

Article

Caveats in Environmental Justice, Consumption and Ecological Footprints: The Relationship and Policy Implications of Socioeconomic Rank and Sustainable Consumption Patterns

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Abstract: The study evaluates the sustainability of consumption patterns among different socioeconomic deciles based on individual ecological footprints generated by four of the world's most polluting industries: animal products/meat, textiles, transport, and residential energy. Online shopping is also considered due to its mounting popularity. A national survey, which ensured equal representation of socioeconomic deciles, involving 600 respondents in Israel was conducted, supplemented by follow-up semi-structured personal interviews with 25 participants. Conventional wisdom supports the notion that wealthier segments of society produce greater ecological footprints in all aspects of their consumption. In fact, our findings reveal that patterns are more nuanced and that there are areas in which poorer populations reveal less sustainable consumption patterns: poorer populations in the lower deciles report a greater per capita ecological footprint in their purchases of textiles and food consumption. By contrast, wealthier deciles have relatively larger ecological footprints in the areas of transport and residential patterns (which drive their energy consumption). Results suggest that some of the fundamental assumptions among environmental justice advocates regarding contrasting consumption patterns in affluent and poorer segments of society are not always supported by empirical evidence. Findings also indicate that there is room for greater government interventions to facilitate more sustainable consumption patterns among poorer populations.

Keywords: consumption; ecological footprint; environmental justice; food; textiles; transportation; energy

1. Introduction

In June 2019, the United Nations released a stern warning about a growing “climate apartheid”. According to the report, by 2030, over 120 million people are expected to be trapped in poverty as a result of climate change and unfavorable weather events. The report explains that “although the world's poor are responsible for a fraction of greenhouse gas emissions, they are the main sufferers of these emissions, and at the same time have the least means to protect against climate change” [1].

This is not the first time that environmental hazards have been linked to poverty and social injustice. In 1994, President Bill Clinton signed an executive order recognizing the challenge of environmental justice and in 2015 Barack Obama, then-U.S. president, linked disconcerting global phenomena such as the rise of Boko Haram and the Civil War in Syria, to climate change [2]. This statement is backed by studies that show that a clear correlation exists between global warming in the Middle East and the conflict in Syria [3,4] a war which has thus far taken the lives of over 200,000 people [5].

A proximate cause of the environmental damage described above is human activity, fueled by ever expanding consumer demand [6–9]. Consumption habits drive the economic growth levers

that place an increasingly heavy burden on natural resources. But there are vast differences in the patterns of consumption within and across different societies. It is often argued that environmental injustice is manifested in consumption patterns globally, and in Israel in particular. We hypothesized, however, that these differences would not be consistent across socioeconomic deciles and that different consumption categories would reveal disparate footprints among different social groups in Israel.

Environmental justice emerged as a field of research that combines social justice, the environment and natural resources. It assesses inter alia the contribution of different socioeconomic groups to collective ecological footprint, the identity of those affected by environmental hazards, and the extent to which different groups participate in the political process [10]. Typically, environmental justice includes a general demand for more equal distribution of environmental benefits and economic burdens [11].

2. Literature Review

Israel belongs to a group of developed countries which exhibit the unhappy combination of a heavy ecological footprint along with a small natural resource base [6]. When these dynamics play out in the face of the country's growing socioeconomic inequalities, there are frequent indications of environmental injustice. In 2015, for example, there were 2240 deaths due to air pollution in Israel and a general increase in the rate of deaths linked to air pollution [12]. Exposure to air pollution has been found to disproportionately increase morbidity and mortality rates, among locally disadvantaged populations, who often live near air pollution centers and have less means to protect themselves and cope with the consequences [13].

Soil contamination and water pollution have also been found to be more acute in areas that are home to underprivileged populations [14]. In general, there is widespread agreement that underprivileged populations in Israel are more affected by environmental hazards than affluent cohorts, regardless of their contribution to the country's ecological footprint [15–17].

Previous evaluations of various societal groups' contribution to the ecological footprint of Israel, suggest a paradox: on the one hand, economically affluent households tend to have more sustainable consumer behavior than households of disadvantaged social strata [18–20]. Preference for green products and control of the "environmental language" is most commonly found among more economically empowered populations [21–23]. At the same time cheaper consumer goods, such as fast fashion and old vehicles, frequently have a greater ecological footprint than more expensive alternatives [24,25].

Questions of environmental justice must be understood within the overall context of the pervasive economic disparities within Israeli society. Figure 1 is a Lorenz curve based on data from Israel's National Insurance Agency, characterizing significant income inequality in Israel. Indeed, the OECD recently reported that while there has been a modest drop in the standard Gini coefficient (from 0.36 to 0.34), average disposal income of Israel's wealthiest 10% remains 13.3 times greater than among the poorest decile. (The OECD average ratio is 9.4.) Some 20% of Israeli live in relative poverty, the highest proportion found among all OECD countries [26]. But are unsustainable consumption patterns—and greater environmental impacts—part of the way that this income disparity is manifested?

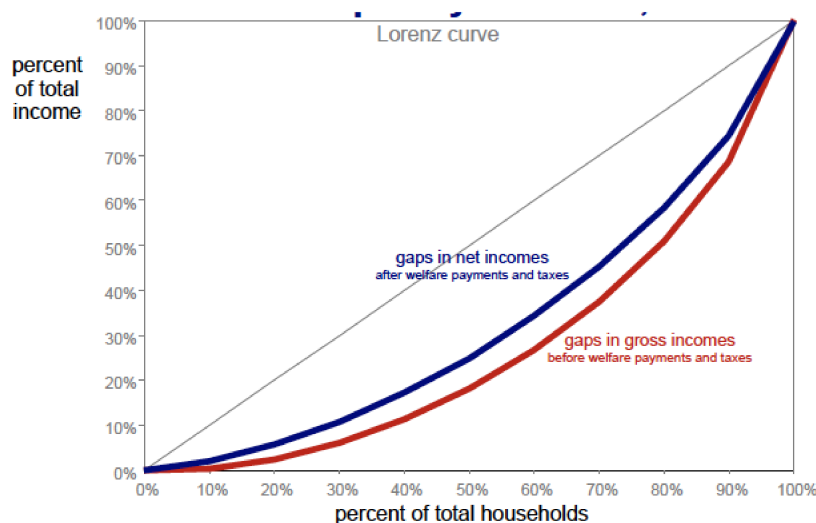


Figure 1. Source: Dan Ben-David, Shores Institute and Tel Aviv University, 2018.

The exceptional increase in disposable income recorded among many Israelis over the last 20 years is surely reflected in a dramatic rise in consumption [6]. According to a study by Garb and Horn [27], households in the high deciles (deciles 8–10) contribute up to 47% of the country’s total ecological footprint, compared with 17% that come from the lower deciles (deciles 1–3). Yet, conclusions found in these disparate studies were largely impressionistic, with no systematic analysis conducted to date to characterize the relative contributions of different segments of Israeli society to the country’s ambient environmental pollution and collective ecological impact.

The cause of such a paradox is likely to be a function of the way sustainable consumption patterns are defined. There are many definitions, and they all share a certain ambiguity and conspicuous lack of recognized measurable indicators. There are several definitions that might be germane. Among these are: “Sustainable consumption refers to the means by which a more equal distribution of consumption can be achieved in the world, and the reduction of the environmental impact of consumerism” [28]; or “Sustainable development means that the needs of the present generation are fulfilled without compromising their ability of future generations to fulfill their needs” [29]. While these characterizations may be intuitively satisfying, they are not easily given to measurement and subsequent management through government interventions.

This research seeks to provide a stronger empirical basis for characterizing the relationship between social class and sustainable consumption. Existing studies have not separated consumption into different categories of products consumed, allowing for an enhanced resolution regarding the actual implications of social class divisions on the environment. Nor have they focused sufficiently on the actual aggregate impact of consuming these products by the public. This leads to a simplistic and one-dimensional presentation of consumption/environment relationship, which in fact should be far more nuanced and based on actual patterns found among different social groups.

After describing a national survey recently conducted about consumption patterns in Israel and follow-up, semi-structured interviews, the findings from the study are described. Conventional wisdom, it appears, is not sufficiently nuanced and tends to generalize excessively about the predominant contribution of affluence to ecological footprints—as well as the modest contribution of poorer socioeconomic segments. After understanding the nature and drivers of unsustainable consumption patterns among poorer populations in Israeli society, some ideas for interventions to reduce existing barriers to sustainable consumption are explored.

3. Methods

This study defines sustainable consumption based on the four most polluting industries in the world: animal/food production [30]; the textile and fashion [31]; transportation [32,33]; and residential energy consumption [34]. Consultation with local and international experts prior to the study confirmed a range of different studies that identify these four industries as among the most polluting anthropogenic enterprises. While the oil industry also constitutes a major polluter, particularly with regards to greenhouse gas emissions, it was decided not to include this because in most cases, consumption of fossil fuels is instrument in another context (e.g., gasoline for transportation needs or heating oil as part of overall residential energy.) In addition, the study examines the field of online purchases, with the understanding that this relatively new pattern of consumption is coming to dominate the way many people acquire consumer products [35] with popularity steadily increasing worldwide and in Israel in particular. In fact, Israel is the world leader in online shopping, both in terms of the percentage of purchasers in the population and in terms of the average amount of purchases. Whereas in 2012, only 30% of Israelis frequently purchased a product from the Internet, during the past year 95% of Israelis have purchased online at least once, and 80% of Israelis buy online regularly [36,37].

A national survey was conducted that examines the scope and frequency of consumption from the above four industries using the ecological footprint index, and online shopping habits to characterize: the frequency and spontaneity of purchase; the type of product category purchased; whether the purchase was from a local or global site and an estimated sum of monthly expenditures.

The highly detailed survey instrument (32 questions) was designed to identify the differences that exist in the consumption patterns of the various socioeconomic clusters within Israel. The findings are also intended to provide insights into existing disparities and the ability of government policies to upgrade the accessibility of sustainable consumption patterns among individuals in different socioeconomic clusters. In order to answer these two research questions, an integrated approach, mixing quantitative and qualitative research, was used. Specifically, the study combined a comprehensive questionnaire of consumer patterns (600 questionnaires) with follow-up, semi-structured, in-depth interviews (25 interviews). Data collection was conducted via Midgam Panel, an Israeli company specializing in Internet-based surveys, through Internet software during the months of September and October, 2018. The panelists were recruited by Midgam Panel with a fee paid for each completed survey, based on socioeconomic characteristics requested by clients. The sample was selected from the panel using a disproportionate stratified sampling technique, so that the same number of panelists were chosen from each decile, even though in Israel, the number of people in each decile does not divide equally. A total of 700 subjects participated in the survey, but only 600 completed the entire questionnaire, producing a completion rate of 85.7%.

The average time required to complete the questionnaire was 42 min. Answers from subjects who did not fully answer the questionnaire were not included in the statistical calculations and therefore the findings are based on the completed surveys of 600 respondents. Sampling strategy prioritized reaching all social deciles, to fully reflect the heterogeneity across geographical districts including: individual income, family income, education, seniority in the country, and receipt of welfare payments. As a result, there was an equal proportion of subjects within each socioeconomic decile. The follow-up, semi-structured, in-depth interviews were conducted in person. Also in this section, the interviewees were selected according to socioeconomic decile as well as to make sure that major subgroups in Israeli society, such as ultra-Orthodox and Arabs were included. The overall aspiration that the sample be fully representative of the diversity in Israeli society.

Quantitative data analysis was carried out in several steps: First, in designing the regression model, the independent variable, identifying individual socioeconomic ranking, was constructed based on the variables of education, residential district (Israel's periphery, in the north and south vs. the more economically robust center), individual income, household Income, receipt of welfare payments, and the extent of position and seniority in Israel. These components were drawn from the socioeconomic rating of the government's Central Bureau of Statistics (CBS). The dependent variable

in the regression analysis involved the ecological footprint for each consumption category. During the second stage, using cluster analysis, the five dependent variables (five consumption categories) were constructed, so that each category could be classified according to five levels of ecological footprint.

These levels of ecological footprint were determined based on previous studies in each consumer category [32,38–47], each product and purchase pattern included on the list contained in the questionnaire was assigned a numerical value (based on the rankings found in the aforementioned studies) (for a full list of sub-variables, see Table A1 in Appendix A). This factor was then multiplied by the amount consumed or the frequency of consumption. The type and quantity of products purchased provided the basis for calculating individual footprint size. (Correlation matrixes for the four consumption categories used in the study are reported in Tables A2–A6 that appear in Appendix B.). Finally, the consumption average among the survey's different socioeconomic deciles in the five consumption categories was calculated in order to reflect the magnitude of the average ecological footprint in the various deciles according to the range of consumption categories.

Different statistical analyses were used for each consumer category: for the food category, we used analysis of variance (ANOVA) to contrast the five consumption groups, based on the five ecological footprint levels. We then used the Pearson test to examine the correlation between the five ecological footprint levels and the socioeconomic deciles (Table A2). For the fashion category we used the Pearson test again to examine the correlation between consumption patterns that we defined as sustainable patterns (such as low purchasing frequency) and socioeconomic deciles (Table A3). Most Israelis live in the center of the country, which is also Israel's economic hub. This creates a dynamic, like many countries, where residents who live in more peripheral areas tend to have lower socioeconomic status, enjoy poorer healthcare/social services and suffer from reduced professional opportunities. The study divided Israelis into four groups, based on their domiciles and the average income levels found in them: Tel Aviv/Center; Judea/Sumaria; Jerusalem/Haifa; Negev (south), Galilee (north).

For transportation and residential energy consumption categories, we used analysis of variance and Pearson test, similar to the food category analysis (Tables A4 and A5), according to the five ecological footprint levels identified. As to online purchases, Pearson tests were similarly applied for the fashion category (Table A6).

The subsequent qualitative data analysis included several steps: respondents were selected from all socioeconomic deciles. Amongst the interviewees, there was a disproportionate representation among specific ethnic groups, such as Arab and ultra-Orthodox Israelis, populations in which poverty rates are particularly high. All interviews were conducted at the interviewees' homes and on a volunteer basis. After conducting the interviews, all interviews were transcribed with comments, allowing for a systematic search of key themes and patterns among interviewees. Finally, the themes that emerged from the interviews were integrated with the findings from the quantitative research to produce a coherent picture of Israel's socioeconomic, consumption dynamics. The results point to several observations about the sustainability of different socioeconomic groups' consumption patterns and the policy implications for enhancing sustainable consumption accessibility.

4. Results

The study reveals significant gaps in consumption habits between the social deciles in different fields. Indeed, a paradox emerges, where lower socioeconomic groups show poorer environmental performance in their consumption patterns for some consumer areas (e.g., food and clothing) and higher environmental performance in other consumption areas (energy consumption and transportation).

In the food sector, no significant differences among the overall ecological footprints of different socioeconomic groups emerged. There were, however, a few meaningful differences in reported consumption among the various deciles in select food products. These include potatoes, smoked meat, sausages, hot dogs, and cooking oil, which the lower deciles consume at a higher rate than higher socioeconomic groups. For example, individuals in the lower socioeconomic decile on average buy 2.83 kilos of potatoes and 0.67 hotdogs units per week, compared with 1.67 kilos of potatoes and

0.16 hotdogs units in the top decile. A separate examination of the sub-variables that make up the socioeconomic variable reveals that the lower the level of education, the higher the consumption of food products with a greater ecological footprint, including food products served in non-perishable disposable packaging. Thus, we see that only 28% of university-educated Israelis report eating canned fish and lamb on a weekly basis as opposed to 41% among Israelis who have not completed high school.

One possible explanation for different food consumption patterns might be cultural. Different religious groups, for example, presumably have contrasting dietary inclinations (omnivores, kosher, vegetarian, and vegan). Findings suggest, however, that the only significant difference in Israel between the various deciles is the observance of Jewish dietary (kosher) rules. Such socioeconomic distinctions associated with religious affiliation, can be attributed to the relatively large family size (and pervasive poverty) among Israel's ultra-Orthodox community [48] these findings are consistent with research that examines environmental awareness among Israel's ultra-Orthodox society [49]. The research reveals that the economic level and the geographical density of the community are among the most significant variables affecting awareness. At the same time, there is a similar proportion of vegetarians and vegans found in all socioeconomic deciles. Figure 2 presents dietary patterns as reported by respondents in different socioeconomic deciles. It is interesting to note that over 30% of respondents in the poorer four deciles report observance of kosher dietary restriction, as opposed to 20% or less and in the top three deciles. For the other dietary regimes, as mentioned, no statistically significant differences were identified.

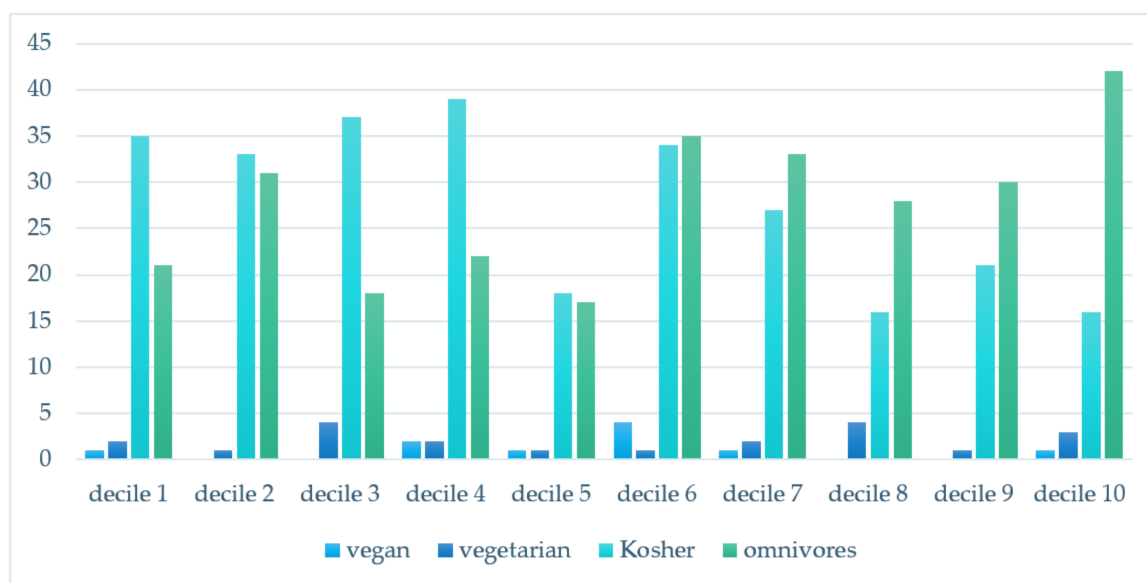


Figure 2. Dietary patterns and restrictions according to socioeconomic deciles.

Regarding fashion and textiles, several correlations were found that are germane when contrasting socioeconomic environmental impacts: a positive correlation between the overall fashion footprint index and individual residential district was identified. The more peripheral a respondent's domicile, the higher the ecological footprint was reported from fashion-associated consumption. Moreover, a negative correlation was found between income and the number of times clothing was purchased over the period of a month. In other words, poorer respondents go shopping for clothes much more frequently than richer respondents. For example, Figure 3 reflects how individuals in the relatively poor, socioeconomic group 3 shop 2.89 times per week, as opposed to socioeconomic group 9, that shops 0.96 times per week on average.

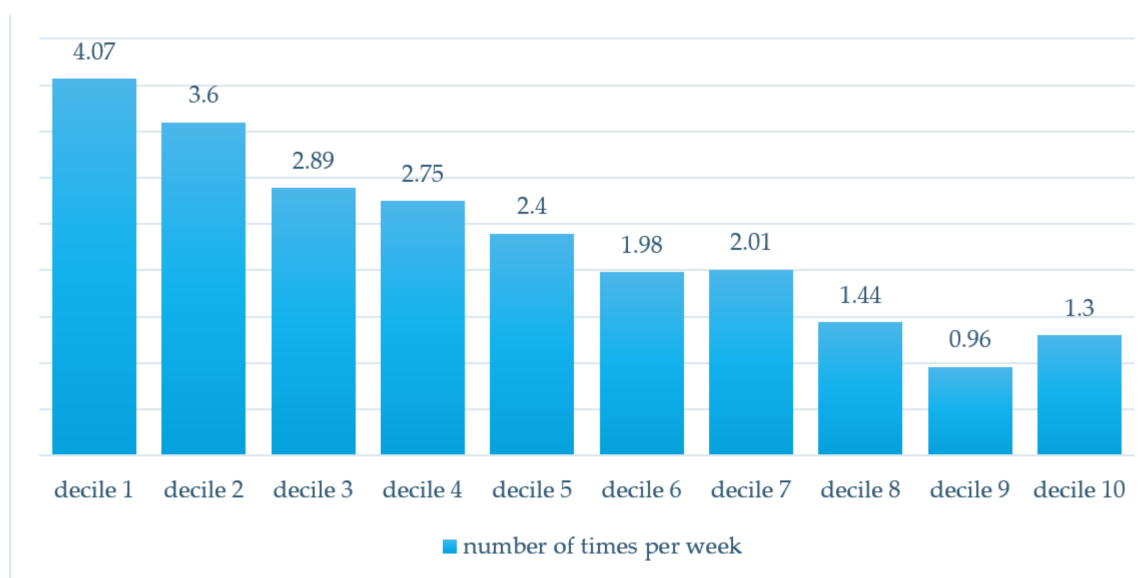


Figure 3. Frequency of clothes shopping according to socioeconomic deciles.

Nonetheless, a positive correlation exists between income and the magnitude of expenditure in fashion. This suggests that the lower the individual income, the higher the purchasing frequency, but the lower the amount of money spent. These findings support the validity of our hypothesis that lower-income individuals tend to buy cheaper apparel and clothing that needs to be replaced more frequently.

It is important to note that there appears to be no essential difference in the considerations for purchasing clothes reported among respondents in the different socioeconomic deciles. As emerging from Figure 4, respondents in all deciles rated price and appearance higher than environmental considerations in making their consumer decisions. These findings confirm the findings of the Israeli Ministry of Industry, Trade and Employment [19], which found that in all deciles, product price constitutes the most important consideration in purchasing a consumer item, with environmental considerations among the least important considerations [50].

In assessing the relative environmental impact generated due to individual transportation, we hypothesized that the higher the socioeconomic rank, the greater the ecological footprint would be. This conjecture was due to the greater use of private vehicles, utilization of transcontinental flights, along with relatively lower use of public transport. Responses confirmed this assumption as shown in Figure 5. Car ownership rates among respondents based in lower socioeconomic (quintile 1–2) groups is 16% as opposed to 25% among wealthier cohorts (9–10). In addition, the use of public transport in lower socioeconomic (1–2) groups is 59% while among wealthier cohorts (9–10), the percentage of public transport users is a mere 20.04%. These figures are consistent with the prior 2017 study by the Israel Central Bureau of Statistics' Income and Expenditure [51] survey. This survey found that ownership of two or more cars per household is only 4.7% in the lower socioeconomic deciles, compared with 49.3% of the households in the upper deciles. It is important to note, though, that frequency of use (number of trips) is *not* associated with socioeconomic ranking. All groups reported transportation use several times a day on average. This is understood to mean that the frequency of vehicle utilization in terms of relative contribution to air pollution emissions is not correlated with socioeconomic ranking, but rather is a multiplier of the general footprint index in transport, based on transportation patterns among different socioeconomic groups.

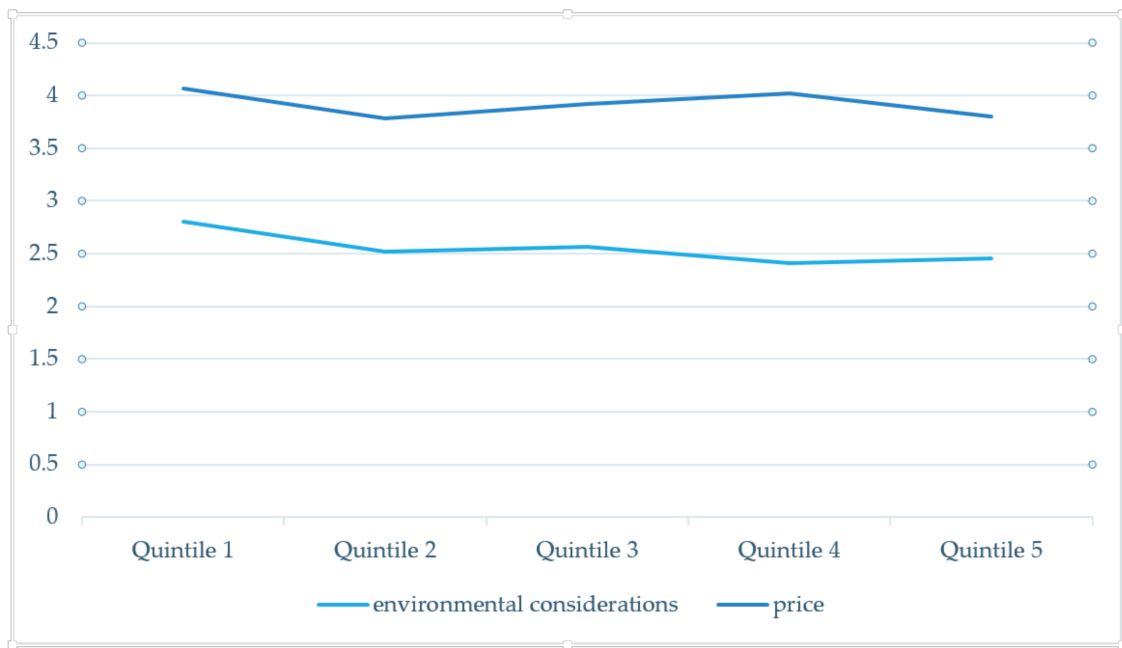


Figure 4. Price versus environmental considerations in purchasing clothing among socioeconomic quintile.

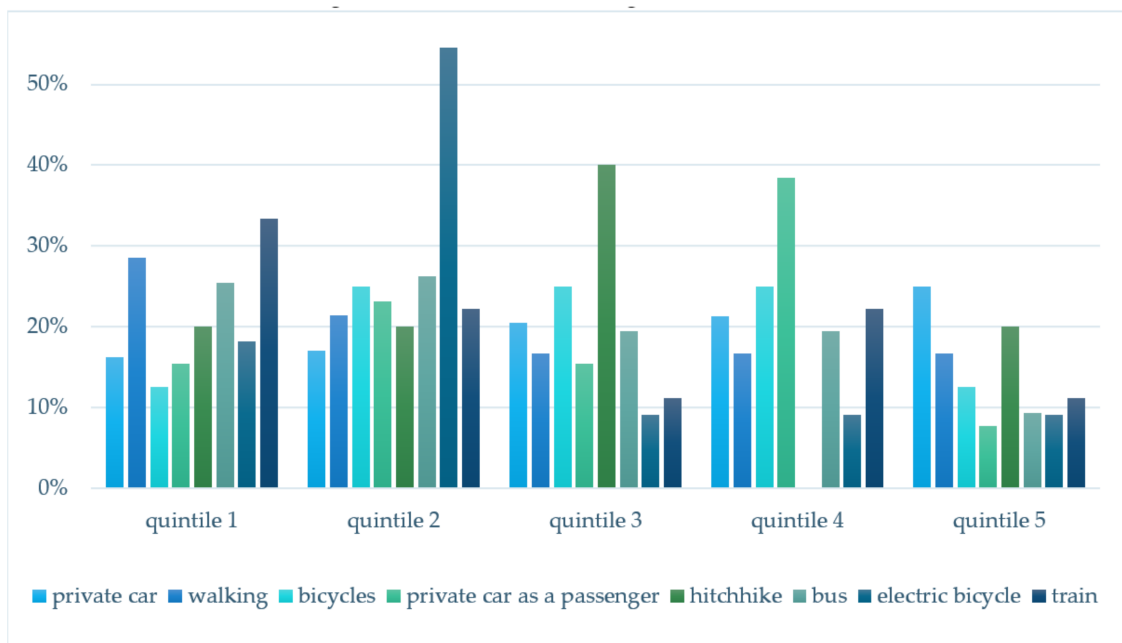


Figure 5. Common means of transportation across Israeli society according to socioeconomic quintiles.

Regarding residential energy use, analysis of variance between the different deciles shows that the higher the decile in which a person is ranked, the higher the ecological footprint associated with energy consumption. This is due to the greater ownership rates and more intensive utilization of high energy consuming devices and appliances. Similar findings were found in an Israeli study [52] examining greenhouse gas emissions and social inequality as a result of household electricity consumption. The study found that the top decile emits 24 times more greenhouse gases than the bottom ones. Interestingly, in assessing the consumer considerations associated with purchasing appliances and other household devices, there appeared to be no significant differences between the social deciles.

In fact, all Israelis rate environmental considerations lower than other competing considerations (e.g., price, quality) when making their consumer decisions.

It is worth mentioning that respondents in the higher deciles report a greater use of energy-saving measures, such as water-saving contraptions, long-lasting light bulbs, and installation of insulated walls. But these environmental advantages are trumped by the significant difference in the sizes of homes among different socioeconomic groups. Accordingly, the size of individual homes serves as a significant multiplier for use of energy consuming devices. In short, the ecological footprint associated with the category of residential energy consumption remains significantly greater for the high socioeconomic deciles.

Figure 6 offers a clear representation of this trend. In the lower socioeconomic groups, installation of water-saving infrastructure is significantly lower than among the wealthier segments of society (36% versus 49%). More dramatically, only 8.4% and 7.4% respectively of the lower deciles report use of insulation and solar water heaters in their homes—in contrast to 31.7% and 84% among the wealthier deciles.

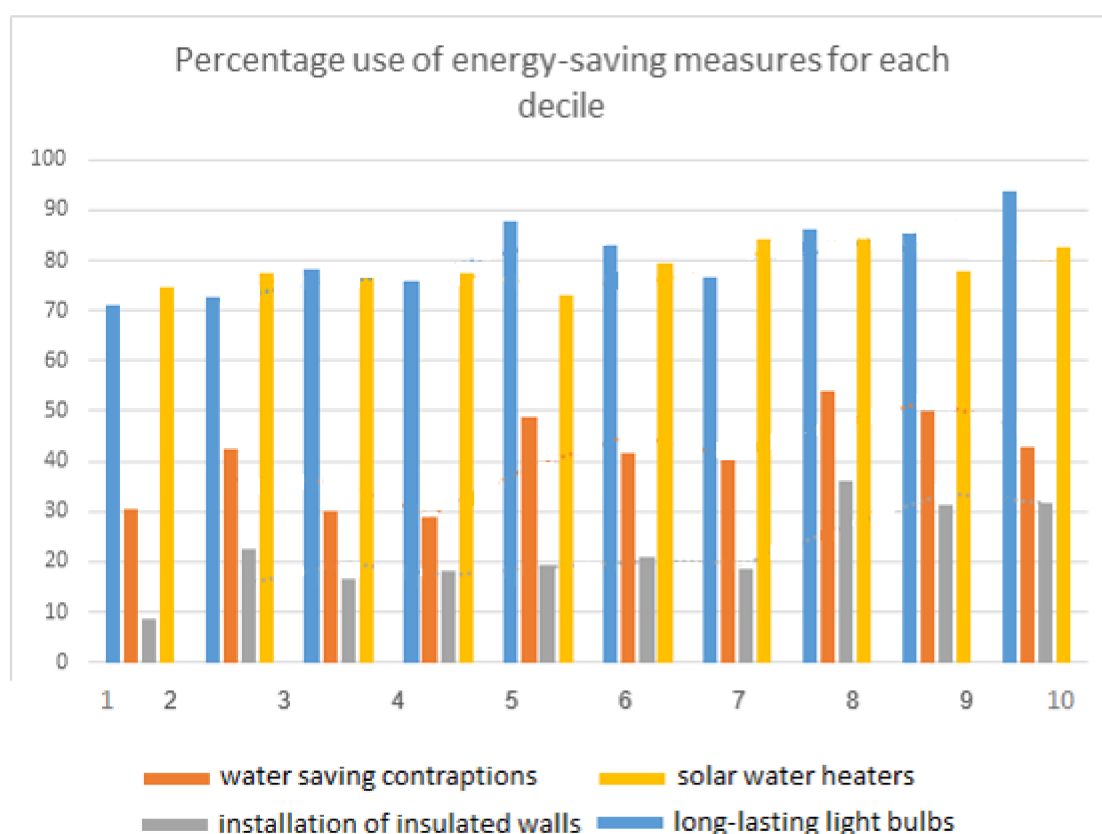


Figure 6. Percent use of energy-saving measure according to socioeconomic decile.

In evaluating the online purchase category, we found significant differences in the sizes of the footprint among the different deciles. Yet the findings did not conform to a clear socioeconomic trend. Accordingly, the second decile showed a significantly greater footprint than the third and fifth deciles. But the largest total ecological footprint was actually found in the eighth decile.

The findings therefore suggest that for all deciles there is a sizable ecological footprint, which reflects excess consumption. The salient differences in the footprints between the deciles are found in the consumption categories rather than in the total ecological footprint size (see Figure 7).

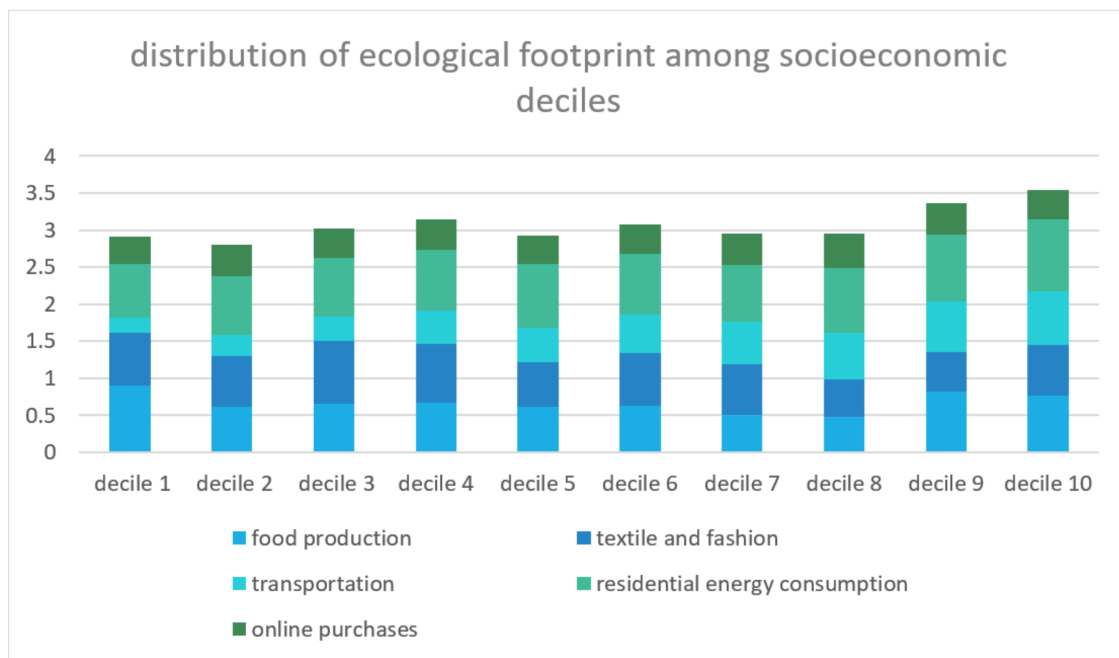


Figure 7. Distribution of ecological footprint in the five different purchase categories, among socioeconomic deciles.

From the qualitative research a significant variable emerged: environmental involvement. We define this factor as knowledge about environmental issues, positions expressed that are associated with environmental agendas and environmentally friendly behavior in daily life that can reduce the individual ecological footprint. Respondents were considered to exhibit low-to-moderate behavioral patterns, when they described a range of actions that require relatively modest costs and impacts. These include expressing concern about the environment, recycling, donating clothes, and purchasing products that advertise with environmental slogans.

The cumulative contribution of these actions to lowering the ecological footprint, however, is relatively low. Indeed, one might even argue that they produce a certain moral license or the phenomenon pejoratively referred to as “greenwash.” In contrast, high-level environmental involvement is reflected in actions that require sacrificing, paradigm replacement, willingness to pay significantly higher prices for environmentally superior products, and daily, environmentally advantageous behavioral changes such as veganism, vegetarianism, flight reduction, and waiver of private of vehicle use. The study found that low-to-moderate environmental involvement was predominantly observed in the high deciles (groups 7–10). At the same time, high-level environmental involvement was observed equally among all deciles.

The qualitative study also suggests that product price remains a key consideration among all deciles. There also appears to be a pervasive lack of awareness about what sustainable consumption means and how to implement it on the individual level. This knowledge gap is common to participants in all deciles across society. On the other hand, the absence of infrastructures that enable sustainable consumption primarily exists in the social and geographical peripheries, where people belonging to the lower socioeconomic deciles tend to live. Hence, limited access to recycling dispensers, food or fashion products with a modest ecological footprint (or of higher quality) and reliable public transport, makes it more challenging for poorer Israelis to adopt environmentally favorable behaviors.

5. Discussion and Conclusions

There is increasing awareness that environmental progress requires increased attention about the way societies consume resources and the associated impacts. Frequently, environmental policy makers do not sufficiently understand consumption patterns that are largely informed by socioeconomic

status. This study highlights the relationship between consumption patterns and socioeconomic status by examining the contribution of the various socioeconomic deciles to Israel's ecological footprint. The findings show the prevalence of significant ecological footprints generated by consumption patterns among all socioeconomic deciles. The difference between the deciles lies in the consumption categories and their relatively higher levels of consumption and impacts, rather than a greater total environmental impact from excess consumption by a single group.

The differences found in the different consumption categories examined can be explained by the contrasting economic capacity across Israeli society. While food and fashion are characterized by relatively inexpensive products with a large ecological footprint, transport and residential are characterized by significantly more expensive products, regardless of their ecological footprint.

Automobiles, flights, homes and electrical devices, even in their cheapest forms, are significantly more expensive than inexpensive food and fashion products. Therefore, it can be assumed that the tendency among low deciles for excess consumption in food and fashion, and the tendency of the high deciles for excess consumption in transportation and residential energy, stem from gaps in purchasing power, combined with a cross-decile consumption culture that leads to excess consumption among all segments of society.

The relatively higher rate of low-to-moderate environmental involvement among the higher deciles can be explained by some of the factors underlying environmental-behavioral change. Such changes depend not only on rational considerations, but first and foremost on the cultural tools with which people are equipped. Cultural and social identity are of profound importance in shaping human behavior towards the environment. Often, unconsciously, they take on greater weight than environmental considerations [10].

In fact, among the higher deciles, pro-environmental behavior has been associated in other studies with ownership of qualified knowledge, moral advantage, and even elitism [53]. There is a positive affinity between pro-environmental behavior, social status symbols, economic status, culture, and hobbies [54]. This is true of environmental involvement as well, assuming that it does not involve excessive protest or undermine the existing social order [10]. In general, environmental involvement, even if at a low level, is expected to increase an individual's social status among people in higher socioeconomic circles.

Accordingly, an insight emerging from this and other studies [55] is that pro-environmental behavior is both acceptable and desirable among the higher societal deciles and sometimes perceived to be a status symbol that enhances an individual's social status. Among the low deciles, however, environmental behavior is not always deemed to be legitimate. Among some interviewees, it was even disparaged as inappropriate cooperation with government institutions or in a few cases, even a source of shame.

Low-to-moderate environmental involvement, among the low deciles, it seems, requires higher relative costs for households than it does among the higher deciles. Moreover, it can be assumed that low-to-medium environmental involvement therefore is less prevalent among the lower deciles, because often it is not socially rewarded. At the same time, when the starting point for basic environmental actions involves a high social payment, the distance towards other, more significant, higher-priced environmental actions, is significantly shortened. This dynamic actually ends up increasing the chances that an environmentally committed individual in a lower socioeconomic group may choose such environmentally friendly actions.

Another explanation for the existence of comparable levels of environmental involvement in all deciles is that many times, individuals whose actions indicate high environmental involvement, do not necessarily do so for conventional environmental reasons or as a result of a conscious environmental impulse [10,56]. For example, notwithstanding the lower carbon footprint of plant based diets [57] many individuals choose veganism as a result of concerns for animal welfare, but do not identify themselves as particularly environmental engaged [58].

Environmental justice constitutes an important stage in the world's discourse about sustainability. In many ways it represents the next stage in the evolution of environmental awareness. At the same time, integrating environmental justice considerations in conventional environmental policies raises new challenges, since it is linked to the demand for equal treatment in the sharing of benefits and economic burdens as well as in the political relations between different societal groups. Perhaps this is why frequently the general discourse about the environment typically does not include a high-resolution discourse about environmental justice and the societal aspects of sustainability. While it is relatively easy to reach a consensus on prohibiting litter in the sea, choosing an optimal location for a landfill can be significantly more difficult. The chances are that those with political power will succeed in preventing the siting of an environmental hazard near their homes, more often than those without access to the centers of power and decision-making.

Some theorists might argue that the assumptions behind the present study do not sufficiently consider the dominant role of political economic organization in producing environmental outcomes and that consumer choices have very little influence on the actual footprint of environmentally harmful products. One well-known perspective, originally presented by Alan Schnaiberg [59], holds that a so-called capitalist treadmill of production accelerates ecological disorganization. According to this view, in order to continue to grow, it is inevitable that a capitalist economy will destroy ecosystems [60]. The position claims that it is naïve to believe that consumers have the power to affect the negative ecological outcomes associated with production.

Yet, such fatalistic resignation flies in the face of innumerable cases where bottom-up, consumer involvement and reasonable elasticity of demand have significantly affected the environmental performance of production—not to mention the actual number of products sold [61]. From the way McDonald's raises and wraps its hamburgers today to the 2013 fashion revolution and the efforts around the world to reduce plastic in products, beverage straws and packaging, commercial interests are increasingly aware of consumer dissatisfaction with their environmental performance. Even when environmental ideology is not powerful enough to sway consumer choices, social pressures are often sufficient to change consumption patterns. Indeed, recent research suggests that the social influence on consumers to purchase green products is more powerful than previously recognized. For instance, when online shoppers were told that other people were buying ecologically friendly products, there was a corresponding 65% increase in sustainable purchases [62]. And while green labeling has met with mixed success [63], it has undoubtedly affected production decisions in countless industries who seek to meet growing market awareness.

At the same time, in the past there has been a tendency for environmental justice advocates to be simplistic and assume that the negative environmental impact from consumption is essentially a problem of the rich [1,11,59]. Our research shows that this is not necessarily the case: there are cases where weaker socioeconomic communities make a disproportionate contribution to negative environmental outcomes. In any case, no single group, rich or poor, can be identified as the sole culprit responsible for environmental damage due to consumption. The study findings are valuable because they suggest that policies that seek to combat unsustainable consumption patterns should not be solely directed at the wealthier classes. Unilateral policies, which target an entire population may not make sense when different socioeconomic realities produce different consumer preferences. Rather, policy makers need to provide practical alternatives and incentives, especially for weaker socioeconomic groups to reduce their individual and collective ecological footprint in the purchasing of food and clothing.

Regarding weaker socioeconomic consumers, however, we suggest that non-sustainable behavior often takes place because these populations do not have access to environmental infrastructures by virtue of their living in the geographic or social periphery. They are also often incentivized to pursue cheaper and environmentally inferior products. Public policy affecting consumer behavior should be cognizant of the obstacles to environmentally friendly performance facing poorer communities, whose environmental awareness may actually be high, but whose socioeconomic

circumstances may prevent sustainable behaviors. This can be addressed, to some extent, with targeted subsidies (e.g., for healthier and smaller ecological foot print food products), designated funding for environmental infrastructures or educational campaigns to help these communities adopt sustainable consumption patterns.

Reducing the ecological footprints produced by stronger socioeconomic consumers will also require more effective and focused public policies to reduce the harmful environmental impacts of consumption. This can include a range of environmental interventions (e.g., carbon taxes, congestion pricing or expanded public transport routes). Such insights can emerge from a higher-resolution, more rigorous analysis of consumption patterns rather than generalizations and stereotypes. The goal of improving the sustainability and environmentally friendly behavior of all citizens will be better served by a more precise and nuanced understanding of consumption patterns and the actual environmental footprints produced by all segments of society.

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Appendix A

Table A1. Ecological footprint rating for the five food groups.

Ecological Footprint Rating	Product Name	Remarks
1 (smallest)	Loaf of bread	
	Wine bottle or other alcoholic bottle	Bottle can be recycled
	Pita and rolls	
	Cereal	
	Fresh Vegetable	
	Fresh Fruit	
	Flour Pack	
	One kilo of potatoes	
	Palpal or hummus in pita	
2	Chocolate table	Based on cocoa imports
	Oil bottle	In a plastic bottle
	Bottle of fruit juice	In a plastic bottle
	Hummus	In plastic packaging
	Imported cereals	
	Mineral water	In a plastic bottle
	Imported dried fruits	
	Pasta in packaging made in Israel	
	Rice package made in Israel	
A cup of cappuccino in a restaurant	Usually contains cow's milk and based on imported coffee beans	
3	Takeaway Salad	In plastic packaging
	Imported pasta in packaging	
	Imported rice package	
	A can of beer	
	A cup of cappuccino in T.A	Usually contains cow's milk, based on imported coffee beans and served in a disposable cup
	Eggs	
	Ice cream	Usually based on cow's milk
Pizza/pasta dish at the restaurant		

Table A1. Cont.

Ecological Footprint Rating	Product Name	Remarks
4	Hot dogs Fish / Seafood Shawarma in pita Yogurt and milk products Yellow cheese packs White cheese boxes/cottage Chicken Turkey	Made from meat industry residues Fresh Long production process and non-perishable packaging Long production process and non-perishable packaging Long production process and non-perishable packaging
5 (biggest)	Canned fish Beef Lamb Frozen fish Milk carton Hamburger Sausage	Long production process and non-perishable packaging
Where Most of the Shopping Is Purchased		
1	In the market	
2	Neighborhood grocery store	
3	Delivery from the Internet	
4	Minimarket	
5	Supermarket	
Dietary Patterns		
1	Vegan saves	
2	Vegetarian	
3	Reduces meat	
4	Kosher	
5	Omnivore	
Number of Items Purchased per Month		
1	0–1	
2	2–3	
3	4–6	
4	7–9	
5	10 and more	
Estimated Cost of Average Item		
1	131 and more	
2	101–130	
3	71–100	
4	31–70	
5	1–30	
Where do You Buy Most of Your Clothes?		
1	Secondhand stores	
2	Local designer stores	
3	International designer stores	
4	Fast fashion stores in malls	
5	Internet	
Frequency of Participation in Give and Take Markets		
1	More than once a month	
2	Between one and three months	
3	Between three and six months	
4	Between six months and once a year	
5	Never	
How Often You Wash Your Clothes?		
1	Having over 6 uses	
2	After 4–6 uses	
3	After 2–3 uses	
4	Depending on the condition of the garment after use	
5	After each use	

Table A1. Cont.

Considerations for Purchasing Clothing on a Scale of 1 to 5	
Consideration	Rating
Trendiness of the garment price	The higher the rating, the higher the ecological footprint
Unique garment	The higher the rating, the higher the ecological footprint
Where is the garment made	The higher the rating, the lower the ecological footprint
Environmental considerations	The higher the rating, the lower the ecological footprint (Double weight)
Conditions of employment of garment manufacturers	The higher the rating, the lower the ecological footprint (Triple weight)
Sustainable values	The higher the rating, the lower the ecological footprint
Fair price	The higher the rating, the higher the ecological footprint (Double weight)
Convenience of purchase	The higher the rating, the higher the ecological footprint
Brand credibility	The higher the rating, the lower the ecological footprint
Brand popularity	The higher the rating, the higher the ecological footprint
Fabric composition	The higher the rating, the lower the ecological footprint
Common Means of Transportation	
1	Walking and regular bikes
2	Electric bicycle / electric scooter
3	Bus / taxi service / train
4	Hitchhike / private car as a passenger
5	Private car
Frequency of Use of the Means of Transport (Multiplies the Means of Transport)	
1	Once a week
2	2–3 times a week
3	4 times a week
4	Once a day
5	Several times a day
Ownership of the Car	
1	No car
2	Other
3	Owned by the employer
4	Owned by spouse/parents
5	Owned by me
Considerations for Choosing Means of Transport on a Scale of 1 to 5	
Consideration	Rating
Comfort	The higher the rating, the higher the ecological footprint
Trip duration	The higher the rating, the higher the ecological footprint
Cost	The higher the rating, the lower the ecological footprint
Reliability	The higher the rating, the higher the ecological footprint
Environmental considerations	The higher the rating, the lower the ecological footprint (triple weight)
Habit	The higher the rating, the higher the ecological footprint
Form of Housing	
1	Apartment in building without elevator
2	Apartment in building with elevator
3	Ground floor one story without yard
4	One-story ground house with courtyard / house with 2 floors or above without yard
5	2-storey house with courtyard
The Average Apartment Area in Israel is 190 m Gross Compared to This Your House	
1	Much below average
2	Slightly below average
3	Similar to average
4	Slightly above average
5	Well above average

Table A1. Cont.

Frequency of Product Use on a Scale of 1–5 (the Lower the Frequency of Use, the Lower the Ecological Footprint)	
Product	Weight
Audio system	Normal
Refrigerator	Normal
Air conditioner	Double weight
Washing machine	Double weight
Clothes Dryer	Triple weight
Baking oven	Normal
Dishwasher	Triple weight
Lighting	Normal
Computer	Normal
TV	Double weight
Which of the Following Exists in Your Home (no = 0 yes = 1)	
1=1 0=5	Long-lasting light bulbs
1=1 3=0	Solar water heaters
1=1 4=0	Water saving contraptions
1=1 0=2	Installation of insulated walls
How Often You Remove Unused Appliances from the Outlet	
1	Every day
2	Several times a week
3	Several times a month
4	Several times a year
5	Never
To What Extent Environmental Considerations Affect You in Choosing a Place to Live (On a Scale of 1–5)	
1	very much
2	4
3	3
4	2
5	Not at all
Considerations in Purchasing Appliances on a Scale of 1 to 5	
Consideration	Rating
Longevity	The higher the rating, the lower the ecological footprint
Opacity	The higher the rating, the lower the ecological footprint
Energy consumption	The higher the rating, the lower the ecological footprint
Reliability	The higher the rating, the lower the ecological footprint
Environmental Considerations	The higher the rating, the lower the ecological footprint (triple weight)
Price	The higher the rating, the higher the ecological footprint
How Many Online Products You Purchased in the Last Year	
1	I did not purchase at all
2	1–5
3	6–10
4	11–20
5	Over 20
How Often do You Buy Online Products from the Following Product Group (Scale of 1–5)	
Product group	Weight
Clothing and footwear	Triple weight
Media Devices	Double weight
Home furniture and accessories	Normal
Toys	Double weight
Electrical appliances	Double weight
Cosmetics	Double weight
Office Supplies	Normal
Food	Normal
Books	Normal
From What Kind Websites do You Purchase?	
1	I never purchase online
2	Only from Israeli websites
3	Mostly from Israeli websites
4	Most often on international websites
5	Only from international websites

Table A1. Cont.

Considerations in Purchasing Products Online on a Scale of 1 to 5	
Consideration	Rating
The resistance of a product	The higher the rating, the lower the ecological footprint (Double weight)
The convenience of shopping	The higher the rating, the higher the ecological footprint
Product price	The higher the rating, the higher the ecological footprint (Double weight)
Product quality	The lower the rating, the higher the ecological footprint (Double weight)
Environmental considerations	The higher the rating, the lower the ecological footprint (Triple weight)
General preference for purchasing from the Internet	The higher the rating, the higher the ecological footprint
To What Extent do the Following Statements Represent Your Online Purchase Patterns on a Scale of 1–5	
Statements	Rating
I usually buy with a pre-made shopping list	The higher the rating, the lower the ecological footprint (double weight)
I tend to buy products following online advertisements	The higher the rating, the higher the ecological footprint
I tend to buy products at night	The higher the rating, the higher the ecological footprint
I tend to buy products spontaneously	The higher the rating, the higher the ecological footprint (double weight)
I tend to purchase additional products that I didn't intend to earn free shipping	The higher the rating, the higher the ecological footprint (double weight)

Appendix B. Correlation Matrixes for the Four Consumption Categories

Table A2. Correlation matrix of socioeconomic rating variables and ecological footprint levels according to product groups.

		District of Residence	Income	Education Level	Family Income
ecological footprint levels 1	Pearson correlation	0.066	0.005	−0.162	−0.034
	Sig (2-tailed)	0.109	0.911	0.000	0.411
	N	600	600	600	600
ecological footprint levels 2	Pearson correlation	−0.006	0.026	−0.125	−0.048
	Sig (2-tailed)	0.881	0.526	0.002	0.245
	N	600	600	600	600
ecological footprint levels 3	Pearson correlation	0.052	−0.014	−0.141	−0.035
	Sig (2-tailed)	0.205	0.736	0.001	0.388
	N	600	600	600	600

Table A2. Cont.

		District of Residence	Income	Education Level	Family Income
ecological footprint levels 4	Pearson correlation	−0.009	0.010	−0.173	−0.054
	Sig (2-tailed)	0.816	0.809	0.000	0.183
	N	600	600	600	600
ecological footprint levels 5	Pearson correlation	−0.012	0.028	−0.184	−0.062
	Sig (2-tailed)	0.304	0.636	0.000	0.201
	N	600	600	600	600
General consumption index	Pearson correlation	0.021	0.005	−0.174	−0.051
	Sig (2-tailed)	0.607	0.894	0.000	0.211
	N	600	600	600	600

Table A3. Correlation matrix for components of the socioeconomic rating variable and ecological footprint in the field of fashion and textiles and its sub-variables.

		District of Residence	Income	Education Level	Family Income
Considerations in buying fashion and clothing products	Pearson correlation	−0.073	−0.035	−0.055	0.011
	Sig (2-tailed)	0.072	395	0.178	0.792
	N	600	596	600	600
Type of store, frequency of purchase and participation in “Take and Give” markets	Pearson correlation	−0.019	−0.026	−0.106 **	0.015
	Sig (2-tailed)	640	0.522	0.010	0.706
	N	600	596	600	600
Overall footprint in fashion and textile	Pearson correlation	−0.103 *	−0.028	−0.040	0.023
	Sig (2-tailed)	0.011	0.491	333	0.566
	N	600	596	600	600

Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed).

Table A4. Correlation matrix for components of the socioeconomic rating.

		District of Residence	Income	Education Level	Family Income
Considerations in selecting transport vehicle	Pearson correlation	−0.021	0.118 **	0.82 *	0.201 **
	Sig (2-tailed)	0.603	0.004	0.046	0.000
	N	597	593	597	0.597
Overall footprint in transportation	Pearson correlation	−0.029	0.282 **	0.165 **	0.231 **
	Sig (2-tailed)	0.477	0.000	0.000	0.000
	N	600	596	600	0.600

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed).

Table A5. Correlation matrix for components of the socioeconomic rating variable and ecological footprint in the field of residential energy consumption and its sub-variables.

		District of Residence	Income	Education Level	Family Income
Use of domestic electrical appliances	Pearson correlation	−0.073	0.280 **	0.031	0.147 **
	Sig (2-tailed)	0.072	0.000	0.453	0.000
	N	600	596	600	600
Use of energy-saving measures	Pearson correlation	−0.077	−0.184**	−0.109 **	−0.109 **
	Sig (2-tailed)	0.061	0.000	0.008	0.007
	N	600	596	600	600
Considerations in purchasing electrical appliances		−0.012	−0.099 *	−0.034	−0.078
		0.774	0.016	412	0.57
		0.600	596	600	600
Overall footprint in residential energy consumption	Pearson correlation	−0.005	−0.013	0.003	−0.019
	Sig (2-tailed)	0.906	0.756	950	0.642
	N	600	596	600	600

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed).

Table A6. Correlation matrix for components of the socioeconomic rating variable and ecological footprint in the field of online purchasing and its sub-variables.

		District of Residence	Income	Education Level	Family Income
Considerations in online purchasing	Pearson correlation	0.022	0.075	0.114 **	0.017
	Sig (2-tailed)	0.607	0.081	0.008	0.689
	N	545	541	545	0.545
Spontaneous acquisition frequency	Pearson correlation	−0.019	−0.017	−0.134 **	−0.015
	Sig (2-tailed)	0.648	0.683	0.002	0.733
	N	554	550	554	554
Overall footprint in online purchasing	Pearson correlation	−0.023	0.094 *	0.018	0.010
	Sig (2-tailed)	0.571	0.022	665	0.799
	N	600	596	600	600

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed).

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