., Hazen, B.T. and Zhang, M. (2016), 'Green information, green certification and consumer perceptions of remanufactured automobile parts, *Resources, Conservation and Recycling*, Vol. 128, pp. 187-196, doi:

10.1016/j.resconrec.2016.07.015.

- WCFAW (2019), “Chinese consumers are willing to pay a premium for high animal welfare products”, 3rd World Conference on Farm Animal Welfare (WCFAW), (中国消费者愿意为高动物福利产品支付溢价 | 2019世界农场动物福利大会), available at: <http://vcearth.com/p/MGIwN2Y5NjUwZjZlNTc2ODg2MzcyNDg3MThiNjZlNTk5> (accessed 15 April 2020).
- Weiner, B. (1985), “An attributional theory of achievement motivation and emotion”, *Psychological Review*, Vol. 92 No. 4, p. 548, doi: 10.1037/0033-295X.92.4.548.
- Xie, B., Wang, L., Yang, H., Wang, Y. and Zhang, M. (2015), “Consumer perceptions and attitudes of organic food products in eastern China”, *British Food Journal*, Vol. 117 No. 3, pp. 1105-1121, doi: 10.1108/BFJ-09-2013-0255.
- Xu, Z., Shi, L., Wang, Y., Zhang, J., Huang, L., Zhang, C. and Tai, Y. (2020), “Pathological findings of COVID-19 associated with acute respiratory distress syndrome”, *The Lancet Respiratory Medicine*, Vol. 8 No. 4, pp. 420-422, doi: 10.1016/S2213-2600(20)30076-X.
- Yang, X. and Weber, A. (2019), “Who can improve the environment — me or the powerful others ? An integrative approach to locus of control and pro-environmental behavior in China”, *Resources, Conservation and Recycling*, Elsevier, Vol. 146, September 2018, pp. 55-67, doi: 10.1016/j.resconrec.2019.03.005.
- Yeung, R., Yee, W. and Morris, J. (2010), “The effects of risk-reducing strategies on consumer perceived risk and on purchase likelihood: a modelling approach”, *British Food Journal*, Vol. 112 No. 3, pp. 306-322, doi: 10.1108/00070701011029174.
- You, X., Li, Y., Zhang, M., Yan, H. and Zhao, R. (2014), “A survey of Chinese citizens’ perceptions on farm animal welfare”, *PloS One*, Vol. 9 No. 10, p. e109177, doi: 10.1371/journal.pone.0109177.
- Yuan, D., Cui, G. and Lai, L. (2016), “Sorry seems to be the hardest word: consumer reactions to self-attributions by firms apologizing for a brand crisis”, *Journal of Consumer Marketing*, Vol. 33 No. 4, pp. 281-291, doi: 10.1108/JCM-02-2015-1306.
- Zanoli, R. and Naspetti, S. (2002), “Consumer motivations in the purchase of organic food: a means-end approach”, *British Food Journal*, Vol. 104 No. 8, pp. 643-653, doi: 10.1108/00070700210425930.
- Zheng, L. (2019), “Preference for male facial masculinity as a function of mental rotation ability in gay and bisexual men, but not in heterosexual men and women in China”, *Frontiers in Psychology*, Vol. 10, p. 2419, doi: 10.3389/fpsyg.2019.02419.

Appendices

A1: Exemplary items

Anxiety

Each question in this section consists of a group of four statements. Please read each group of statements carefully and then select the one, which best describes your feelings over the past three months.

I do not worry about my health affected by COVID-19.

I occasionally worry about my health affected by COVID-19.

I spend much of my time worrying about my health affected by COVID-19.

I spend most of my time worrying about my health affected by COVID-19.

Risk perception

(1=very low; 7=very high)

I think that COVID-19 has risk on...

...people's health.

...people's life quality.

...the economy (e.g. wealth or job markets).

Food safety concern

(1=strongly disagree; 7=strongly agree)

I am concerned about the safety of food and meat products.

I am generally worried about food safety issues in my region.

The quality and safety of meat nowadays concerns me.

Perceived individual responsibility

(1=strongly disagree; 7=strongly agree)

Individuals need to rethink some of their food and meat preferences (e.g. for game meat).

Individuals need to adjust some of the food and meat products they choose.

Individuals need to pay more attention to the safety and hygiene standards when choosing food and meat products.

Individuals need to reconsider the food markets (e.g. hygiene standards) where they buy from.

Perceived marketer responsibility

(1=strongly disagree; 7=strongly agree)

The management of food markets needs to improve its inspection procedures.

Local/outdoor food markets have to increase their hygiene standards.

Fish and meat sellers need to change their sourcing and handling operations.

Perceived government responsibility

(1=strongly disagree; 7=strongly agree)

I think that the government needs to exercise stricter regulations on the inspection of food and meat products.

Local and central authorities have to execute higher hygiene standards for food/meat distribution.

The National Health Inspection needs to monitor food safety more effectively.

Previous purchase behaviors

(1=not often at all; 7=very often)

During the last year...

How often have you bought game meat?

How often have you bought animal welfare products?

A2: Definition of animal welfare products

Animal welfare products are produced in animal-friendly conditions considering procedures of feeding, livestock breeding and keeping (for example, by free-range grazing cattle, goats, and sheep). Animal welfare products also fulfill certain standards for animal slaughtering (for example, reducing physical pain and mental suffering; modified based on WCFAW; 2019).

A3: Correlation table

	Risk perception	Anxiety	FSC	InResp	MarkResp	GovResp	IN-LOC	GMA	WTB AWP
Risk perception	1								
Anxiety	0.192**	1							
FSC	0.252**	0.433**	1						
InResp	0.242**	0.015	0.115	1					
MarResp	0.203**	0.019	0.141*	0.507**	1				
GovResp	0.183**	0.021	0.065	0.528**	0.739**	1			
IN-LOC	0.153*	-0.005	0.114	0.136*	0.154*	0.194**	1		
GMA	0.185**	0.101	0.135*	0.416**	0.523**	0.514**	0.218**	1	
WTB AWP	0.117	-0.022	-0.058	0.317**	0.433**	0.467**	0.279**	0.334**	1

Note(s): FSC=food safety concern; IN-LOC=internal locus of control; GMA=game meat avoidance; AWP=animal welfare products.

** Correlation is significant at the level of 1%.

* Correlation is significant at the level of 5%.

10. Summary and Conclusion

10.1 Overall Contribution

This dissertation consists of four research articles that contributed to extend and validate existing theories in the area of sustainable consumer behaviors as well as to further improve companies' and policymakers' interventions to promote sustainable practices among consumers, as demonstrated in the S-O-R model (Figure 1). Article I contributed to previous research on the relationship between locus of control and pro-environmental behaviors by integrating internal and external dimensions as well as applying the framework to Chinese individuals. Evidences suggested the positive correlations between internal and external dimensions and their simultaneous positive effects on pro-environmental behaviors in different domains. Findings are in line with previous research that demonstrated positive effects of internal locus of control (Cleveland et al., 2012), whereas this study also underlines the positive impact of external locus of control in an integrative model and recommends an emphasis on shared responsibility as a promotional concept.

Article II empirically examined the concept of consumer green empowerment to advertise environmentally friendly products based on message priming. It contributed to previous research by supporting the positive effects of empowerment in the sense of empowering consumers to influence companies' pro-environmental operations, in addition to empowering consumers to co-create products (Fuchs & Schreier, 2011). Evidences showed that consumers' perceived power over companies can be actively managed through message priming and significantly increase corporate evaluations in the dimensions of customer orientation and corporate environmental responsibility as well as purchase intentions. This article delivered a more effective approach to advertise environmentally friendly products and to improve consumers' perceptions of a company, compared to green appeals and more general, non-environmental framings of empowerment.

Article III contributed to previous research on self-determination theory and economic incentives for promoting sustainable behaviors based on evidences from a recycling context. First, the article added to the discussion on the effectiveness of internal and non-internal motivators while demonstrating that the latter can increase internalized motivation among individuals who have not yet internalized recycling behaviors. Evidences call for a reconsideration of previous findings that found limited effects of non-internal motivators (Bolderdijk et al., 2013; Schwartz, 2012). Second, different interventions were shown to cause

divergent effects on motivational patterns but also behavioral intentions across countries. Previous experimental research requires verification for different socio-cultural contexts. From a practical point of view, a new incentive design was provided that effectively combines benefits of environmental appeals and economic incentives under certain circumstances for two pro-environmental goals simultaneously: promoting recycling practices and environmentally friendly purchases.

The last article IV sheds light on individuals' responses to the COVID-19 pandemic in the domain of sustainable meat consumption. It contributed to previous research especially to the discussion on whether internal and/or external responsibility attributions lead to improved behavioral intentions. In the presence of a health crisis, which individuals only weakly associate with their personal behaviors, they would still be willing to contribute, provided that other stakeholders fulfill their tasks. The significant positive impact of external attributions on individuals' intentions was underlined in contrast to previous research that argued for negative effects (e.g. Wang, 2014; Yuan et al., 2016). Moreover, marketers and policymakers need to be aware that a health crisis in this kind also increases people's food safety concerns, which negatively affects purchase intentions of animal welfare products. Overall, this research contributed as one of the first articles on the potential effects of the COVID-19 pandemic on sustainable consumption patterns.

To sum up, this cumulative dissertation contributed to understanding major socio-psychological determinants of various sustainable consumer behaviors, among others, purchase of environmentally friendly products and individual waste sorting. In particular, it examined individuals' perceptions of roles and responsibilities of different stakeholders for sustainability issues including consumers, corporations and government, as well as how these factors affect behavioral intentions. Further, two intervention measures were recommended: consumer green empowerment to promote the purchase of environmentally friendly products and green rewards (economic incentives designed for pro-environmental spending options) to enhance individual recycling, depending on the geographical region.

10.2 Summary of Practical Implications

Based on four empirical research articles, this dissertation derives several implications on promoting different sustainable consumer behaviors in the purchase and non-purchase categories (see Table 2; in respect of stimulating responses through the indicating variables in the S-O-R

model in Figure 1). To enhance sustainable purchase behaviors, this dissertation's findings suggest applying the *consumer green empowerment* concept in the advertisements for environmentally friendly products such as organic foods. Parallel to that, large companies can also achieve improved corporate evaluations. Smaller companies can achieve positive effects on individuals' perceived customer orientation based on empowerment elements. Still, they should emphasize the ecological benefits enabled by individual purchase if they aim to increase perceived environmental responsibility (see Article II). Besides, promotional programs should stress individuals' and the government's effectiveness to conserve the environment to promote sustainable purchase actions (see Article I).

As consequences of the ongoing COVID-19 pandemic, food suppliers and retailers should be prepared that Chinese consumers expect them to substantially improve their safety and hygiene standards, which is supposed to reduce the risk probability of a future biological hazard from food. The Chinese government is expected to take action with stricter regulations and inspections for meat safety, while this expectation is reflected in consumers' intentions to buy animal welfare products. To meet the pronounced market potential in this product category, the government is supposed to speed up the establishment of animal welfare production and certification (see Article IV).

Among non-purchase behaviors, including energy conservation and green transportation usage, promotional campaigns are recommended to stress the shared environmental responsibility among individuals, corporations, and the government (Article I). Besides, to intensify recycling behaviors, different approaches should be applied depending on the socio-cultural context. In Germany, environmental appeals appear to achieve best outcomes to stimulate recycling intentions. In contrast, Chinese people have increased internalized motivations and overall highest recycling intentions when green rewards are applied. In the USA, a mixed approach is recommended, since both standard rewards and environmental appeals achieve significant effects (see Article III). In addition, promotional programs should focus on communicating individuals' and the government's ability to conserve the environment to increase recycling behaviors (see Article I).

Table 30: Table of overall practical implications

Sustainable purchase behaviors		
Type of behavior	Implications for	Implications
Purchase of environmentally friendly products (e.g. organic foods)	Marketers	Empower consumers to influence companies' operations and in return the environment in order to stimulate purchase intentions and corporate evaluations (customer orientation and corporate environmental responsibility), if companies are large; Emphasize the ecological impact of individual purchase to increase perceived environmental responsibility, if companies are small.
	Policymakers	Emphasize individuals' and the government's abilities to improve the environment.
Purchase of animal welfare products	Marketers	Food suppliers and retailers should be prepared that consumers expect them to improve safety and hygiene standards of meat products.
	Policymakers	Governmental authorities should implement stricter regulations and inspections for meat safety as well as accelerate product certifications in order to promote intentions to adopt animal welfare products.
Sustainable non-purchase behaviors		
Recycling	Marketers	Co-develop incentive programs with municipalities to realize spillovers from recycling to the purchase of environmentally friendly products (green rewards).
	Policymakers	Apply different interventions to promote recycling behaviors depending on the degree of internalization: <ul style="list-style-type: none"> • Germany: green appeals • USA: both green appeals and monetary rewards • China: monetary rewards in alignment with pro-environmental spending options; Emphasize individuals' and the government's abilities to improve the environment.
Energy saving, green transportation	Marketers/policymakers	Highlight individuals', companies' and the government's abilities to improve the environment.

10.3 Limitations and Future Research

Based on research findings of this dissertation, I will point out limitations and derive recommendations for future research in the following. Since survey data were used to explain intentional variables in the articles, the intention-behavior gap still needs to be closed (Carrington et al., 2014). In Article III, I focused on extrinsic motivators, which might be more likely triggering actual behaviors compared to intrinsic motivators (Harackiewicz et al., 2002).

However, results still need to be validated using actual behavioral data, also with regard to the social desirability bias (Paulhus, 2013).

Moreover, most articles of this dissertation only applied Chinese samples; therefore, the representativeness for other socio-cultural and political contexts needs to be investigated.⁵ In case of Article I, the simultaneous effects of internal and external locus of control should be validated for a country where higher individual autonomy especially in terms of environmental activities is present. Although mean comparisons for control beliefs were conducted between China and Canada based on results from previous studies (Cleveland et al., 2012; Kalamas et al., 2014), the integrated ELOC model still needs to be tested in a Western context. In Article II, the concept of consumer empowerment might generate different effects in other countries depending on the consumers' desire to gain power over companies' decisions and pro-environmental activities. Even though basic human needs such as that for autonomy are assumed equal across countries (Chen et al., 2015), the desire of a specific type of power needs to be further discussed. Furthermore, although the differences between Germany, the USA and China in response on recycling incentives are explored in Article III, evidences also need to be reviewed in other economies in transition such as India that is less central-guided compared to China (cf. Zurbrügg et al., 2004), as well as in Western countries with low recycling rates. Overall, political and socio-cultural dimensions might play a significant role in interaction with the psychological factors investigated in this dissertation (Hadler & Haller, 2011). Apart from that, in Article II and IV, a sample of younger and better-educated participants was acquired, therefore, findings require a verification for older and rural population.

Moreover, evidences such as in Article I and IV identified some important socio-psychological determinants of sustainable consumption patterns but still need more experimental research to translate results into concrete action measures. For instance, it should be explored how shared responsibility can be promoted for different pro-environmental behaviors (Article I).

Another challenge that future research should tackle is to what extent the behavioral types and product categories examined in different articles are representative for other sustainable behaviors or products. For example, for advertising environmentally friendly products, the level of product involvement might play a significant role deciding how carefully consumers deal with

⁵ In Article III, intervention effects were analyzed for three countries, after the measurement invariance between countries was tested as a pre-requisite of result comparisons (Steenkamp & Baumgartner, 1998) (see Table 21). The comparability needs to be considered for further cross-national validations.

product information (e.g. Atkinson & Rosenthal, 2014). Further, among others, product prices would also cause differences in consumers' importance assessment of product quality and environmental benefits of the product (e.g. Grimmer & Bingham, 2013). In terms of pro-environmental behaviors, some behaviors might be easier and others more difficult to perform (Green-Demeirs et al., 1997). The level of difficulty might also influence the effectiveness of specific interventions such as rewards. Overall, a larger variety of sustainable products and behaviors needs to be considered, especially also socially sustainable behaviors and ethical products that this dissertation has not focused on.

References

- Allen, J. B., & Ferrand, J. L. (1999). Environmental Locus of Control, Sympathy, and Proenvironmental Behavior: A Test of Geller's Actively Caring Hypothesis. *Environment and Behavior*, 31(3), 338–353.
<https://doi.org/10.1177/00139169921972137>
- Asensio, O. I., & Delmas, M. A. (2015). Nonprice incentives and energy conservation. *Proceedings of the National Academy of Sciences of the United States of America*.
<https://doi.org/10.1073/pnas.1401880112>
- Atkinson, L., & Rosenthal, S. (2014). Signaling the green sell: The influence of eco-label source, argument specificity, and product involvement on consumer trust. *Journal of Advertising*, 43(1), 33–45. <https://doi.org/10.1080/00913367.2013.834803>
- Bagozzi, R. P. (1986). Attitude formation under the theory of reasoned action and a purposeful behaviour reformulation. *British Journal of Social Psychology*, 25(2), 95–107.
<https://doi.org/10.1111/j.2044-8309.1986.tb00708.x>
- Belz, F.-M. (2004), “Nachhaltigkeits-Marketing”, in Wiedmann, K.-P., Fritz, W. and Abel, B. (Eds.), *Management mit Vision und Verantwortung: Eine Herausforderung an Wissenschaft und Praxis*, Gabler Verlag, Wiesbaden, pp. 467–492.
- Blocker, C. P., Flint, D. J., Myers, M. B., & Slater, S. F. (2011). Proactive customer orientation and its role for creating customer value in global markets. *Journal of the Academy of Marketing Science*, 39(2), 216–233. <https://doi.org/10.1007/s11747-010-0202-9>
- Bolderdijk, J. W., & Steg, L. (2015). Promoting sustainable consumption: The risks of using financial incentives. In *Handbook of research on sustainable consumption*. Edward Elgar Publishing.
- Bolderdijk, J. W., Steg, L., Geller, E. S., Lehman, P. K., & Postmes, T. (2013). Comparing the effectiveness of monetary versus moral motives in environmental campaigning. *Nature Climate Change*, 3(4), 413–416. <https://doi.org/10.1038/nclimate1767>
- Brewin, C. R., & Shapiro, D. A. (1984). Beyond locus of control: Attribution of responsibility for positive and negative outcomes. *British Journal of Psychology*, 75(1), 43–49.
<https://doi.org/10.1111/j.2044-8295.1984.tb02788.x>
- Buerke, A. (2016). Nachhaltigkeit und Consumer Confusion am Point of Sale. In *Nachhaltigkeit und Consumer Confusion am Point of Sale*. <https://doi.org/10.1007/978->

- Buerke, A., Straatmann, T., Lin-Hi, N., & Müller, K. (2017). Consumer awareness and sustainability-focused value orientation as motivating factors of responsible consumer behavior. *Review of Managerial Science*, 11(4), 959–991.
<https://doi.org/10.1007/s11846-016-0211-2>
- Cao, S. (2011). Impact of China's large-scale ecological restoration program on the environment and society in arid and semiarid areas of China: achievements, problems, synthesis, and applications. *Critical Reviews in Environmental Science and Technology*, 41(4), 317-335. <https://doi.org/10.1080/10643380902800034>
- Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2014). Lost in translation: Exploring the ethical consumer intention–behavior gap. *Journal of Business Research*, 67(1), 2759-2767. <https://doi.org/10.1016/j.jbusres.2012.09.022>
- Chahal, H. S., & Kaur, A. (2015). Appeals in Green Advertising: A Study of Factors Affecting the Persuasiveness of Appeals. *Journal of Management Sciences and Technology*, 3 (1), 86-97.
- Chan, R. Y. (2000). An emerging green market in China: Myth or reality? *Business Horizons*, 43(March), 55–60. [https://doi.org/10.1016/S0007-6813\(00\)88561-4](https://doi.org/10.1016/S0007-6813(00)88561-4)
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., ... & Ryan, R. M. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and emotion*, 39(2), 216-236.
<https://doi.org/10.1007/s11031-014-9450-1>
- Church, A. T., Katigbak, M. S., Locke, K. D., Zhang, H., Shen, J., de Jesús Vargas-Flores, J., ... & Mastor, K. A. (2013). Need satisfaction and well-being: Testing self-determination theory in eight cultures. *Journal of Cross-Cultural Psychology*, 44(4), 507-534.
<https://doi.org/10.1177/0022022112466590>
- Cleveland, M., Kalamas, M., & Laroche, M. (2012). “It’s not Easy Being Green”: Exploring Green Creeds, Green Deeds, and Internal Environmental Locus of Control Mark. *Psychology & Marketing*, 30(6), 461–469. <https://doi.org/10.1002/mar>
- Cohen, M. J. (2020). Does the COVID-19 outbreak mark the onset of a sustainable consumption transition? *Sustainability: Science, Practice, and Policy*, 16(1), 1–3.
<https://doi.org/10.1080/15487733.2020.1740472>
- Coombs, W. T. (2007). Attribution theory as a guide for post-crisis communication research. *Public Relations Review*, 33(2), 135-139. <https://doi.org/10.1016/j.pubrev.2006.11.016>

- Cremiato, R., Mastellone, M. L., Tagliaferri, C., Zaccariello, L., & Lettieri, P. (2018). Environmental impact of municipal solid waste management using Life Cycle Assessment: The effect of anaerobic digestion, materials recovery and secondary fuels production. *Renewable Energy*, 124, 180-188.
<https://doi.org/10.1016/j.renene.2017.06.033>
- Daxue. (2020). The organic food market in China. <https://daxueconsulting.com/organic-food-in-china/> (accessed 29.10.2020).
- De Groot, M., Drenthen, M., & Wouter, T. De Groot. 2011. "Public visions of the human/nature relationship and their implications for environmental ethics." *Environmental Ethics*, 33(1), 1-12. <https://doi.org/10.5840/enviroethics20113314>
- Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, 19(2), 109-134.
[https://doi.org/10.1016/0092-6566\(85\)90023-6](https://doi.org/10.1016/0092-6566(85)90023-6)
- Eroglu, S. M. K. & Davis, L.,(2001). Atmospheric qualities of online retailing. *Journal of Business Research*, 54(2), 177-184. [https://doi.org/10.1016/S0148-2963\(99\)00087-9](https://doi.org/10.1016/S0148-2963(99)00087-9)
- European Commission. (2019a). A European Green Deal.
https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_de (accessed 29.10.2020).
- European Commission. (2019b). Organic farming in the EU.
https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/market-brief-organic-farming-in-the-eu_mar2019_en.pdf (accessed 29.10.2020).
- Fernandez-Feijoo, B., Romero, S., & Ruiz, S. (2014). Effect of stakeholders' pressure on transparency of sustainability reports within the GRI framework. *Journal of business ethics*, 122(1), 53-63. <https://doi.org/10.1007/s10551-013-1748-5>
- Fiske, S. T., & Dépret, E. (1996). Control, interdependence and power: Understanding social cognition in its social context. *European review of social psychology*, 7(1), 31-61.
<https://doi.org/10.1080/14792779443000094>
- Frey, B. S., & Oberholzer-Gee, F. (1997). The cost of price incentives: An empirical analysis of motivation crowding-out. *The American economic review*, 87(4), 746-755.
<https://doi.org/10.2307/2951373>
- Fuchs, C., Prandelli, E., & Schreier, M. (2010). The psychological effects of empowerment strategies on consumers' product demand. *Journal of Marketing*, 74(1), 65–79.

- <https://doi.org/10.1509/jmkg.74.1.65>
- Fuchs, C., & Schreier, M. (2011). Customer empowerment in new product development. *Journal of Product Innovation Management*, 28(1), 17–32.
<https://doi.org/10.1111/j.1540-5885.2010.00778.x>
- Füller, J., Mühlbacher, H., Matzler, K., & Jawecki, G. (2009). Consumer empowerment through internet-based co-creation. *Journal of management information systems*, 26(3), 71-102. <https://doi.org/10.2753/MIS0742-1222260303>
- Green-Demeirs, I., Pelletier, L. G., & Ménard, S. (1997). The impact of behavioural difficulty on the saliency of the association between self-determined motivation and environmental behaviours. *Canadian Journal of Behavioural Science*, 29(3), 157–166.
<https://doi.org/10.1037/0008-400x.29.3.157>
- Green, T., & Peloza, J. (2014). Finding the right shade of green: The effect of advertising appeal type on environmentally friendly consumption. *Journal of Advertising*, 43(2), 128–141. <https://doi.org/10.1080/00913367.2013.834805>
- Grimmer, M., & Bingham, T. (2013). Company environmental performance and consumer purchase intentions. *Journal of Business Research*, 66(10), 1945–1953.
<https://doi.org/10.1016/j.jbusres.2013.02.017>
- Guay, F., Chanal, J., Ratelle, C. F., Marsh, H. W., Larose, S., & Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology*, 80(4), 711-735.
<https://doi.org/10.1348/000709910X499084>
- Guardian. (2019). Across the globe, millions join biggest climate protest ever.
<https://www.theguardian.com/environment/2019/sep/21/across-the-globe-millions-join-biggest-climate-protest-ever> (accessed 29.10.2020).
- Hadler, M., & Haller, M. (2011). Global activism and nationally driven recycling: The influence of world society and national contexts on public and private environmental behavior. *International Sociology*, 26(3), 315–345.
<https://doi.org/10.1177/0268580910392258>
- Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why?. *Educational psychologist*, 33(1), 1-21. https://doi.org/10.1207/s15326985ep3301_1
- Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational*

- Psychology, 80(5), 706. <https://doi.org/10.1037/0022-0663.94.3.638>
- Hoffman, D. L., Novak, T. P., & Schlosser, A. E. (2003). Locus of control, Web use, and consumer attitudes toward Internet regulation. *Journal of Public Policy and Marketing*, 22(1), 41–57. <https://doi.org/10.1509/jppm.22.1.41.17628>
- Hu, Y., & Cheng, H. (2013). Water pollution during China's industrial transition. *Environmental Development*, 8, 57-73. <https://doi.org/10.1016/j.envdev.2013.06.001>
- Huo, H., Zhang, Q., Guan, D., Su, X., Zhao, H., & He, K. (2014). Examining air pollution in China using production-and consumption-based emissions accounting approaches. *Environmental science & technology*, 48(24), 14139-14147. <https://doi.org/10.1021/es503959t>
- Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., & Hertwich, E. G. (2016). Environmental impact assessment of household consumption. *Journal of Industrial Ecology*, 20(3), 526-536. <https://doi.org/10.1111/jiec.12371>
- Judge, T. A., & Bono, J. E. (2001). Relationship of core self-evaluations traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: A meta-analysis. *Journal of Applied Psychology*, 86(1), 80–92. <https://doi.org/10.1037/0021-9010.86.1.80>
- Kaiser, F. G., Henn, L., & Marschke, B. (2020). Financial rewards for long-term environmental protection. *Journal of Environmental Psychology*, 101411. <https://doi.org/10.1016/j.jenvp.2020.101411>
- Kalamas, M., Cleveland, M., & Laroche, M. (2014). Pro-environmental behaviors for thee but not for me: Green giants, green Gods, and external environmental locus of control. *Journal of Business Research*, 67(2), 12–22. <https://doi.org/10.1016/j.jbusres.2013.03.007>
- Kelley, H. H. (1967). Attribution theory in social psychology. *Nebraska Symposium on Motivation*.
- Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, Approach, and Inhibition. *Psychological Review*, 110(2), 265–284. <https://doi.org/10.1037/0033-295X.110.2.265>
- Kim, S. K., & Hsieh, P. H. (2006). Connecting power with locus of control in marketing channel relationships: a response surface approach. *International Journal of Research in Marketing*, 23(1), 13-29. <https://doi.org/10.1016/j.ijresmar.2006.01.003>
- Kip Viscusi, W., Huber, J., & Bell, J. (2011). Promoting recycling: Private values, social norms, and economic incentives. *American Economic Review*, 101(3), 65–70.

<https://doi.org/10.1257/aer.101.3.65>

- Kirchgeorg, M. (2004), “Nachhaltigkeits-Marketing — Integration bestehender Erkenntnisse oder konzeptionelle Erweiterung?”, in Hülsmann, M. (Ed.), *Betriebswirtschaftslehre und Nachhaltigkeit: Bestandsaufnahme und Forschungsprogrammatik*; Wirtschaftswissenschaft, Springer Fachmedien, Wiesbaden, pp. 269–302.
- Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why Do People Behave Environmentally and What are the Barriers to Pro-Environmental Behaviour. *Environmental Education Research*, 8(3), 239–260.
<https://doi.org/10.1080/1350462022014540>
- Kumar, A., Holuszko, M., & Espinosa, D. C. R. (2017). E-waste: an overview on generation, collection, legislation and recycling practices. *Resources, Conservation and Recycling*, 122, 32-42. <https://doi.org/10.1016/j.resconrec.2017.01.018>
- Lanzini, P., & Thøgersen, J. (2014). Behavioural spillover in the environmental domain: An intervention study. *Journal of Environmental Psychology*, 40, 381–390.
<https://doi.org/10.1016/j.jenvp.2014.09.006>
- Lee, C. T., Hashim, H., Ho, C. S., Van Fan, Y., & Klemeš, J. J. (2017). Sustaining the low-carbon emission development in Asia and beyond: Sustainable energy, water, transportation and low-carbon emission technology. *Journal of cleaner production*, 146, 1-13. <https://doi.org/10.1016/j.jclepro.2016.11.144>
- Li, Y., Lu, Y., Zhang, X., Liu, L., Wang, M., & Jiang, X. (2016). Propensity of green consumption behaviors in representative cities in China. *Journal of Cleaner Production*, 133, 1328-1336. <https://doi.org/10.1016/j.jclepro.2016.06.012>
- Luo, C., Liu, C., Wang, Y., Liu, X., Li, F., Zhang, G., & Li, X. (2011). Heavy metal contamination in soils and vegetables near an e-waste processing site, south China. *Journal of hazardous materials*, 186(1), 481-490.
<https://doi.org/10.1016/j.jhazmat.2010.11.024>
- Marrucci, L., Daddi, T., & Iraldo, F. (2019). The integration of circular economy with sustainable consumption and production tools: Systematic review and future research agenda. *Journal of Cleaner Production*, 240, 118268.
<https://doi.org/10.1016/j.jclepro.2019.118268>
- McCarthy, B., Liu, H. B., & Chen, T. (2016). Innovations in the agro-food system: Adoption of certified organic food and green food by Chinese consumers. *British Food Journal*.
<https://doi.org/10.1108/BFJ-10-2015-0375>

- McDonald, L., & Härtel, C. E. (2000). Applying the involvement construct to organisational crises (pp. 799-803). Faculty of Business & Economics, Monash University.
- Meffert, H., Burmann, C. and Kirchgeorg, M. (2015), Marketing: Grundlagen marktorientierter Unternehmensführung ; Konzepte - Instrumente - Praxisbeispiele, 12., überarb. u. aktual. Aufl., Springer Gabler, Wiesbaden.
- Meier, M. S., Stoessel, F., Jungbluth, N., Juraske, R., Schader, C., & Stolze, M. (2015). Environmental impacts of organic and conventional agricultural products—Are the differences captured by life cycle assessment?. *Journal of environmental management*, 149, 193-208. <https://doi.org/10.1016/j.jenvman.2014.10.006>
- Michaelidou, N., & Hassan, L. M. (2008). The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food. *International Journal of Consumer Studies*, 32(2), 163–170. <https://doi.org/10.1111/j.1470-6431.2007.00619.x>
- Ministry of Civil Affairs of China. (2020). The power of China's five-year plan (中国“五年规划”的力量) <http://www.mca.gov.cn/article/xw/mtbd/202010/20201000029684.shtml> (accessed 29.10.2020).
- Monkhouse, L. Le, Barnes, B. R., & Hanh Pham, T. S. (2013). Measuring Confucian values among East Asian consumers: A four country study. *Asia Pacific Business Review*, 19(3), 320–336. <https://doi.org/10.1080/13602381.2012.732388>
- Morwitz, V. (2014). Consumers' purchase intentions and their behavior. *Foundations and Trends® in Marketing*, 7(3), 181-230. <https://doi.org/10.1561/17000000036>
- Muralidharan, S., La Ferle, C., & Sung, Y. (2017). Are we a product of our environment? Assessing culturally congruent Green advertising appeals, novelty, and environmental concern in India and the USA. *Asian Journal of Communication*, 27(4), 396-414. <https://doi.org/10.1080/01292986.2017.1280063>
- Newman, G. E., Gorlin, M., & Dhar, R. (2014). When Going Green Backfires: How Firm Intentions Shape the Evaluation of Socially Beneficial Product Enhancements. *Journal of Consumer Research*, 41(3), 823–839. <https://doi.org/10.1086/677841>
- Odongo, N. H., & Wang, D. (2018). Corporate responsibility, ethics and accountability. *Social Responsibility Journal*. <https://doi.org/10.1108/SRJ-10-2016-0175>
- Osbaldiston, R., & Sheldon, K. M. (2003). Promoting internalized motivation for environmentally responsible behavior: A prospective study of environmental goals. *Journal of environmental psychology*, 23(4), 349-357. <https://doi.org/10.1016/S0272->

- Parguel, B., Benoît-Moreau, F., & Larceneux, F. (2011). How sustainability ratings might deter ‘greenwashing’: A closer look at ethical corporate communication. *Journal of business ethics*, 102(1), 15. <https://doi.org/10.1007/s10551-011-0901-2>
- Paulhus, D. L. (2013). Measurement and Control of Response Bias. In *Measures of Personality and Social Psychological Attitudes*. <https://doi.org/10.1016/b978-0-12-590241-0.50006-x>
- Pettersen, N. (1987). A Conceptual Difference between Internal-External Locus of Control and Causal Attribution. *Psychological Reports*.
<https://doi.org/10.2466/pr0.1987.60.1.203>
- Price, E. A., Vining, J., & Saunders, C. D. (2009). Intrinsic and extrinsic rewards in a nonformal environmental education program. *Zoo Biology*, 28(5), 361–376.
<https://doi.org/10.1002/zoo.20183>
- Prothero, A., Dobscha, S., Freund, J., Kilbourne, W. E., Luchs, M. G., Ozanne, L. K., & Thøgersen, J. (2011). Sustainable consumption: Opportunities for consumer research and public policy. *Journal of Public Policy & Marketing*, 30(1), 31-38.
<https://doi.org/10.1509/jppm.30.1.31>
- Reczek, R. W., Trudel, R., & White, K. (2018). Focusing on the forest or the trees: How abstract versus concrete construal level predicts responses to eco-friendly products. *Journal of Environmental Psychology*, 57, 87-98.
<https://doi.org/10.1016/j.jenvp.2018.06.003>
- Reeve, J. (2002). Self-Determination Theory Applied to Educational Settings. In *Handbook of Self-Determination Research*.
- Deci, L. R. MR (2000): Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 54-67.
<https://doi.org/10.1006/ceps.1999.1020>
- Schwartz, S. H. (2012). A Proposal for Measuring Value Orientations across Nations. In *Core ESS Questionnaire*.
- Scialabba, N. E. H., & Müller-Lindenlauf, M. (2010). Organic agriculture and climate change. *Renewable Agriculture and Food Systems*, 25(2), 158-169.
<https://doi.org/10.1017/S1742170510000116>
- Shao, J. (2019). Sustainable consumption in China: New trends and research interests. *Business Strategy and the Environment*, 28(8), 1507-1517.

<https://doi.org/10.1002/bse.2327>

- Sheeran, P., & Abraham, C. (2003). Mediator of moderators: Temporal stability of intention and the intention-behavior relation. *Personality and Social Psychology Bulletin*, 29(2), 205-215. <https://doi.org/10.1177/0146167202239046>
- Sherman, E., Mathur, A., & Smith, R. B. (1997). Store environment and consumer purchase behavior: mediating role of consumer emotions. *Psychology & Marketing*, 14(4), 361-378. [https://doi.org/10.1002/\(SICI\)1520-6793\(199707\)14:4<361::AID-MAR4>3.0.CO;2-7](https://doi.org/10.1002/(SICI)1520-6793(199707)14:4<361::AID-MAR4>3.0.CO;2-7)
- Shu, C., Zhou, K. Z., Xiao, Y., & Gao, S. (2016). How Green Management Influences Product Innovation in China: The Role of Institutional Benefits. *Journal of Business Ethics*, 133(3), 471–485. <https://doi.org/10.1007/s10551-014-2401-7>
- Si, H., Shi, J. G., Tang, D., Wu, G., & Lan, J. (2020). Understanding intention and behavior toward sustainable usage of bike sharing by extending the theory of planned behavior. *Resources, Conservation and Recycling*, 152, 104513. <https://doi.org/10.1016/j.resconrec.2019.104513>
- Singh, J., Laurenti, R., Sinha, R., & Frostell, B. (2014). Progress and challenges to the global waste management system. *Waste Management & Research*, 32(9), 800-812. <https://doi.org/10.1177/0734242X14537868>
- Steinhorst, J., Klöckner, C. A., & Matthies, E. (2015). Saving electricity - For the money or the environment? Risks of limiting pro-environmental spillover when using monetary framing. *Journal of Environmental Psychology*, 43, 125–135. <https://doi.org/10.1016/j.jenvp.2015.05.012>
- Sun, P., Lu, X., Xu, C., Sun, W., & Pan, B. (2020). Understanding of COVID-19 based on current evidence. *Journal of medical virology*, 92(6), 548-551. <https://doi.org/10.1002/jmv.25722>
- Sustainable Food System Programme (SFS). (2020). SFS Programme statement on the COVID-19 (coronavirus) crisis and food systems. <https://www.oneplanetnetwork.org/sfsprogrammestatement-covid-19-coronavirus-crisis-and-food-systems> (assessed 01.11.2020).
- Tapia-Fonllem, C., Corral-Verdugo, V., Fraijo-Sing, B., & Durón-Ramos, M. F. (2013). Assessing sustainable behavior and its correlates: A measure of pro-ecological, frugal, altruistic and equitable actions. *Sustainability*, 5(2), 711-723. <https://doi.org/10.3390/su5020711>

- Thøgersen, J. (2003). Monetary incentives and recycling: Behavioural and psychological reactions to a performance-dependent garbage fee. *Journal of Consumer Policy*, 26(2), 197-228. <https://doi.org/10.1023/a:1023633320485>
- Turker, D. (2009). Measuring Corporate Social Responsibility : A Scale Development Study. 411–427. <https://doi.org/10.1007/s10551-008-9780-6>
- Umweltbundesamt (UBA). (2020). Indicator: Recycling municipal waste. <https://www.umweltbundesamt.de/en/indicator-recycling-municipal-waste#at-a-glance> (accessed 20.10.2020).
- UN. (1987). Report of the World Commission on Environment and Development: Our Common Future. <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf> (accessed 29.10.2020).
- US Congress. (2019). 116TH CONGRESS 1ST SESSION H. RES. 109. <https://www.congress.gov/116/bills/hres109/BILLS-116hres109ih.pdf> (accessed 29.10.2020).
- Van Oost, K., Quine, T. A., Govers, G., De Gryze, S., Six, J., Harden, J. W., ... & Giraldez, J. V. (2007). The impact of agricultural soil erosion on the global carbon cycle. *Science*, 318(5850), 626-629. <https://doi.org/10.1126/science.1145724>
- van Zomeren, M., Spears, R., & Leach, C. W. (2010). Experimental evidence for a dual pathway model analysis of coping with the climate crisis. *Journal of Environmental Psychology*, 30(4), 339-346. <https://doi.org/10.1016/j.jenvp.2010.02.006>
- Vergara, S. E., & Tchobanoglous, G. (2012). Municipal solid waste and the environment: a global perspective. *Annual Review of Environment and Resources*, 37, 277-309. <https://doi.org/10.1146/annurev-environ-050511-122532>
- Vlachopoulos, S. P., & Karageorghis, C. I. (2005). Interaction of external, introjected, and identified regulation with intrinsic motivation in exercise: relationships with exercise enjoyment. *Journal of Applied Biobehavioral Research*, 10(2), 113-132. <https://doi.org/10.1111/j.1751-9861.2005.tb00007.x>
- Wallston, K. A., Wallston, B. S., & DeVellis, R. (1978). Development of the Multidimensional Health Locus of Control (MHLC) Scales. *Health Education & Behavior*, 6(1), 160–170. <https://doi.org/10.1177/109019817800600107>
- Walsh, G., & Beatty, S. E. (2007). Customer-based corporate reputation of a service firm : scale development and validation. *Journal of the Academy of Marketing Science*, 35(1),

- 127–143. <https://doi.org/10.1007/s11747-007-0015-7>
- Wang, S. T. (2014). Consumer characteristics and social influence factors on green purchasing intentions. *Marketing Intelligence and Planning*. <https://doi.org/10.1108/MIP-12-2012-0146>
- Weiner, B. (1985). An Attributional Theory of Achievement Motivation and Emotion. *Psychological Review*. <https://doi.org/10.1037/0033-295X.92.4.548>
- Yang, X. (2021). Potential consequences of COVID-19 for sustainable meat consumption: the role of food safety concerns and responsibility attributions. *British Food Journal*, 123(2), 455-474. <https://doi.org/10.1108/BFJ-04-2020-0332>
- Yang, X., & Weber, A. (2019). Who can improve the environment—Me or the powerful others? An integrative approach to locus of control and pro-environmental behavior in China. *Resources, Conservation and Recycling*, 146, 55-67. <https://doi.org/10.1016/j.resconrec.2019.03.005>
- Yuan, D., Cui, G., & Lai, L. (2016). Sorry seems to be the hardest word: consumer reactions to self-attributions by firms apologizing for a brand crisis. *Journal of Consumer Marketing*, 33(4), 281-291. <https://doi.org/10.1108/JCM-02-2015-1306>
- Zurbrugg, C., Drescher, S., Patel, A., & Sharatchandra, H. C. (2004). Decentralised composting of urban waste—an overview of community and private initiatives in Indian cities. *Waste management*, 24(7), 655-662. <https://doi.org/10.1016/j.wasman.2004.01.003>