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Appraising the Influence of Pro-environmental Self-Identity on Sustainable Consumption Buying and Curtailment in Emerging Markets: Evidence from China and Poland

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Abstract

Understanding sustainable consumption buying and curtailment behavior in emerging markets is limited, yet this knowledge is vital to the future of these economies. The newer conceptualization of pro-environmental self-identity (PESI), as environmentally-friendly dynamic-self, can significantly inform comprehension of these behaviors, and strengthen them. Utilizing intra-personal influences and situational cueing, this paper appraises the influence of PESI on the sustainable buying and curtailment behaviors of consumers in China and Poland. Surveying these consumers, PESI was confirmed as a significant influence on their buying and curtailment behaviors. Contextual and behavioral distinctions also emerged, highlighting a buying emphasis in China and curtailment orientation in Poland. Notably, PESI was found to be multi-activated by situational cueing, moral responsibility, assessment, social desirability, tinted by consumer effectiveness and knowledge. Important implications arise for eco-innovation and buying and curtailment policy-making in emerging markets. PESI consumers have a potential active stakeholder role in this innovation and policy development.

Keywords

Emerging markets; sustainable consumption buying behavior; sustainable consumption curtailment behavior; pro-environmental self-identity; China; Poland.

1. Introduction

Emerging markets are increasingly being recognized as the economic powerhouses of the near-future, and as ‘champions’ of sustainable economic growth and responsible consumption and production (Lacy & Hayward, 2011). Two of these markets – China and Poland – are the focus of this paper because of the interplay between their sustainability endeavors and pursuit of resource intensive, consumerist economic growth (Dermody, Hanmer-Lloyd, Koenig-Lewis, & Zhao, 2015).

Provisional research indicates that consumers in emerging economies engage more with sustainable consumption buying behaviors than consumers in developed markets (Accenture, 2014). However, little is known about what activates this consumption, and where curtailment fits. This is hampered by a lack of culturally-informed, conceptually-rich and multi-behavioral studies critically analyzing consumption behaviors of consumers in emerging markets (Sharma, 2011; Sheth, 2011; Steg, Bolderdijk, Keizer, & Perlaviciute, 2014). Most notable in this research narrowness is Western concentration on the attitude-behavior gap. This limits appraisal of broader interconnected intra-personal and macro influences, including the cultural distinctiveness of emerging markets (Chabowski, Mena, & Gonzalez-Padron, 2011; Ertz, Karakas, & Sarigöllü, 2016; Prothero et al., 2011). Thus researchers are calling for new conceptual approaches (Hassan, Shiu, & Shaw, 2016).

The under-researched concept of pro-environmental self-identity (PESI) as dynamic self-construal is one such approach. The contribution of this paper resides in appraising the influence of PESI on both sustainable consumption buying and curtailment behaviors of consumers in the emerging markets of China and Poland. This study proposes and empirically tests a comprehensive framework focusing on the intra-personal influences on the ‘action-readiness’ of PESI in two distinct emerging markets, thus significantly advancing how

sustainable consumption buying and curtailment in emerging markets can be understood and strengthened.

2. Conceptual Framework

2.1 The interplay between economic growth and sustainability in emerging markets

The evolving economic power of emerging markets is fueled by a relatively new phenomenon, namely the rise of their affluent consumers with unprecedented consumerism demands (Lacy & Hayward, 2011). This is expressed by their avid demand for luxury Western brands, most visible from China's new super-rich elite and expanding affluent consumers (Anand & Segal, 2016; Chadha & Husband, 2006; Hao, 2014; Sharma, 2011). These super-rich consumers are from a global rich class system renowned for its significant political and economic influence (Anand & Segal, 2016). Poland's economic growth and stability is also noteworthy when contrasted with its European cousins, with nearly double the GDP growth of prominent Euro states (Piatkowski, 2015). In parallel with China, this has increased Polish consumer affluence and spending (Vadovics, 2008), rendering it a major contributor to Poland's economic prosperity (Sielewicz, 2015).

Within this economic positioning, emerging markets are also becoming more active and powerful as sustainability champions (Lacy & Hayward, 2011). The strong 'voice' of their political leaders at COP21 (Paris climate change agreement 2015) and the 2016 G20 China-US climate agreement (BBC, 2016) is testament to this. An 'Easternization-effect' (Sheth, 2011) may be unfolding as China increases its influence in progressing sustainability policy and innovation. Albeit the challenge of this role is huge because accelerated man-made climate change and resource depletion are having catastrophic consequences for the life chances of people and the planet (Intergovernmental Panel on Climate Change, 2013; Krausmann et al., 2009). As 'champions', emerging markets have potential to assume leadership to redress major

climatic and pollution calamities. This includes wide scale and life threatening polluted air and water, flooding, drought and heat waves that increase mortality in all life-forms as they deplete landmass and increase desertification, disease and health epidemics, food and water insecurity, and dispossession.

However, navigating market growth, consumer spending and sustainability generates significant challenges for emerging markets. One major challenge is the potential conflict between emerging markets prioritization of economic prosperity fueling the luxury consumerism of their super-rich and affluent consumers and growing a more ecologically sustainable economy that values human and environmental capital. For example, even if consumers in emerging markets are more engaged in sustainable buying behavior (Accenture, 2014), this may be negated by the political and economic influence of the super-rich and their status-consumption. Indeed research shows that luxury consumerism is unlikely to have ethical or responsible credentials (Davies, Lee, & Ahonkhai, 2012). It may, though, trigger human-centric happiness as these consumers enjoy their economic liberalism and/or their hard-earned Soviet-free prosperity (Czapiński & Panek, 2014).

Building on more recent ideas on situated social cognition (Smith & Semin 2007), this conflict resides within the multilayered contextually-sensitive, economic, political, and social situational cueing that underpins identity-syntonic consumerism and sustainable consumption behaviors. These cues are evident in warnings from climate scientists that unprecedented temperature rises have propelled climate change impacts into an immediate emergency (National Centers for Environmental Information, 2016); thus many nations are on a crash trajectory with Paris (2015) COP21 climate agreements (The Guardian, 2016), including China and Poland. For example, while agreeing with COP21 and the pro-environmental values of its European neighbors, Poland will collide with COP21 because of its reliance on fossil fuels and

nuclear energy (not smart energy) – both signals of its economic prosperity (BBC, 2012; The Economist, 2014).

Cues from emerging markets' frontline experiences of ecological problems might mitigate some friction, for instance, increasing drought in southern Poland (Kundzewicz & Matczak, 2012), high mortality from extreme air pollution in China (coal/vehicle emissions) (WHO, 2015). Increasing understanding of consumer's sustainable consumption behaviors will also be invaluable. This is because sustainable consumption embraces buying and curtailment (Prothero, et al., 2011), thus reducing natural resource usage/waste and pollution emissions to safeguard future generations' needs, whilst fulfilling current generations' primary needs and quality of life (Norwegian Ministry of the Environment, 1994). Accordingly, it can serve as economic, political, and social cueing to influence the behaviors of consumers, politicians and business leaders in emerging markets. One potential outcome could be growing consumer commitment towards consuming more sustainably, thereby building much needed trust with business eco-innovators (Accenture, 2014; Lacy & Hayward, 2011). Notwithstanding business leaders are often more interested in consumers buying than curtailing their consumption, reflecting an economic cue of a marketplace-dominant 'Westernization-effect'. However, China could use its political cueing to lessen this dominance via its 'Easternization-effect' (Sheth, 2011). Overall, these economic, political, and social cues highlight the challenges emerging markets face in progressing identity-syntonic sustainable consumption buying and curtailment behaviors, and emphasize the need for further investigation of PESI.

2.2 Clarifying the concept of PESI

While there is obfuscation within identity-environment classifications (Kashima, Paladino, & Margetts, 2014; Reed, Forehand, Puntoni, & Warlop, 2012), PESI is distinctive as an environmentally friendly self-concept that is symbolically expressive and shaped by

mainstream socio-cultural forces. Supported by situated social cognition (Smith & Semin, 2007), this socio-cultural dimension suggests PESI is situationally-cued, and, in turn these cues direct consumers' environmentally-friendly behaviors. As highlighted above, within emerging markets a major situational cue for consumers to navigate is the potential friction between sustainability and economic growth and consumerism representing the marketplace status-quo (Dermody, et al., 2015; Kashima, et al., 2014; Whitmarsh & O'Neill, 2010).

Predominantly, consumers with PESI will assert their environmental-friendliness through publically endorsed normalized consumption choices (e.g. fair-trade), embedded within their sustainable consumption identity projects and lifestyles. Turner (1987) labels this normalization 'mundane environmentalism' because of widespread acceptance, not rejection or reconfiguration, of dominant economic growth/consumerism norms and situational cues driving consumption mindsets in both emerging and developed economies.

Generally, self-identity entails temporal interplay between social and personal self-identity working together as an organizing system in constructing who a person was, is and could become in the future (Oyserman & James, 2008). Hence, PESI can be inferred as dynamic, fluid, multidimensional, situationally-cued, and both a conscious/unconscious influence on consumers' consumption actions and evaluative sense-making of the world around them (Oyserman, 2009). Furthermore, as an adaptive energetic force, PESI can be conceived as 'self-in-action' (Bryan, Adams, & Monin, 2013; Oyserman, 2009), where the strength of individuals' pro-environmental self-concept is so pervasive, it drives their pro-environmental behaviors. Emphasis therefore shifts to what an individual is – *'I am an environmentally-friendly consumer'*, not what they do – *'I buy fair-trade products'*. Less is understood, however, about PESI as active-self in emerging markets like China and Poland, particularly given identity is situationally-cued. This paper addresses this knowledge gap.

2.3 PESI and sustainable consumption behaviors

Numerous studies confirm the connection between identity and consumption, acknowledging consumption is integral to consumers' desire to build or enhance their self-identity regardless of affluence levels (Belk, 2010; Whitmarsh & O'Neill, 2010). This connectivity extends to self-identity influencing pro-environmental behaviors (Dermody, et al., 2015; Oyserman, 2009; Reed, et al., 2012; Thorbjørnsen, Pedersen, & Nysveen, 2007; van der Werff, Steg, & Keizer, 2013; Whitmarsh & O'Neill, 2010). Accordingly consumption choices can construct and preserve 'self' and build relationships with significant others (Belk, 2010; Soron, 2010).

To date, PESI, specifically, has been utilized in few studies, essentially Dermody et al. (2015) and Whitmarsh and O'Neill (2010). Even so, fuller understanding of sustainable consumption buying and curtailment behaviors can be gained by conceiving them as expressions of PESI – enacted as identity projects and lifestyles within marketplace spaces (Dermody, et al., 2015; Soron, 2010; Whitmarsh & O'Neill, 2010). Albeit further studies are needed to more fully understand PESI as a behavioral influencer (Oyserman, 2009; Reed, et al., 2012), particularly in emerging markets.

While some researchers maintain identity is a subset of attitudes-behavior research, with no viable autonomous contribution (e.g. Sparks & Gurthrie, 1998), studies show it does have an independent influence on behaviors (e.g. Dermody, et al., 2015; Oyserman, 2009; Reed, et al., 2012; Thorbjørnsen, et al., 2007). Indeed PESI has a stronger influence on pro-environmental behaviors than attitudes and values (Sparks & Shepherd, 1992; Whitmarsh & O'Neill, 2010), because identity 'manages' consistency between consumers' attitudes and behaviors to maintain continuity across their experiences. Hence, once a pro-environmental behavioral choice becomes identity-syntonic, this behavior becomes automatized (Bryan, et al., 2013; Oyserman, 2009). PESI is therefore potentially significantly important in explaining singular and spillover (more than one) sustainable consumption behaviors of pro-

environmental consumers (Kashima, et al., 2014; van der Werff, et al., 2013; Whitmarsh & O'Neill, 2010), embracing both buying and curtailment behaviors. Thus hypothesis 1 is:

H1. PESI has a positive impact on (a) the sustainable consumption buying behavior and (b) the sustainable consumption curtailment behavior of consumers in emerging markets.

2.4 Intra-personal influences on PESI and sustainable buying and curtailment

In addition to situational cues, a heterogeneous mix of congruent intra-personal influences affects the activation of PESI. These are conceptualized in Figure 1. Four influences are investigated: values, social consumption motivation, perceived consumer effectiveness, and a perceived lack of climate change knowledge. All are recognized for their potential to positively/negatively drive consumption interactions, including sustainable buying and curtailment.

Insert Figure 1 here

Numerous studies identify a strong relationship between values and pro-environmental behaviors (e.g. de Groot & Steg, 2010; Grønhøj & Thøgersen, 2009; van der Werff & Steg, 2016), and this values-relationship likely extends to sustainable consumption behaviors too. Values are significant guiding principles in consumers' lives, particularly when pro-environmentalist values are highly placed within a values hierarchy (de Groot, Steg, Keizer, Farsang, & Watt, 2012; van der Werff, et al., 2013). Research shows biospheric and altruistic values positively influence pro-environmentalism, whilst egoistic values do not. This symbolizes the mutuality and self-transcendence of biospheric/altruistic values and the individualistic, calculative and self-enhancement of egoistic values (de Groot & Steg, 2010; Grønhøj & Thøgersen, 2009). Values create a cohesive core to self-identity (Hitlin, 2003), thus are critically important in advancing more stable, long-term behavior change (Crompton & Kasser, 2010). However only a small number of more recent studies have explored self-identity

and values simultaneously (e.g. Gatersleben, Murtagha, & Abrahamseb, 2012; van der Werff & Steg, 2016; Whitmarsh & O'Neill, 2010). Less is known about this values-identity interaction in emerging markets for sustainable buying and curtailment, hence its examination in this paper.

Social consumption motivation – as a form of social exchange – aligns with social status and the social dimension of identity embedded within conspicuous consumption (Fitzmaurice & Comegys, 2006). Driven by perceived and actual judgments from their significant peers, consumers acquire possessions to socially display their self-achievement and happiness to maximize their social status. Studies show this status desire occurs among consumers in both developed and emerging markets (Banerjee & Duflo, 2007), although it is less understood in emerging markets, as illustrated above. The ‘action-readiness’ of PESI might therefore be motivated by consumers’ evaluations of their situationally-cued social interactions with significant others as they chose what (not) to consume (Dermody, et al., 2015; Gatersleben, et al., 2012). Dermody et al. (2015) is the only study to date examining the relationship between social consumption motivation, PESI and sustainable consumption. They found social consumption motivation positively and directly influenced the sustainable consumption buying behavior of consumers in the UK and China, as well as PESI partially mediating the influence of this motivation on their behavior. This paper extends these findings by including consumption curtailment in emerging markets.

Perceived consumer effectiveness is a form of personal efficacy associated with perceived behavioral control. Studies reveal consumers’ self-belief in the effectiveness of their consumption actions reinforces their willingness to make consumption sacrifices – within the parameters of the ‘marketplace’ (situational cueing) – to help ‘solve’ environmental problems like waste and food insecurity. Accordingly research shows perceived consumer effectiveness strongly predicts pro-environmental behavior (Bamberg & Möser, 2007; Ellen, Wiener, &

Cobb-Walgren, 1991; Roberts, 1996). It may therefore align closely with PESI, as self-in-action, by linking with strong biospheric/altruistic values in championing sustainable consumption buying and curtailment. However, less is known about this empowered self in emerging markets. Potentially it could be weaker because these consumers have less market experience whilst living with climate change problems. Their inexperience may compound a verification threat to PESI if they feel limited consumption power to effectively enact their identity ideal (Norman & Aron, 2003) through their sustainable buying/curtailment. This research gap is explored in this paper.

A perceived lack of climate change knowledge is identified as a major barrier to pro-environmental behaviors (Gifford, 2011). This knowledge is impeded by the intangibility of climate change problems, leaving individuals feeling ill-informed to act pro-environmentally (Capstick, Whitmarsh, Poortinga, Pidgeon, & Upham, 2015; Kahan et al., 2012). Furthermore, research confirms environmental knowledge has no direct effect on pro-environmental behaviors (Kollmuss & Agyeman, 2002). Rather, like situational cueing, its influence is more indirect as it sits in the background of consumers' mindsets. Thus it interlinks with values systems, self-identity and consumer effectiveness (Howell, 2013; Price, Walker, & Boschetti, 2014). Less is known about how this knowledge barrier potentially 'deactivates' PESI among consumers in emerging markets, nor in a sustainable consumption buying/curtailment context. This paper probes this gap.

Based on this discussion of intra-personal influences, the following hypotheses are proposed:

H2. (a) Biospheric/altruistic values, (b) social consumption motivation, and (c) perceived consumer effectiveness positively impact the PESI of consumers in emerging markets.

H3. (a) Egoistic values and (b) perceived lack of climate change knowledge negatively impact the PESI of consumers in emerging markets.

The preceding discussion highlights potential and established intra-personal activators of PESI. A small number of studies (with provisional findings) support this in suggesting a mediating role for PESI between values, environmental preferences and behavior (Gatersleben, et al., 2012; van der Werff, et al., 2013; van der Werff, Steg, & Keizer, 2014; Whitmarsh & O'Neill, 2010). Dermody et al. (2015) indicate a mediating role for PESI between environmental concern, social consumption motivation, materialism and sustainable consumption buying behaviors in both developed and emerging markets; albeit they advise deeper appraisal of PESI and the influence of broader antecedents on it is warranted. Recent research from van der Werff and Steg (2016) also suggests that environmental identity mediates the relationship between biospheric values and personal norms in the context of smart energy systems. Nevertheless, they caution their findings need replication to confirm their predictive strength and indeed their application to emerging markets. Given the preceding review, and supported by Dermody et al. (2015) and van der Werff, Steg and Keizer (2014), it can be provisionally deduced that values, social consumption motivation and perceived consumer effectiveness directly and indirectly, via PESI, impact sustainable consumption buying and curtailment, whilst the impact of lack of climate change knowledge on behavior is fully mediated by PESI. The final hypotheses are therefore:

H4. Biospheric/altruistic values have a positive direct and indirect effect via PESI on (a) the sustainable consumption buying behavior and (b) the sustainable consumption curtailment behavior of consumers in emerging markets.

H5. Egoistic values have a negative direct and indirect effect via PESI on (a) the sustainable consumption buying behavior and (b) the sustainable consumption curtailment behavior of consumers in emerging markets.

H6. Social consumption motivation has a positive direct and indirect effect via PESI on (a) the sustainable consumption buying behavior and (b) the sustainable consumption curtailment behavior of consumers in emerging markets.

H7. Perceived consumer effectiveness has a positive direct and indirect effect via PESI on (a) the sustainable consumption buying behavior and (b) the sustainable consumption curtailment behavior of consumers in emerging markets.

H8. Perceived lack of climate change knowledge only has a negative indirect effect via PESI on (a) the sustainable consumption buying behavior and (b) the sustainable consumption curtailment behavior of consumers in emerging markets.

3. Method

3.1 Sample and procedures

Using an international commercial research panel, Chinese and Polish consumers participated in an online survey hosted by Survey Sampling International (SSI). Age and gender-based quotas warranted the sample represented the population structure of each country. SSI ensured respondent authentication and data quality by eliminating those completing the survey more than once, too quickly or with low response variation across items. The final sample comprised 1023 respondents from China and 505 respondents from Poland. Of these respondents, 51.4% (China) and 47.1% (Poland) were male.

3.2 Measures

Following Lee et al.'s (2014) approach, biospheric/altruistic (8 items) and egoistic values (5 items) were measured using scales from de Groot and Steg (2008). Perceived consumer effectiveness entailed a 4-item scale from Roberts (1996). Following Moschis (1985), social consumption motivation was captured on a 4-item scale. Perceived lack of climate change knowledge¹ was measured by 3 items proposed by Lorenzoni, Nicholson-Cole and Whitmarsh (2007), whilst 4 items captured PESI (Whitmarsh & O'Neill, 2010). Sustainable consumption

¹ *Climate change knowledge was selected because of the popularised connections made between accelerated (man-made) climate change and human consumption/production when this study was designed.*

buying and curtailment behavior was adopted from Whitmarsh and O'Neil (2010). Measurement items, factor loadings and reliability indicators are listed in the appendix. Independent researchers translated the original English questionnaire to Chinese and Polish using a rigorous approach of translation and back-translation to ensure translation adequacy and pre-tests to address conceptual equivalence.

3.3 Data Analysis

Confirmatory factor analysis (CFA) utilizing AMOS (v.22) was conducted to determine the psychometric properties of the scales. Hayes' (2013) SPSS macro syntax PROCESS (v2.16) was employed to compute the direct and indirect effects as traditional approaches for assessing mediation have various conceptual and mathematical limitations. Bootstrapping procedures, which are based on generating multiple random samples, have several advantages as they estimate a model's predictive power, overcome non-normality commonly encountered during interaction effect analyses and provide accurate confidence intervals (Preacher & Hayes, 2008).

To enable comparability between the Chinese and Polish sample, the analyses controlled for socio-demographic characteristics in line with common practice applied by other researchers (e.g. Hanss, Böhm, Doran, & Homburg, 2016; Morrison & Beer, 2017). Decades of prior research highlight potential relationships between consumer socio-demographics and sustainable consumption behaviour (e.g. Gilg, Barr, & Ford, 2005; Panzone, Hilton, Sale, & Cohen, 2016; Sidique, Lupi, & Joshi, 2010). Some recent studies also provide demographic evidence from China, albeit mixed, such as age, gender, education, and family status (McCarthy, Liu, & Chen, 2016; Wei, Chen, & Long, 2016; Wu, Zhou, & Song, 2016; Yang, Zhang, & Zhao, 2016). For example, Yang et al. (2016) found females, households with children and older generations were more likely to conduct energy curtailment behaviours, whilst the highly educated were extravagant in their energy consumption. Wei et al. (2016)

demonstrated that low-carbon behavioural intention and ecological personality differed significantly in gender, education, main occupation, and income.

4. Results

4.1 Scale evaluations

The final measurement model for the whole sample yielded a significant χ^2 test statistic ($\chi^2(293)=1389.66, p \leq .001$) which was expected considering the large sample and the sensitivity of this measure to sample size (Hu & Bentler, 1995). However, commonly used alternative fit indices demonstrated a good fit with a chi-square divided by degrees of freedom (χ^2/df)=4.74 of below 5 (Schumacker & Lomax, 2010), Comparative-Fit index (CFI)=.94, Goodness-of-fit index (GFI)=.93, Tucker-Lewis-Index (TLI)=.92 were all above the recommended level of .90 (Hair, Black, Babin, & Anderson, 2010) and the Root Mean Square Error of approximation (RMSEA)=.050 was below .06 (Hu & Bentler, 1995). In addition, the critical N statistic at $p=.05$ indicating the sample size at which the χ^2 would be non-significant was 367, thus above the cut-off of 200 (Hoelter, 1983). Therefore the model fit was deemed adequate.

Eight items were discarded due to low standardized factor loadings. The composite reliabilities were higher than the recommended value of .70 (Nunkoo & Gursoy, 2012) (Table 1). All remaining factor loadings were significant and above .50 (Anderson & Gerbing, 1988). The average variance extracted (AVE) values exceeded .50 for all latent constructs except biospheric/altruistic values (.48) and curtailment (.46). These were slightly below the recommended level, confirming partial convergent validity. All square roots of AVE were higher than the corresponding inter-construct correlations for the whole sample, supporting discriminant validity (Fornell & Larcker, 1981). Multi-group CFA was conducted to examine configural and metric invariance. The results for the multi-group measurement model demonstrated acceptable fit ($\chi^2(586)=1910.47, p \leq .001, \chi^2/df=3.26, CFI=.91, TLI=.90,$

RMSEA=.038, critical $N=515$ at $p=.05$) and adequate factor loadings, supporting configural invariance. The invariance of factorial measurement and structure across groups was tested by comparing a constrained model with a totally-free model (Anderson & Gerbing, 1988). Due to the sensitivity of the commonly used $\Delta\chi^2$ to sample size, ΔCFI was assessed to test for metric invariance (Cheung & Rensvold, 2002). Full metric invariance was established, as the ΔCFI was -.007, thus below the recommended threshold of -.01. Harman's single factor test revealed that a single factor only accounts for 22.73% of the variance and a single latent factor in CFA led to a poor fit to the data, thus indicating no substantial common method bias.

Insert Table 1 here

4.2 Hypotheses tests

The hypothesized direct and indirect effects were tested with a simple mediation model statistically controlling for gender, age, education and children living at home following the PROCESS syntax (Hayes, 2013). Table 2 shows PESI was positively related to buying ($b_{11(China)}=.34$; $b_{11(Poland)}=.28$) and curtailment ($b_{12(China)}=.18$; $b_{12(Poland)}=.35$), supporting H1a and H1b in both countries.

Regarding the antecedents of PESI, biospheric/altruistic values ($a_{1(China)}=.37$; $a_{1(Poland)}=.45$) and social consumption motivation ($a_{3(China)}=.17$; $a_{3(Poland)}=.18$) had a significant positive effect on PESI, supporting H2a and H2b in both countries. The effect of biospheric/altruistic values on PESI was higher for Poland than for China. A moderated mediation² was employed to examine whether these differences were significant. A significant interaction effect of biospheric/altruistic values and country on PESI was found ($a_{1 \times \text{Country}}=-.12$, $t=-2.59$, $p<.010$). Perceived consumer effectiveness impacts PESI significantly only in Poland

² Conditional process analysis allowing all direct and indirect effects to be moderated by country (i.e. Poland=0, China=1)

($a_{4(Poland)}=.16$), thus supporting H2c for Poland but not China. The conditional process analysis confirms that country moderates this relationship ($a_{4 \times \text{Country}}=-.13$, $t=-3.73$, $p<.000$).

No support was found for H3a as egoistic values had no significant influence on PESI. Perceived lack of climate change knowledge had no significant effect on PESI in Poland, but a small negative effect in China ($a_{5(China)}=-.09$). Accordingly, H3b was supported in China but not Poland. Altogether, these five antecedents explain 34% of PESI's variation in China and 37% in Poland.

Insert Table 2 here

Biospheric/altruistic values had a significant positive direct effect on buying ($c'_{11(China)}=.17$; $c'_{11(Poland)}=.15$) and curtailment ($c'_{12(China)}=.36$; $c'_{12(Poland)}=.13$). Table 3 shows that the indirect effects of biospheric/altruistic values on buying ($a_1b_{11(China)}=.13$; $a_1b_{11(Poland)}=.13$) and curtailment ($a_1b_{12(China)}=.07$; $a_1b_{12(Poland)}=.16$), via PESI (based on 5,000 bootstrap samples), were also significant as the bias-corrected bootstrap confidence intervals (CI) were entirely above zero. This supports H4a and H4b in both countries. The conditional process analysis revealed a significantly larger direct effect of biospheric/ altruistic values on curtailment for China ($c'_{12 \times \text{Country}}=.24$, $t=4.00$, $p<.000$). For Poland the indirect effect was significantly larger, demonstrated by a significant negative index of moderated mediation ($-.79$, $SE=.035$, $\text{BootLLCI}=-.15$, $\text{BootULCI}=-.02$). Egoistic values had a significant but positive direct effect on buying in both countries ($c'_{21(China)}=.09$; $c'_{21(Poland)}=.09$), and no significant direct or indirect effect on curtailment. Accordingly, H5a and H5b were not supported.

Social consumption motivation had a significant positive direct ($c'_{31(China)}=.16$; $c'_{31(Poland)}=.09$) and indirect effect, via PESI, on buying ($a_3b_{11(China)}=.06$; $a_3b_{11(Poland)}=.05$), supporting H6a. A significant interaction effect between social consumption motivation and country ($c'_{31 \times \text{Country}}=.10$, $t=2.47$, $p<.014$) confirmed the direct effect on buying was larger in China than Poland. Social consumption motivation had a significant indirect influence on

curtailment, via PESI, in both countries ($a_3b_{12(China)}=.03$; $a_3b_{12(Poland)}=.06$). However, there was no direct effect on curtailment in China. In Poland a significant but small negative effect on curtailment was found ($a_3b_{12(Poland)}=-.09$). Hence H6b was partially supported.

A direct effect of perceived consumer effectiveness on curtailment was confirmed for China only ($c'_{42(China)}=.08$); for Poland this direct effect was insignificant. However, perceived consumer effectiveness had a significant positive indirect effect on buying ($a_4b_{11(Poland)}=.04$) and curtailment ($a_4b_{12(Poland)}=.06$) in Poland. Thus, H7a was partially supported for Poland only, whilst H7b was partially supported for both countries. The country difference in the indirect effect was confirmed by a significant negative index of moderated mediation for buying ($-.03$, $SE=.01$, $BootLLCI=-.06$, $BootULCI=-.01$) and curtailment ($-.03$, $SE=.01$, $BootLLCI=-.06$, $BootULCI=-.01$).

H8a and H8b were confirmed for China – perceived lack of climate change knowledge had a significant negative indirect effect via PESI on buying ($a_5b_{11(China)}=-.03$) and curtailment ($a_5b_{12(China)}=-.02$). In Poland no support was found for H8a/b. Perceived lack of climate change knowledge had no effect on curtailment and a significant negative direct effect on buying ($c'_{51(Poland)}=-.09$).

Insert Table 3 here

5. Discussion

5.1 Theoretical implications

The influence of PESI, as a dynamic expression of environmentally-friendly self, on sustainable buying and curtailment is empirically verified in both China and Poland. Furthermore, the findings strengthen its conceptualization (Oyserman, 2009) by highlighting its fluidity, dynamism, multidimensionality, and situational cueing. This is evident in PESI's differing influence behaviorally between buying and curtailment in China and Poland. In

China, the environmental-friendliness of PESI focuses more on buying than curtailment, signaling identity-syntonic behavior rooted in economic political situational cueing, with an environmental-tint. This emphasis gives credence to the increasing presence of detrimental 'green materialism', as consumers in China satisfy their consumption desires via purchases with greener credentials. This, problematically, reduces the need for consumption reduction (Dermody, et al., 2015), raising concern over the primacy given to buying, typically as consumerism, rooted in the situational cueing of economic prosperity. Importantly, the 'mundane environmentalism' of buying does not equate fully to sustainable consumption lifestyles because it excludes curtailment. In Poland, the environmental-friendliness of PESI is reversed, with a greater effect on curtailment. This may reflect more social situational cueing, whereby Polish consumers comprehend the environmentally-friendliness of their PESI necessitating a lifestyle of consuming less.

The inclusion of intra-personal influences further informs understanding of the interactions between PESI-buying-curtailment in emerging markets. Hence, the positive influences of biospheric/altruistic values on PESI align with existing values theory (e.g. Crompton & Kasser, 2010; de Groot & Steg, 2010), confirming their mutual self-transcendence qualities are vital influences and potentially fundamental to PESI construction and maintenance, and consumer commitment to sustainable lifestyles. The importance of biospheric/altruistic values is also highlighted by their direct influence on buying and curtailment consumption; with a notably larger direct effect on curtailment in China. This is interesting, since Chinese consumers' PESI appears to more strongly influence buying, while these values directly influence curtailment. This suggests that while PESI drives their sustainable buying with relative ease, its activation for curtailment must overcome a significantly evolving China, with friction between its economic and social/environmental situational cues, to prioritize a sense of responsibility, potentially embedded in China's social and collectivist norms. This situational cueing may also

be reflected in the small positive direct effect of egoistic values on sustainable-buying (not curtailment) in China and Poland, which bypasses a biospheric/altruistic enriched PESI. Moderate consumption desire may therefore be useful as a behavioral trigger, but not beyond mundane environmentalism. Overall, PESI is activated by morally-based values, particularly with respect to buying.

The significant effect of social consumption motivation on PESI substantiates the importance and ‘positive nature’ of social status in emerging markets. This status illustrates the situational cueing of PESI, whereby sustainable-buying embraces desire for social approval and status (Bamberg & Möser, 2007; Fitzmaurice & Comegys, 2006). An example is ‘face’ (*mien-tsu*) in China, motivating consumers to visibly display their committed pro-environmental friendliness to significant others in their in-groups. Interestingly, the impact of social consumption motivation on curtailment is more indirect, emphasizing the importance of PESI to reducing consumption. PESI may therefore ‘regulate’ social consumption motivation, in line with moral values, to safeguard consumption reduction. A similar effect also occurs for consumer effectiveness in Poland with an indirect effect on buying and curtailment, confirming the ‘self-in-action’ capacity of PESI. In China, though, perceived consumer effectiveness only has a direct effect on curtailment. Possibly a verification threat is occurring here, indicating avenues for fuller exploration.

Furthermore, the effects of perceived lack of climate change knowledge partially run counter to existing theory asserting no direct knowledge effects occur (e.g. Kollmuss & Agyeman, 2002). Knowledge theory also appears to ‘work’ differently between Asian (China) and European (Poland) emerging markets. In Poland, perceived lack of climate change knowledge has no effect on PESI, instead directly influencing sustainable consumption buying, but not curtailment. In China, knowledge of climate change appears to strengthen PESI in ‘directing’ buying and curtailment. This suggests a morally-based knowledge dimension,

potentially as moral reasoning, embedded in China's more collectivist values and 'lived experience' of climate change and pollution. Overall, the behavioral fluidity and synergistic nature of PESI is highlighted among consumers in China and Poland. Hence PESI can be contextually and behaviorally (buying/curtailment) distinctive, and multi-activated by moral responsibility, assessment, desire and empowerment, tinted by knowledge and experience to represent the environmentally-friendliness of these consumers' buying and curtailment identity-congruent behavior. Appraising the interplay between economic, political and social situational cueing, their selves also appear to be flowing through their past, present, into their future. To some degree this study also reveals an 'Easternization-effect' (Sheth, 2011).

5.2 *Managerial implications*

PESI among consumers in China and Poland is of significant value to their governments and business in helping to shape thinking on solutions to redress environmental problems. Notably the identity-syntonic connection between these consumers' environmentally-friendly buying behaviors can be utilized to inform authentic eco-innovation supported by government-backed incentives. Initially this is likely to mirror policy and innovations of developed nations, for example, hybrid and electric vehicles. However, it is critical that the thinking underpinning this innovation is designed for emerging markets, for their direct-benefit into their longer-term future, not only short-term gains.

As emerging markets continue to evolve, sharing of eco-innovation ideas between developed and emerging markets should grow and emerging markets need to assume eco-technological and scientific innovation leadership. Importantly, this eco-innovation could advance problematical consumption curtailment too, albeit embedded in a sustainable-buying mindset. For example, designing products with inbuilt longevity (with upgrades). The progression of such innovations to overcome the life-challenges in emerging markets may also

significantly aid developed economies, for instance, China's advances in solar energy as clean, smart 'economic energy' – illustrating an 'Easternization-effect' as developed nations follow China's eco-innovation leadership.

Nevertheless the question remains: is mundane environmentalism, with its economic growth and buying emphasis, enough for emerging markets, many of which will be living with climate change, waste and pollution problems? Or can they pursue an alternative sustainability-pathway that also embraces curtailment? While these questions are bigger than this paper, insights are proffered, albeit more research is needed. The findings highlight the primacy of buying; hence this is a tough challenge. However, the unveiling of identity-syntonic empowered consumers with ecological/altruistic values suggests a constructive way forward. These forceful PESI consumers can play a vital citizenly and ambassadorial role as part of a stakeholder network including business, government, NGOs, to collaboratively develop stronger, curtailment-based sustainability policies and innovations for themselves, future generations, and the planet. They are likely to think and act differently, and to challenge existing policy and innovation thinking. For example, reduction as an inherent part of consumption-offerings, thereby helping to advance curtailment-based behaviors. Their 'constructive-criticism' gives emerging markets the opportunity to embrace curtailment much earlier in their evolutionary cycle, compared with attempts to 'retro-fit' in developed markets.

Acting as citizen-ambassadors within this network too, these empowered consumers can represent the needs of the many disempowered in emerging markets, by utilizing deliberative and inclusionary procedures. Additionally, they can educate naive affluent 'first-time buyers' about the environmental and human risks of pursuing consumerism and the benefits and opportunities for consumption reduction alternatives. Thus, they have potential for considerable influence in the future thinking of governments and business in emerging and developed markets.

5.3 Further Research

This paper makes a significant contribution to understanding the concept of PESI and its influence on sustainable consumption buying and curtailment behaviors in China and Poland. Nevertheless, additional mixed-methods and longitudinal research will further inform how its multi-activation ‘works’ in emerging markets. Buying and curtailment variation in this environmentally-friendly self-construal merit further exploration, particularly the more challenging consumption curtailment. The situational cueing of PESI deserves longitudinal examination to monitor and appraise significant transitions in emerging markets evolution. Fuller appraisal of differences and similarities in PESI between European and Asian emerging markets will be valuable, including extended socio-demographic and psychographic profiling. Westernization-Easternization cyclical influences on buying/curtailment innovation warrants fuller study. Research exploring utilization of market savvy consumers with morally empowered PESI, as ambassadors and stakeholders in eco-innovation and policy-making, will also be worthwhile, including how they and their influence can be grown.

References

- Accenture. (2014). The Consumer Study: From Marketing to Matter from https://www.unglobalcompact.org/docs/news_events/8.1/UNGC_Accenture_Havas_Consumer_Study_2014.pdf Retrieved 9th August 2016.
- Anand, S., & Segal, P. (2016). Who are the Global Top 1%? from <http://www.economics.ox.ac.uk/Department-of-Economics-Discussion-Paper-Series/who-are-the-global-top-1> Retrieved 23 August 2016.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103(3), 411-423. doi: 10.1037/0033-2909.103.3.411
- 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. doi: 10.1016/j.jenvp.2006.12.002
- Banerjee, A. V., & Duflo, E. (2007). The Economic Lives of the Poor. *Journal of Economic Perspectives*, 21(1), 141-168. doi: 10.1257/jep.21.1.141
- BBC. (2012). Poland's dependence on coal from <http://www.bbc.co.uk/news/world-radio-and-tv-17813431> Retrieved 9th August 2016.
- BBC. (2016). Paris climate deal: US and China formally join pact from <http://www.bbc.co.uk/news/world-asia-china-37265541> Retrieved 03rd September 2016.
- Belk, R., W. (2010). The ineluctable mysteries of possessions. *Journal of Social Behavior and Personality*, 6(6), 17-55.
- Bryan, C. J., Adams, G. S., & Monin, B. (2013). When cheating would make you a cheater: Implicating the self prevents unethical behavior. *Journal of Experimental Psychology: General*, 142(4), 1001-1005. doi: 10.1037/a0030655
- Capstick, S., Whitmarsh, L., Poortinga, W., Pidgeon, N., & Upham, P. (2015). International trends in public perceptions of climate change over the past quarter century. *WIREs Climate Change*, 6(1), 35-61. doi: 10.1002/wcc.321
- Chabowski, B. R., Mena, J. A., & Gonzalez-Padron, T. L. (2011). The structure of sustainability research in marketing, 1958-2008: a basis for future research opportunities. *Journal of the Academy Marketing Science*, 39(1), 55-70. doi: 10.1007/s11747-010-0212-7
- Chadha, R., & Husband, P. (2006). *The Cult of Luxury Brands: Inside Asia's Love Affair with Luxury*. Boston: Nicholas Brealey International, London.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233-255. doi: 10.1207/S15328007SEM0902_5
- Crompton, T., & Kasser, T. (2010). Human identity: a missing link in environmental campaigning. *Environment: Science and Policy for Sustainable Development*, 52(4), 23-33.
- Czapiński, J., & Panek, T. (2014). Social diagnosis 2013: the objective and subject quality of life in Poland from http://www.diagnoza.com/data/report/report_2013.pdf Retrieved 9th August 2016.

- Davies, I., Lee, Z., & Ahonkhai, I. (2012). Do Consumers Care About Ethical-Luxury? . *Journal of Business Ethics*, *106*(1), 37-51. doi: 10.1007/s10551-011-1071-y
- de Groot, J. I. M., & Steg, L. (2008). Value Orientations to Explain Beliefs Related to Environmental Significant Behavior: How to Measure Egoistic, Altruistic, and Biospheric Value Orientations. *Environment and Behavior*, *40*(3), 330-354. doi: 10.1177/0013916506297831
- de Groot, J. I. M., & Steg, L. (2010). Relationships between value orientations, self-determined motivational types and pro-environmental behavioural intentions. *Journal of Environmental Psychology*, *30*(4). doi: 10.1016/j.jenvp.2010.04.002
- de Groot, J. I. M., Steg, L., Keizer, M., Farsang, A., & Watt, A. (2012). Environmental Values in Post-socialist Hungary: Is It Useful to Distinguish Egoistic, Altruistic and Biospheric Values? *Czech Sociological Review*, *48*(3), 421-440.
- Dermody, J., Hanmer-Lloyd, S., Koenig-Lewis, N., & Zhao, A. (2015). Advancing sustainable consumption in the UK and China: the mediating effect of pro-environmental self-identity. *Journal of Marketing Management*, *31*(13-14), 1472-1502. doi: 10.1080/0267257X.2015.1061039
- Ellen, P. S., Wiener, J. L., & Cobb-Walgren, C. (1991). The role of perceived consumer effectiveness in motivating environmentally conscious behaviors. *Journal of Public Policy & Marketing*, *10*(2), 102-117.
- Ertz, M., Karakas, F., & Sarigöllü, E. (2016). Exploring pro-environmental behaviors of consumers: An analysis of contextual factors, attitude, and behaviors. *Journal of Business Research*, *69*(10), 3971-3980. doi: 10.1016/j.jbusres.2016.06.010
- Fitzmaurice, J., & Comegys, C. (2006). Materialism and social consumption. *Journal of Marketing Theory*, *14*(4), 287-299. doi: 10.2753/MTP1069-6679140403
- Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Errors. *Journal of Marketing Research*, *18*(1), 39-50.
- Gatersleben, B., Murtagha, N., & Abrahamseb, W. (2012). Values, identity and pro-environmental behaviour. *Contemporary Social Science: Journal of the Academy of Social Sciences*, *9*(4), 1-19. doi: 10.1080/21582041.2012.682086
- Gifford, R. (2011). The dragons of inaction: psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, *66*(4), 290-302. doi: 10.1037/a0023566
- Gilg, A., Barr, S., & Ford, N. (2005). Green consumption or sustainable lifestyles? Identifying the sustainable consumer. *Futures*, *37*(6), 481-504. doi: 10.1016/j.futures.2004.10.016
- Grønhøj, A., & Thøgersen, J. (2009). Like father, like son? Intergenerational transmission of values, attitudes, and behaviours in the environmental domain. *Journal of Environmental Psychology*, *29*(4), 414-421. doi: 10.1016/j.jenvp.2009.05.002
- Hair, J., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper saddle River, New Jersey: Pearson Education International.
- 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. doi: 10.1002/sd.1615

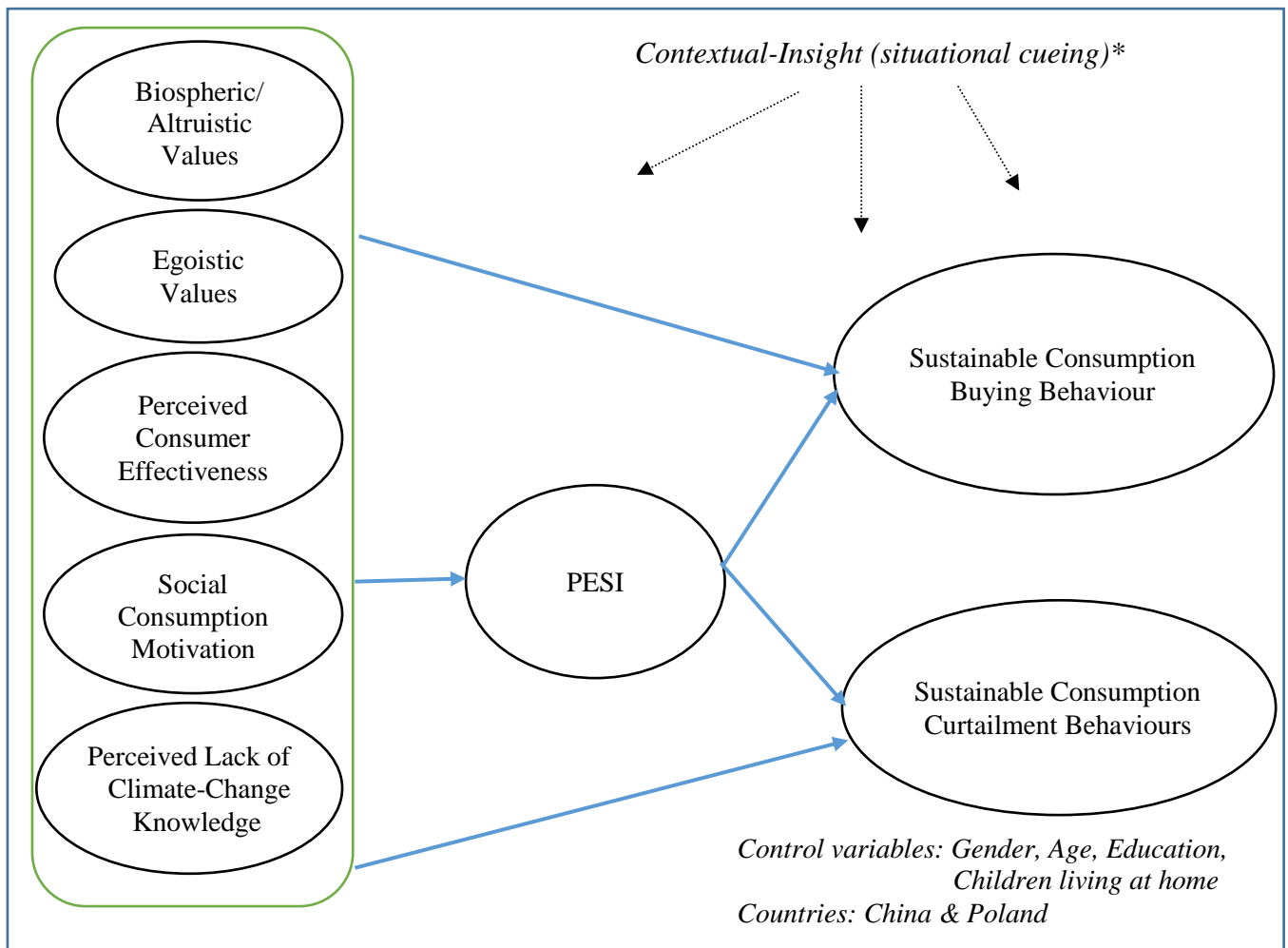
- Hao, F. (2014). The effect of economic affluence and ecological degradation on Chinese environmental concern: a multilevel analysis. *Journal of Environmental Studies Sciences*, 4(2), 123-131. doi: 10.1007/s13412-014-0166-z
- Hassan, L., Shiu, E., & Shaw, D. (2016). Who says there is an intention–behaviour gap? Assessing the empirical evidence of an intention-behaviour gap in ethical consumption. *Journal of Business Ethics*, 136(2), 219-236. doi: 10.1007/s10551-014-2440-0
- Hayes, A. F. (2013). *Introduction to mediation, moderation and conditional process analysis*. New York: The Guildford Press.
- Hitlin, S. (2003). Values as the core of personal identity: Drawing links between two theories of self. *Social Psychology Quarterly*, 66(2), 118-137. doi: 10.2307/1519843
- Hoelter, J. W. (1983). The analysis of covariance structures: Goodness-of-fit indices. *Sociological Methods & Research*, 11(3), 325-344. doi: 10.1177/0049124183011003003
- Howell, R. A. (2013). It's not (just) “the environment, stupid!” Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles. *Global Environmental Change*, 23(1), 281-290. doi: 10.1016/j.gloenvcha.2012.10.015
- Hu, L., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76-99). Thousand Oaks, CA: Sage.
- Intergovernmental Panel on Climate Change. (2013). Climate Change 2013: The Physical Science Basis Summary for Policymakers from https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIAR5_SPM_brochure_en.pdf Retrieved 04th August 2016.
- Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature and Culture*, 2, 732-735. doi: 10.1038/nclimate1547
- Kashima, Y., Paladino, A., & Margetts, E. A. (2014). Environmentalist identity and environmental striving. *Journal of Environmental Psychology*, 38, 64-75. doi: 10.1016/j.jenvp.2013.12.014
- Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 240-260. doi: 10.1080/13504620220145401
- Krausmann, F., Gingrich, S., Eisenmenger, N., Erb, K.-H., Haberl, H., & Fischer-Kowalski, M. (2009). Growth in global materials use, GDP and population during the 20th century. *Ecological Economics*, 68(10), 2696-2705. doi: 10.1016/j.ecolecon.2009.05.007
- Kundzewicz, Z. W., & Matczak, P. (2012). Climate change regional review: Poland. *WIREs Climate Change*, 3(4), 297-311. doi: 10.1002/wcc.175
- Lacy, P., & Hayward, R. (2011). A new era of sustainability in emerging markets? Insights from a global CEO study by the United Nations Global Compact and Accenture. *Corporate Governance: The International Journal of Business in Society*, 11(4), 348-357. doi: 10.1108/14720701111159208
- Lee, Y.-k., Kim, S., Kim, M.-s., & Choi, J.-g. (2014). Antecedents and interrelationships of three types of pro-environmental behavior. *Journal of Business Research*, 67(10), 2097-2105. doi: 10.1016/j.jbusres.2014.04.018

- Lorenzoni, I., Nicholson-Cole, S., & Whitmarsh, L. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*, 17(3-4), 445-459. doi: 10.1016/j.gloenvcha.2007.01.004
- 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*, 118(6), 1334-1349. doi: 10.1108/BFJ-10-2015-0375
- Morrison, P. S., & Beer, B. (2017). Consumption and Environmental Awareness: Demographics of the European Experience. In H. Shibusawa, K. Sakurai, T. Mizunoya & S. Uchida (Eds.), *Socioeconomic Environmental Policies and Evaluations in Regional Science* (Vol. 24, pp. 81-102). Singapore: Springer.
- Moschis, G. P. (1985). The Role of Family Communication in Consumer socialization of children and adolescents. *Journal of Consumer Research*, 11(4), 898-913. doi: 10.1086/209025
- National Centers for Environmental Information. (2016). Global Summary Information - May 2016 from <http://www.ncdc.noaa.gov/sotc/summary-info/global/201605> Retrieved 6 August 2016.
- Norman, C. C., & Aron, A. (2003). Aspects of possible self that predict motivation to achieve or avoid it. *Journal of Experimental Social Psychology*, 39(5), 500-507. doi: 10.1016/S0022-1031(03)00029-5
- Norwegian Ministry of the Environment. (1994). Oslo Roundtable on Sustainable Production and Consumption. Retrieved from <http://www.iisd.ca/consume/oslo000.html>
- Nunkoo, R., & Gursoy, D. (2012). Residents' support for tourism: An identity perspective. *Annals of Tourism Research*, 39(1), 243-268. doi: 10.1016/j.annals.2011.05.006
- Oyserman, D. (2009). Identity-based motivation and consumer behavior. *Journal of Consumer Psychology*, 19(3), 276-279. doi: 10.1016/j.jcps.2009.06.001
- Oyserman, D., & James, L. (2008). Possible selves: From content to process. In K. Markman, W. M. P. Klein & J. A. Suhr (Eds.), *The handbook of imagination and mental stimulation* (pp. 373-394). New York, NY: Psychology Press.
- Panzone, L., Hilton, D., Sale, L., & Cohen, D. (2016). Socio-demographics, implicit attitudes, explicit attitudes, and sustainable consumption in supermarket shopping. *Journal of Economic Psychology*, 55, 77-95. doi: 10.1016/j.joep.2016.02.004
- Piatkowski, M. (2015). How Poland Became Europe's Growth Champion: Insights from the Successful Post-Socialist Transition. Future Development Blog (World Bank) from <https://www.brookings.edu/2015/02/11/how-poland-became-europes-growth-champion-insights-from-the-successful-post-socialist-transition/> Retrieved 11th February 2015.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879-891. doi: 10.3758/BRM.40.3.879
- Price, J. C., Walker, I. A., & Boschetti, F. (2014). Measuring cultural values and beliefs about environment to identify their role in climate change responses. *Journal of Environmental Psychology*, 37(March), 8-20. doi: 10.1016/j.jenvp.2013.10.001
- 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. doi: 10.1509/jppm.30.1.31
- Reed, A., Forehand, M. R., Puntoni, S., & Warlop, L. (2012). Identity-based consumer behavior. *International Journal of Research in Marketing*, 29(4), 310-321. doi: 10.1016/j.ijresmar.2012.08.002
- Roberts, J. A. (1996). Green consumer in the 1990s: profile and implications for advertising. *Journal of Business Research*, 36(3), 217-231. doi: 10.1016/0148-2963(95)00150-6
- Schumacker, R. E., & Lomax, R. G. (2010). *A Beginner's Guide to Structural Equation Modeling* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Sharma, P. (2011). Country of origin effects in developed and emerging markets: Exploring the contrasting roles of materialism and value consciousness. *Journal of International Business Studies*, 42(2), 285-306. doi: 10.1057/jibs.2010.16
- Sheth, J., N. (2011). Impact of Emerging Markets on Marketing: Rethinking Existing Perspectives and Practices. *Journal of Marketing*, 75(4), 166-182. doi: 10.1509/jmkg.75.4.166
- Sidique, S. F., Lupi, F., & Joshi, S. V. (2010). The effects of behavior and attitudes on drop-off recycling activities. *Resources, Conservation and Recycling*, 54(3), 163-170. doi: 10.1016/j.resconrec.2009.07.012
- Sielewicz, G. (2015). Poland Retail Sector – Household spending is supporting the economy but challenges remain from <http://www.coface.com/News-Publications/Publications/Poland-Retail-Sector-Household-spending-is-supporting-the-economy-but-challenges-remain> Retrieved 03rd August 2016.
- Smith, E. R., & Semin, G. R. (2007). Situated Social Cognition. *Current Directions in Psychological Science*, 16(3), 132-135. doi: doi.org/10.1111/j.1467-8721.2007.00490.x
- Soron, D. (2010). Sustainability, self-identity and the sociology of consumption. *Sustainable Development*, 18(3), 172-181. doi: 10.1002/sd.457
- Sparks, P., & Gurthrie, C. A. (1998). Self-Identity and the Theory of Planned Behavior: A Useful Addition or an Unhelpful Artifice? *Journal of Applied Social Psychology*, 28(15), 1393-1410. doi: 10.1111/j.1559-1816.1998.tb01683.x
- Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behaviour: assessing the role of identification with green consumerism. *Social Psychology Quarterly*, 55(4), 388-399. doi: 10.2307/2786955
- Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental Psychology*, 38, 104-115. doi: 10.1016/j.jenvp.2014.01.002
- The Economist. (2014). Polish energy. Going nuclear from <http://www.economist.com/blogs/easternapproaches/2014/01/polish-energy> Retrieved 8th August 2016.
- The Guardian. (2016). Shattered records show climate change is an emergency today, scientists warn from <https://www.theguardian.com/environment/2016/jun/17/shattered-records-climate-change-emergency-today-scientists-warn> Retrieved 17th June 2016.

- Thorbjørnsen, H., Pedersen, P. E., & Nysveen, H. (2007). This is Who I am: Identity Expressiveness and the Theory of Planned Behavior. *Psychology & Marketing*, 24(9), 763-785. doi: 10.1002/mar.20183
- Turner, J. C. (1987). *Rediscovering the social group: A self-categorization theory*. Oxford, UK: Wiley-Blackwell.
- Vadovics, E. (2008). Emerging sustainable consumption patterns in Central Eastern Europe, with a specific focus on Hungary. In A. Tukker, M. Charter, C. Vezzoli, E. Sto & M. M. Andersen (Eds.), *System Innovation for Sustainability 1: Perspectives on radical changes to sustainable consumption and production*. Sheffield: Generalleaf Publishing.
- van der Werff, E., & Steg, L. (2016). The psychology of participation and interest in smart energy systems: Comparing the value-belief-norm theory and the value-identity-personal norm model. *Energy Research & Social Science*, 22(December), 107-114. doi: 10.1016/j.erss.2016.08.022
- van der Werff, E., Steg, L., & Keizer, K. (2013). The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour. *Journal of Environmental Psychology*, 34(June), 55-63. doi: 10.1016/j.jenvp.2012.12.006
- van der Werff, E., Steg, L., & Keizer, K. (2014). Follow the signal: When past pro-environmental actions signal who you are. *Journal of Environmental Psychology*, 40(December), 273-282. doi: 10.1016/j.jenvp.2014.07.004
- Wei, J., Chen, H., & Long, R. (2016). Is ecological personality always consistent with low-carbon behavioral intention of urban residents? *Energy Policy*, 98(November), 343-352. doi: 10.1016/j.enpol.2016.09.004
- Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, 30(3), 305-314. doi: 10.1016/j.jenvp.2010.01.003
- World Health Organisation. (2015). Climate and Health Country Profile 2015 – China from <http://www.who.int/globalchange/resources/PHE-country-profile-China.pdf?ua=1> Retrieved 30th July 2016.
- Wu, C.-s., Zhou, X.-x., & Song, M. (2016). Sustainable consumer behavior in China: an empirical analysis from the Midwest regions. *Journal of Cleaner Production*, 134(November), 147-165. doi: 10.1016/j.jclepro.2015.06.057
- Yang, S., Zhang, Y., & Zhao, D. (2016). Who exhibits more energy-saving behavior in direct and indirect ways in China? The role of psychological factors and socio-demographics. *Energy Policy*, 93(June), 196-205. doi: 10.1016/j.enpol.2016.02.018

Figure 1: Conceptual Model



**Not directly measured; extensive review of secondary data & scholarship used to inform appraisal.*

Table 1: Correlation and Square Root of AVE

| Constructs | CR | Ego | Bio_Alt | PCE | Perceived lack of climate-change knowledge | PESI | SCM | Buying | Curtailment |
|---|-----------|------------|----------------|------------|---|-------------|------------|---------------|--------------------|
| Ego | .82 | .78 | | | | | | | |
| Bio_Alt | .86 | .29 | .69 | | | | | | |
| PCE | .80 | -.29 | .32 | .82 | | | | | |
| Perceived lack of climate-change knowledge | .79 | .19 | -.14 | -.56 | .75 | | | | |
| PESI | .72 | .29 | .67 | .24 | -.20 | .75 | | | |
| SCM | .81 | .66 | .28 | -.23 | .08 | .41 | .76 | | |
| Buying | .82 | .53 | .49 | .06 | -.10 | .68 | .57 | .73 | |
| Curtailment | .72 | .02 | .47 | .29 | -.16 | .44 | .03 | .41 | .68 |

Note: Values in the diagonal represent square root of AVE.

Ego (Egoistic Values), Bio_Alt (Biospheric/Altruistic Values); PCE (Perceived Consumer Effectiveness); SCM (Social Consumption Motivation); PESI (Pro-Environmental Self-Identity).

Table 2. Model coefficients for the hypothesized direct effects

| China | | | | Consequent | | | | | | | | |
|---|-----------------------|------|-------|-------------------------|-------------------------|------|------------------------------|------|-------------------------|------|-------|------|
| Antecedent | M (PESI) | | | Y ₁ (Buying) | | | Y ₂ (Curtailment) | | | | | |
| | Coeff. | t | p | Coeff. | t | p | Coeff. | t | p | | | |
| X ₁ (Bio_Alt) | <i>a</i> ₁ | .37 | 12.52 | .000 | <i>c'</i> ₁₁ | .17 | 4.97 | .000 | <i>c'</i> ₁₂ | .36 | 9.61 | .000 |
| X ₂ (Ego) | <i>a</i> ₂ | .01 | .63 | .530 | <i>c'</i> ₂₁ | .09 | 3.62 | .000 | <i>c'</i> ₂₂ | -.00 | -.12 | .903 |
| X ₃ (SCM) | <i>a</i> ₃ | .17 | 6.25 | .000 | <i>c'</i> ₃₁ | .16 | 5.43 | .000 | <i>c'</i> ₃₂ | .02 | .67 | .505 |
| X ₄ (PCE) | <i>a</i> ₄ | .04 | .02 | .079 | <i>c'</i> ₄₁ | .00 | .107 | .915 | <i>c'</i> ₄₂ | .08 | 2.94 | .003 |
| X ₅ (Perceived lack of climate-change knowledge) | <i>a</i> ₅ | -.09 | -3.75 | .000 | <i>c'</i> ₅₁ | -.04 | -1.54 | .125 | <i>c'</i> ₅₂ | .01 | .30 | .765 |
| M (PESI) | | | | | <i>b</i> ₁₁ | .34 | 9.93 | .000 | <i>b</i> ₁₂ | .18 | 4.89 | .000 |
| C ₁ (Gender) | <i>c</i> ₁ | -.01 | -.28 | .783 | <i>c</i> ₁₁ | -.08 | -2.02 | .044 | <i>c</i> ₁₂ | -.04 | -1.08 | .281 |
| C ₂ (Age) | <i>c</i> ₂ | .08 | 5.32 | .000 | <i>c</i> ₂₁ | .00 | .238 | .812 | <i>c</i> ₂₂ | .03 | 1.84 | .067 |
| C ₃ (Education) | <i>c</i> ₃ | .10 | 4.62 | .000 | <i>c</i> ₃₁ | .03 | 1.17 | .241 | <i>c</i> ₃₂ | .03 | 1.10 | .272 |
| C ₄ (Children) | <i>c</i> ₄ | .14 | 3.66 | .000 | <i>c</i> ₄₁ | .09 | 2.08 | .038 | <i>c</i> ₄₂ | -.04 | -.96 | .339 |
| Constant | <i>i</i> | 1.47 | 7.22 | .000 | <i>i</i> ₁₁ | .78 | 3.43 | .001 | <i>i</i> ₁₂ | 1.68 | 6.92 | .000 |
| R ² =.34 | | | | R ² =.34 | | | | | R ² =.24 | | | |
| F(9, 1013)=59.04, | | | | F(10,1012)=51.87, | | | | | F(10,1012)=31.60, | | | |
| p < .000 | | | | p < .000 | | | | | p < .000 | | | |
| Poland | | | | Consequent | | | | | | | | |
| Antecedent | M (PESI) | | | Y ₁ (Buying) | | | Y ₂ (Curtailment) | | | | | |
| | Coeff. | t | p | Coeff. | t | p | Coeff. | t | p | | | |
| X ₁ (Bio_Alt) | <i>a</i> ₁ | .45 | 10.28 | .000 | <i>c'</i> ₁₁ | .15 | 3.24 | .001 | <i>c'</i> ₁₂ | .13 | 2.56 | .011 |
| X ₂ (Ego) | <i>a</i> ₂ | -.03 | -.74 | .458 | <i>c'</i> ₂₁ | .09 | 2.69 | .007 | <i>c'</i> ₂₂ | .03 | .89 | .373 |
| X ₃ (SCM) | <i>a</i> ₃ | .18 | 5.16 | .000 | <i>c'</i> ₃₁ | .09 | 2.60 | .010 | <i>c'</i> ₃₂ | -.09 | -2.45 | .015 |
| X ₄ (PCE) | <i>a</i> ₄ | .16 | 4.58 | .000 | <i>c'</i> ₄₁ | .04 | 1.27 | .204 | <i>c'</i> ₄₂ | .01 | .13 | .899 |
| X ₅ (Perceived lack of climate-change knowledge) | <i>a</i> ₅ | -.05 | -1.37 | .171 | <i>c'</i> ₅₁ | -.09 | -2.59 | .010 | <i>c'</i> ₅₂ | -.02 | -.55 | .580 |
| M (PESI) | | | | | <i>b</i> ₁₁ | .28 | 6.65 | .000 | <i>b</i> ₁₂ | .35 | 7.19 | .000 |
| C ₁ (Gender) | <i>c</i> ₁ | .03 | .41 | .686 | <i>c</i> ₁₁ | .01 | .24 | .813 | <i>c</i> ₁₂ | -.15 | -2.21 | .028 |
| C ₂ (Age) | <i>c</i> ₂ | .10 | 5.21 | .000 | <i>c</i> ₂₁ | .04 | 2.32 | .021 | <i>c</i> ₂₂ | -.02 | -.89 | .373 |
| C ₃ (Education) | <i>c</i> ₃ | .01 | .95 | .344 | <i>c</i> ₃₁ | .01 | .63 | .527 | <i>c</i> ₃₂ | .01 | .42 | .678 |
| C ₄ (Children) | <i>c</i> ₄ | -.05 | -.86 | .390 | <i>c</i> ₄₁ | .06 | 1.08 | .283 | <i>c</i> ₄₂ | .15 | 2.37 | .018 |
| Constant | <i>i</i> | .97 | 4.19 | .000 | <i>i</i> ₁₁ | .75 | 3.40 | .001 | <i>i</i> ₁₂ | 2.78 | 10.85 | .000 |
| R ² =.37 | | | | R ² =.28 | | | | | R ² =.21 | | | |
| F(9,495) = 32.66, | | | | F(10,494) = 19.29, | | | | | F(10,494) = 13.42, | | | |
| p < .000 | | | | p < .000 | | | | | p < .000 | | | |

Note: Ego (Egoistic Values), Alt_Bio (Biospheric/Altruistic/Values); PCE (Perceived Consumer Effectiveness); SCM (Social Consumption Motivation), PESI (Pro-Environmental Self-Identity)

Table 3: Indirect Effects Applying Bootstrap Bias-Corrected Method 95% CI for PESI as a Mediator

| | Point estimate | BootSE | LLCI | ULCI | Mediation Results |
|--|----------------|--------|------|------|--------------------------|
| China | | | | | |
| Consequent: Buying | | | | | |
| Bio_Alt | .13 | .02 | .09 | .17 | Direct & indirect effect |
| Egoistic | .01 | .01 | -.01 | .02 | Only direct effect |
| SCM | .06 | .01 | .03 | .08 | Direct & indirect effect |
| PCE | .01 | .01 | -.00 | .03 | No effect |
| Perceived lack of climate-change knowledge | -.03 | .01 | -.05 | -.01 | Only indirect effect |
| Consequent: Curtailment | | | | | |
| Bio_Alt | .07 | .02 | .04 | .11 | Direct & indirect effect |
| Ego | .00 | .01 | -.01 | .01 | No effect |
| SCM | .03 | .01 | .02 | .05 | Only indirect effect |
| PCE | .01 | .01 | -.00 | .02 | Only direct effect |
| Perceived lack of climate-change knowledge | -.02 | .01 | -.03 | -.01 | Only indirect effect |
| Poland | | | | | |
| Consequent: Buying | | | | | |
| Bio_Alt | .13 | .03 | .08 | .18 | Direct & indirect effect |
| Ego | -.01 | .01 | -.03 | .01 | Only direct effect |
| SCM | .05 | .01 | .03 | .08 | Direct & indirect effect |
| PCE | .04 | .01 | .02 | .08 | Only indirect effect |
| Perceived lack of climate-change knowledge | -.01 | .01 | -.04 | .01 | Only direct effect |
| Consequent: Curtailment | | | | | |
| Bio_Alt | .16 | .03 | .10 | .23 | Direct & indirect effect |
| Ego | -.01 | .01 | -.04 | .02 | No effect |
| SCM | .06 | .02 | .03 | .10 | Direct & indirect effect |
| PCE | .06 | .02 | .03 | .09 | Only indirect effect |
| Perceived lack of climate-change knowledge | -.02 | .02 | -.05 | .01 | No effect |

Note: SE= Standard error, LLCI= Lower limit confidence interval, and ULCI = Upper limit confidence interval; Ego (Egoistic Values), Bio_Alt (Biospheric/Altruistic Values); PCE (Perceived Consumer Effectiveness); SCM (Social Consumption Motivation)

Appendix: Item Scales and Reliability

| Construct and Scale Items | China | | Poland | | Whole Sample | |
|--|---------|-----|---------|-----|--------------|-----|
| | Loading | CR | Loading | CR | Loading | CR |
| <i>Egoistic Values (Ego)</i> | | .76 | | .74 | | .82 |
| Social power ¹ | n/a | | n/a | | n/a | |
| Wealth | .71 | | .66 | | .76 | |
| Authority | .76 | | .63 | | .76 | |
| Influential | .68 | | .78 | | .81 | |
| Ambitious ¹ | n/a | | n/a | | n/a | |
| <i>Biospheric/Altruistic Values (Bio_Alt)</i> | | .86 | | .86 | | .86 |
| Respecting the earth | .74 | | .71 | | .74 | |
| Unity with nature | .59 | | .67 | | .62 | |
| Protecting the environment | .77 | | .83 | | .81 | |
| Preventing pollution | .76 | | .86 | | .81 | |
| Equality ¹ | n/a | | n/a | | n/a | |
| A world of peace | .61 | | .52 | | .55 | |
| Social justice | .67 | | .63 | | .66 | |
| Helpful | .68 | | .58 | | .64 | |
| <i>Perceived Consumer Effectiveness (PCE)</i> | | .81 | | .79 | | .80 |
| When I buy products, I try to consider how my use of them will affect the environment. ¹ | n/a | | n/a | | n/a | |
| It is worthless for the individual consumer to do anything about pollution.® | .82 | | .73 | | .77 | |
| Since one person cannot have any effect upon pollution and natural resource problems, it doesn't make any difference what I do.® | .84 | | .88 | | .87 | |
| Each consumer's behavior can have a positive effect on society by purchasing products sold by socially responsible companies. | n/a | | n/a | | n/a | |
| <i>Perceived Lack of Climate-Change Knowledge</i> | | .80 | | .77 | | .79 |
| I don't know that much about causes of climate change | .76 | | .76 | | .77 | |
| I don't know that much about potential solutions to climate change | .69 | | .71 | | .70 | |
| I don't know that much about the consequences of climate change | .81 | | .71 | | .78 | |

| Construct and Scale Items | China | | Poland | | Whole Sample | |
|---|---------|-----|---------|-----|--------------|-----|
| | Loading | CR | Loading | CR | Loading | CR |
| <i>Social Consumption Motivation (SCM)</i> | | .75 | | .74 | | .81 |
| Before purchasing a product, it is important to know ...what others think of different brands or products. ¹ | n/a | | n/a | | n/a | |
| ...what kinds of people buy certain brands or products. | .79 | | .79 | | .82 | |
| ...what others think of people who buy certain brands or products. | .64 | | .62 | | .67 | |
| ...what brands or products to buy to make good impressions on others. | .68 | | .69 | | .80 | |
| <i>Pro-environmental Self-Identity (PESI)</i> | | .73 | | .68 | | .72 |
| I think of myself as an environmentally-friendly consumer. | .74 | | .65 | | .69 | |
| I think of myself as someone who is very concerned with environmental issues. | .78 | | .77 | | .81 | |
| I would be embarrassed to be seen as having an environmentally-friendly lifestyle. ¹ ® | n/a | | n/a | | n/a | |
| I would not want my family or friends to think of me as someone who is concerned about environmental issues. ¹ ® | n/a | | n/a | | n/a | |
| <i>Sustainable Consumption Buying Behavior (Buying)</i> | | .77 | | .78 | | .82 |
| Buy organic | .67 | | .68 | | .72 | |
| Buy environmentally-friendly products | .80 | | .81 | | .84 | |
| Buy food which is locally grown or in season | .64 | | .57 | | .67 | |
| Buy products using reduced packaging | .59 | | .66 | | .70 | |
| <i>Sustainable Consumption Curtailment Behavior (Curtailment)</i> | | .76 | | .69 | | .72 |
| Turn off lights you are not using | .90 | | .61 | | .78 | |
| Turn off the tap while you brush your teeth | .70 | | .55 | | .64 | |
| Save water by taking shorter showers | .52 | | .79 | | .59 | |

Note: ¹Items dropped due to low loadings. ® Reversely coded items.

Measurement Model Fit - China: $\chi^2(293) = 1338.95, p \leq .001, \chi^2/df = 4.57, CFI = .90, GFI = .91, RMSEA = .059$. Poland: $\chi^2(293) = 571.58, p \leq .001, \chi^2/df = 1.951, CFI = .94, GFI = .92, RMSEA = .043$.

Measurement: Bio, Alt & Ego Values: importance of each value item rated as 'a guiding principle in their life' on a scale from -1 (opposed to value) to 4 (supreme value); PCE, SCM, perceived lack of climate change knowledge, and PESI: 5-point Likert scale (1= strongly disagree, 5=strongly agree); Buying & Curtailment: 5-point Likert scale (1=never to 5=always).

