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Sustainable consumer behavior: a multilevel perspective

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Sustainable consumption encompasses a wide range of behaviors, from consumer purchase of eco-friendly products to household and municipal water use patterns. Extant research has tended to examine the predictors of such behaviors either at the individual-level or the group- or contextual-level. Yet such behaviors are very likely shaped by the interaction of factors across multiple levels of analysis. Multilevel modeling approaches to analyzing hierarchical datasets can greatly expand our understanding of the core factors driving sustainable consumption behavior. We review the small but growing number of multilevel studies in this research domain—reporting new analyses of cross-national data on altruistic and biospheric values—and end with a call for further theoretical and empirical multilevel examination of consumption behavior.

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'Sustainable development' is defined [...] as: 'the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life-cycle, so as not to jeopardise the needs of future generations'

—Organization for Economic Cooperation and Development (OECD)

Consumption is a process involving many stages, including recognition of a want or need, evaluation of alternatives and post-purchase and post-use behavior [1,2••], that may challenge environmental and social sustainability aspirations [3••,4,5,6,7••]. Although we tend to view consumption as an individual-level phenomenon, in fact it is a process that occurs within a larger system of investments, production and trade involving cultural, institutional, power, economic and infrastructure forces [8••]. Accordingly, consumer behavior can and should be understood via a multilevel perspective as any particular behavior is nested within and determined by factors operating at multiple levels (e.g., individual, household, community, nation). For example, socio-psychological variables such as environmental attitudes and intertemporal discounting, household-related variables such as household income and size, local contextual factors such as weather conditions and community ordinances, and national and global factors such as policies and trade agreements interact with each other in complex ways to constrain and guide consumption-related beliefs and decisions.

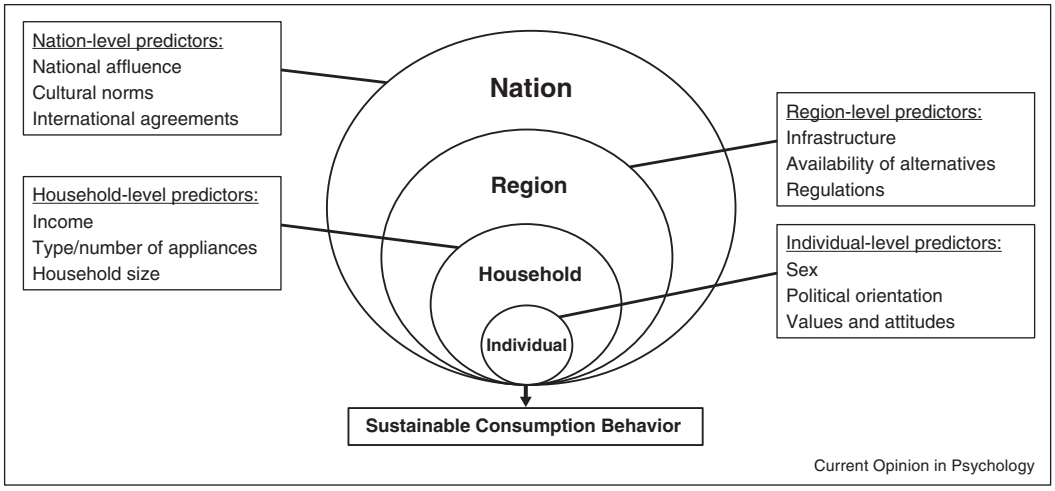
Sustainable consumption thus emerges at the intersection of individual- and contextual-level drivers of behavior [e.g., [9–12]]. Although it is recognized that consumption with the intention to promote positive environmental effects is nested within contextual constraints [13•,14], many studies interested in understanding and predicting sustainable consumption at the individual level tend to overlook both social and situational factors influencing consumers' decision to act sustainably (e.g., cultural norms, availability of low-impact alternatives) [15••,16,17]. Even less research considers how factors operating at the individual and contextual levels may interact with one another to shape sustainable consumption.

Rather than providing a broad review of sustainable consumption research, the purpose of this article is to review studies that have examined the extent to which contextual variables influence sustainable consumption, or the proximate factors known to affect the likelihood of such behavior, primarily using multilevel or hierarchical linear modeling to do so (see Figure 1). Multilevel research designs are the recommended methodology to examine nested or hierarchical data because such analyses appropriately and accurately assess the effects of distinct levels of explanatory variables [18,19,20]. One core aim of our brief review is to highlight the benefits of adopting a multilevel perspective to study sustainable consumption behavior when the necessary data are available, and to encourage broad implementation of this set of approaches in future research examining consumption behavior.

From attitudes to sustainable consumer behavior

The move from relatively less to more sustainable consumption is partly a function of an individual's attitudes

Figure 1



Multilevel model depicting predictors of sustainable consumption behavior at distinct levels.

and the behavior-specific costs involved [21]. Multilevel studies examining factors influencing pro-environmental attitudes and related behavioral dispositions are informative because they provide a broader perspective within which to situate individuals' decision-making.

Multilevel studies have shown that several individual-level characteristics as well as contextual factors influence pro-environmental attitudes. Recent large-scale studies comprising nationally representative survey data from over 30 countries [22,23••], for example, find that pro-environmental attitudes and eco-friendly behavior are positively correlated with income, education level, general trust in other individuals, and post-materialist values (e.g., support for greater public participation in government decision, protecting freedom of speech). These studies also find that older adults tend to report weaker environmental attitudes, as do men and political conservatives. At the country level, these studies find that higher levels of endorsement of post-materialist values in a nation, national wealth (e.g., as measured by GDP per capita) and positive growth trends in national wealth are all associated with greater public willingness to make financial sacrifices for the environment.

However, the effect of country-level affluence and post-materialist values on pro-environmental attitudes and behavior is not always consistently positive. Other studies have shown a negative relationship between national affluence and public concern for the environment [24,25,26]. These contradictory results may in part be explained by differences between studies with respect to how environmental attitudes have been measured. For example, individuals of affluent nations might report greater engagement in sustainable consumption because questions assessing such behavior (e.g., whether individuals choose household products that are better for the environment, or reduce water consumption for environmental reasons) might be irrelevant to many individuals in poor nations, who might engage in such behaviors out of necessity and not due to environmental reasons [25].

Other studies have suggested that pro-environmental attitudes also emerge out of first-hand experience with environmental degradation, which is likely to be negatively associated with country-level measures of development. For example, a multilevel study analyzing 15 year-old student data from the 2006 Programme for International Student Assessment (PISA) across 56 countries found that pro-environmental attitudes were higher among students living in countries with more polluted environments [27].

Taken as a whole, these findings highlight the direct impacts or 'main effects' of contextual factors such as national wealth, cultural values or environmental degradation on one of the key predictors of sustainable consumption, namely, general attitudes toward consumption and the environment.

Multilevel studies examining specific sustainable consumer behaviors

An increasing number of multilevel studies have examined particular sustainable consumer behaviors. For example, one multilevel study examined the extent to which both household and neighborhood characteristics influence residential energy consumption in the Chinese city of Jinan [28•]. At the household level, greater energy use was evident in residences with higher household income and size, number of adults living in the household, and presence of one or more air conditioners. At the neighborhood level, energy consumption was lower in

urban residential neighborhoods with higher household density, suggesting that high-density and compact residential neighborhoods are more energy efficient. A similar analysis was conducted across regions in the USA [29]. Overall, the results show that residential energy consumption is greater in households in colder regions, single-family detached houses, larger households, and those that need to use heating or cooling systems.

Another study using the 2007 Eurobarometer data across 27 countries observed that waste recycling and the reduction of both energy and water consumption were the top-three pro-environmental actions reported by European citizens [30]. In line with results reviewed above, pro-environmental actions were higher among women and citizens with high socio-economic status and pro-environmental attitudes. At the country level, investment in environmental protection, percentage of waste treated and GDP per capita were consistently related to waste recycling and a reduction in car use.

Another multilevel study used this same European data focusing on 18 countries and on the purchase of environmentally labeled products [31]. Once again, women, those better off economically and those with higher education and pro-environmental attitudes were more likely to report purchasing environmentally friendly goods. At the country level, only general trust in others was consistently related to purchase of environmentally labeled products once all other individual- and country-level variables were taken into account.

One important consequence of consumption is waste production and disposal. Related to this point, a multilevel study observed littering behavior across public locations in 10 states of the USA [32••]. Cigarette butts, paper and food wrappers were the top-three litter observed on sites. At the individual level, littering behavior was more likely among young people, while at the site level littering was more frequent in sites with existing litter and less likely in sites with available trash receptacles. These findings indicate how multilevel research designs can be useful in delineating specific predictors of behavior, which might lead to better intervention designs [see also [33•]].

Cross-level interactions

One of the most powerful advantages of using multilevel modeling approaches when working with nested or hierarchical data is the possibility to estimate cross-level interaction effects [34,35,36]. These allow researchers to ask theoretical and empirical questions that are unavailable if analyses are restricted solely to the individual or context levels separately.

In the context of sustainable consumption, a multilevel approach allows researchers to explore whether the effect of individual-level demographic, psychological or social variables (e.g., sex, income, values, attitudes) potentially differ as a function of cultural or other contextual factors (e.g., availability of alternatives, infrastructure, dimensions of cultural variability, national wealth). Multilevel modeling thus allows researchers to overcome one of the critical weaknesses of much extant research on sustainable consumption: the assumption that particular individual-level predictors of behavior operate similarly across different populations and contexts.

Although relatively little work has been done examining such cross-level interactions in the context of sustainable consumer behavior, the few studies that do exist reveal unique insights into the driving factors behind the intention to promote environmental sustainability. One study analyzing data from 27 countries, for example, examined whether country characteristics would enhance or decrease the positive association between education level and various measures of pro-environmental attitudes [26]. Distinct cross-level interactions were observed for each attitude measure, but overall the positive effect of education on pro-environmental attitudes was more pronounced in countries with higher levels of liberal democracy (i.e., a country's political rights, suffrage, civil liberties, constitutional development, legislative effectiveness, and whether groups are excluded from the political process).

Other cross-interaction findings lend support to the hypothesis that as nations become wealthier their more affluent citizens become more interested in environmental protection [[37], but see [25]]. For example, one study that analyzed data from 22 countries found that the individual-level correlation between personal income and support for environmental protection was greater in countries that had experienced recent economic growth [38]. Another study analyzing data from 34 countries found that the association between perceived importance of global warming and participants' willingness to make sacrifices to protect the environment was higher in countries with a higher standard of living (measured with the Human Development Index) compared to countries with a lower standard of living [39]. A recent 24-country study showed that the association between perceived importance of climate change and pro-environmental intentions—including sustainable consumer intentions such as conserving water and electricity at home, buying environmentally–friendly products and eating food which is locally grown or in season—was stronger for respondents in wealthier countries than for respondents in poorer countries [40••].

Theoretical and practical implications of multilevel research designs

Whereas well-developed theories of consumption behavior exist at the individual- (e.g., psychological [41]) and

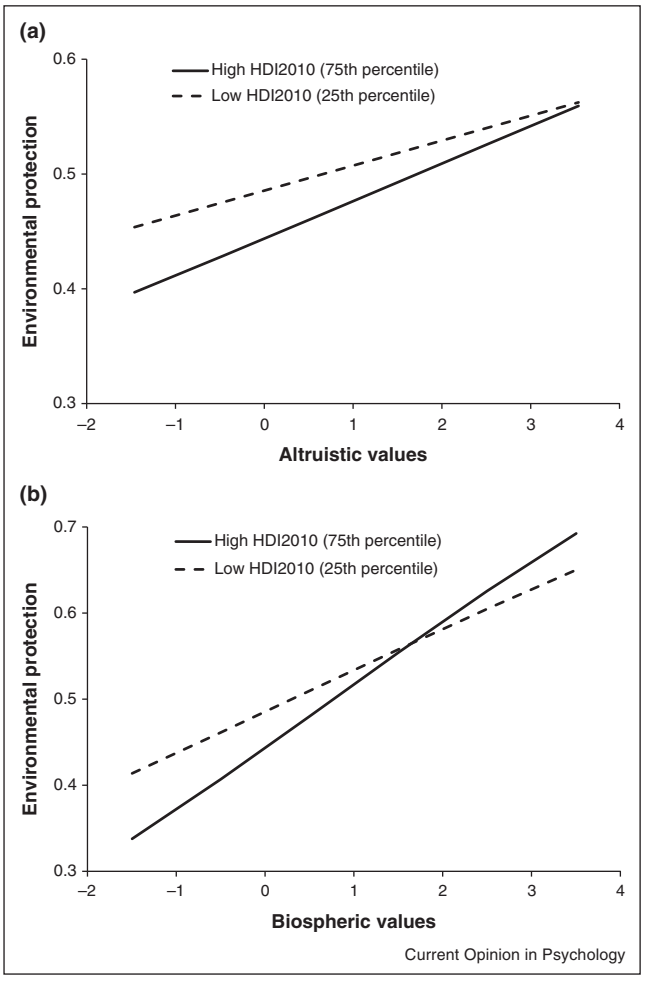
contextual- (e.g., cultural [37]) levels separately, theoretical accounts that integrate across levels are sorely lacking on (sustainable) consumption behavior. One critical implication is that researchers who are pursuing multilevel modeling approaches in this domain lack an obvious theoretical grounding for hypothesis development and testing. This is particularly problematic given the vastly increased number of empirical questions researchers are able to ask of hierarchical datasets (including but not limited to examination of cross-level interactions).

At the same time, the reviewed cross-level interaction findings support the basic contention that individuals are better able to act on their pro-environmental tendencies when external barriers and behavior-specific costs and difficulties are relatively lower, and when favoring contingencies are present [21,42,43,44]. Our review also highlights that one such favoring contingency is affluence and standard of living in a country, which moderate the relationships between individual-level variables [38,39,40••]. This is perhaps a starting point in the development of cross-level theorizing. Although there is clearly a need for further multilevel empirical research, theory building that can guide such work is at least as important at this early stage in the field's development.

One important practical implication of multilevel research designs is that variables we assume to predict sustainable consumer behavior in one particular context may be weaker predictors or even completely irrelevant in another context, which would consequently have implications for marketing and intervention actions designed to encourage sustainable behavior. It will only be through careful examination of how particular factors interact across levels of analysis that scholars and practitioners will be in a position to support meaningful sustainable consumption efforts moving forward. To illustrate this point, we analyzed data from the World Values Survey and found, as expected, that the associations between values and environmental protection are stronger in countries with a higher standard of living (see Figure 2). Although values can influence sustainable consumption [45•,46,47], our findings clearly show that their impact is not uniform across contexts.

A multilevel approach can thus aid researchers in generating new predictions about how to spur behavior in a particular context. For example, if multilevel analysis confirm that young people litter more but that context is also important [32••], this would provide insights on the kind of appeals and interventions that might mitigate such behavior. In this example, interventions could focus on increasing the use of trash receptacles by young people while at the same time making sure sites are litter-free and trash receptacles are available. (See Ref. [28] for another example of the practical implications of cross-level interactions for understanding energy consumption.) In turn,

Figure 2



Associations between values and environmental protection as a function of countries' standard of living. The relationships between support for environmental protection and endorsement of altruistic (Panel a) and biospheric (Panel b) values are stronger in countries with a higher standard of living. *Note*. The plots summarize the moderating effect of country-level standard of living, as measured by the 2010 Human Development Index (HDI), on the relationship between individual-level variables assessing values and environmental protection. We used data from the World Values Survey (Wave 6, 2010–2014) comprising 57 countries and 73,117 respondents to test the cross-level interaction. The HDI of the countries ranged from .45 (Rwanda) to .93 (Australia), with a mean/median value of .75 (Kazakhstan and Mexico; *SD* = .12). The value items ask respondents whether a person who holds the particular value is 'like me' on a 6-point scale (recoded to 1 = not at all like me, 6 = very much like me). Altruistic values were measured with the item 'It is important to this person to do something for the good of society' (*M* = 2.46, *SD* = 1.23), and biospheric values with the item 'Looking after the environment is important to this person; to care for nature and save life resources' (*M* = 2.50, *SD* = 1.26). A dichotomous outcome item measured environmental protection (0 = economic growth, 1 = environmental protection; *M* = .48, *SD* = .50). The response options were 'Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent' (selected by 52.2% of the respondents), and 'Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs' (selected by 47.8% of the respondents). We used a reduced *y*-axis scale and the full computed range for the *x*-axis to better display the nature of the interaction. Raw data and HLM output is available from Taciano L. Milfont.

this suggests that promoting pro-environmental values and attitudes alone will be insufficient, as supportive and conducive decision-making environments are also critical for sustainable consumption patterns to emerge.

Conclusions

Consumption practices are often household rather than individual decisions, which illustrates that sustainable consumption happens across multiple levels of decision-making and within the confines of broader contextual constraints and facilitators. Multilevel research designs can facilitate the identification of socio-psychological, institutional, structural and cultural contexts that influence sustainable consumption. Moreover, such research approaches allow researchers to more fully examine how factors operating at various levels of analysis—from the individual to the societal—interact with one another in powerful and often unanticipated ways to shape sustainable consumption patterns. As the availability of high quality, nested datasets continues to increase, the use of multilevel modeling approaches is likely to grow, expanding our understanding of these critical behaviors.

Conflict of interest

The authors declare no conflict of interest.

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