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Attachment to Material Goods and Subjective Well-Being: Evidence from Life Satisfaction in Rural Areas in Vietnam

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Abstract: In our daily lives, some people tend to use the same material goods more extensively than other people. It would appear that people like this consume fewer material inputs, other things being equal. Our research question is whether they are also happier in terms of life satisfaction. To study this, we first hypothesized that they are happier due to the endowment effect, prosocial or pro-environmental motivations, or income and substitution effects. We show that income and substitution effects are positive for people who use products for longer. Using a reduced form model that incorporates these four effects together, and empirical data originally collected from rural areas in Vietnam, we divide consumption into material consumption and residual consumption and demonstrate that, in general, increased material consumption is not associated with increased well-being; however, for those who take better care of their possessions, this effect is reversed, and material consumption does increase well-being. Our study shows that for people who take better care of their possessions, increased consumption is linked to increased well-being. This finding has a useful policy implication for developing countries to improve their well-being by promoting economic growth alongside responsible consumption.

Keywords: mottainai; attachment; subjective well-being; life satisfaction; happiness

1. Introduction

There have been increasingly urgent calls to transform the current material-intensive economy to a circular economy [1,2]. There are many potential ways to achieve this transformation but reusing material goods as much as possible in the forms of eco-design, direct reuse, or recycling, is a prominent, simple way to do this, both on the demand and supply sides [3]. This study explores how attachment to goods is related to life satisfaction, an oft-cited aspect of subjective well-being (SWB). There exists vast literature on attachment theory, including psychological studies that focus on interpersonal relationships, that is, the intimate emotional bonds between people, such as those between parents and children (e.g., [4]). Research on attachment has been expanded to "places" or "neighborhoods" in sociology and human geography [5] (p. 144) and empirical studies revealed that many people (from 40% to 65%) demonstrated attachment to their neighborhoods [6] (p. 274). According to [7], place attachment can be categorized as either "social attachment", which includes institutional ties, social activity, and local intimates; or "affective attachment" in which the satisfaction is with the neighborhood itself [5] (p. 145). Following this categorization, we use the term attachment to goods in

the latter sense—namely, we focus in this paper on material possession attachment [8]. In particular, we hypothesize the following four relationships between longer use of goods and SWB.

First, the tendency to use the same good for longer can increase effective income, if other things remain equal. This excess resource may be put into the further purchasing of either consumable or durable goods. In a conventional worldview, this enables us to reach higher utility, which we aim to establish in the theoretical model in the next section.

Second, in a well-known experiment, Kahneman et al. [9] compared people's willingness to accept giving up a mug that they were previously awarded. The surprising result showed that the willingness to accept was higher than the market price, implying that some subjective value was added to the owner of the mug since it was given to them. The authors' interpretation was that once you own a material good, you might feel attached to it after keeping it for a certain period of time, so you would avoid parting with it even if an equivalent or superior good could be purchased. They called this the endowment effect [10], which was demonstrated in a laboratory experiment [11–13] (p. 194). This effect, more generally called loss aversion, provides another rationale to assume that utility depends on whether consumers continue to use the same commodity. This has been partly examined in the theme of product attachment [14,15]. Recent research suggests that attachment to possessions influences disposition decisions at various stages [16,17], and previous studies have shown that strong emotional attachment to a product discourages consumers from replacing or discarding it [14,17] (p. 215).

Third, in the modern world, where there is increasing awareness of the importance of sustainability and a tendency toward a circular economy, people may be happier when they decide to keep using the same product that is still usable, even if they can afford to repurchase a new one. They find reusing to be prosocial, whether it is due to pure environmentalism or the "warm glow" effect [18]. In the warm glow theory, an agent is assumed to prefer one alternative but aspires to choose another for ethical reasons and receives psychological satisfaction (i.e., a warm glow) from acting in accordance with their aspirations [19] (p. 502). Empirical studies have revealed that the warm glow effect can be found in the context of environmental protection [20,21]. A related concept is the positive feelings associated with empathy that can reinforce prosocial behavior [22] (p. 60). From this perspective, people may regard throwing products away as immoral because it harms the environment or others. Note that this prosocial effect does not necessarily involve attachment, endowment, or loss aversion effects.

Fourth, there could be some latent factors that affect both material possession and SWB. Due to these factors, those who tend to use the same good may also tend to focus on long-term relationships, for example. An in-depth investigation of these variables is beyond the scope of the current study, but it is useful here to point to the spirit of mottainai, which is a Japanese adjective frequently used to describe the feeling when something still usable is wasted [23]. The waste from food-related activities such as grocery shopping, cooking, eating, handling surplus food, and so forth, could be reduced by following the mottainai spirit of Japanese culture [24]. Such cultural factors can affect both attachment to goods and SWB. Interestingly, this can be said about material goods, money, and even talent and opportunities.

To date, it has not been clear how the transformation into consumption based on a circular economy would affect SWB. In contrast, the vast literature has focused on the relationship between income and SWB (for the comprehensive review on this theme, see [25]). Previous studies revealed that income positively correlates to SWB within countries (e.g., [26–29]). It has been argued that income ceases to augment SWB once individual income level rises above a certain threshold [25]. This has been called the "Easterlin paradox" since it has been confirmed that the reported happiness does not rise in proportion to income increase in those countries such as the United States, Japan, and European countries [28,30–33]. Other studies include the perspective of aspiration for better lives, career achievement, and so forth, which plays an important role in explaining the relatively lower levels of SWB (e.g., [34]).

In contrast to the previous studies that question the role of income in raising SWB, there has also been growing research that provides evidence that income matters to augmenting SWB [25,35,36].

For example, using panel data to control for individual fixed effects, it has been revealed that the income of the reference group (together with their own income) significantly affects SWB [37]. Argyle [31] argues that there exists no satiation point of income, as opposed to the previous studies that explored the threshold of income, in line with the Easterlin paradox. This research shows that relative income matters and strongly affects SWB [25,38]. Recent studies revealed that relative income and consumption (such as home-ownership) significantly contribute to increasing SWB [39,40].

Donati [41] suggests that the effect of material well-being on SWB is not linear but rather diminishes with higher levels of material well-being. This is in line with the economic concept of diminishing marginal utility. Empirical studies also show diminishing marginal effects. Gokdemir [42] shows that, in Turkey, only the consumption of durable goods is correlated with life satisfaction. DeLeir and Kalil [43] shows that out of nine consumption categories, only one, leisure, is positively correlated with SWB, using U.S. data. Zhang and Xiong [44] employs 77 consumption categories and 13 SWB indicators to investigate the relationship between consumption and SWB in Japan and shows the particularly strong correlation between relational consumption and SWB. Dumludag [45] shows that the relationship between life satisfaction and each consumption category varies in accordance with the development stage. Relatedly, Pandelaere [46] reviews studies on experiential versus material consumption and suggests that even though many studies find an advantage for experiential consumption, this effect does not occur for materialists, which implies that materialists do not benefit more from material than from experiential consumption owing to unrealistic expectations. The above-mentioned literature implies that material well-being cannot be easily increased and that it depends on the contents of consumption or the development stage. However, previous studies do not fully clarify the effect of "individuals' attitudes toward material goods" on material well-being. In this study, we thus investigate the relationship between material well-being and "attachment to material goods" in the context of a rural developing country.

The rest of the paper will proceed as follows. In the next section, we theoretically explore the effects of conventional substitution and income. In Section 3, we use a theoretically reduced form that incorporates four effects and empirically test our hypothesis using survey data from rural Vietnam. Finally, we provide a discussion and conclusions in Section 4.

2. Materials and Methods

2.1. Conceptual Model

To see how longer use of goods can affect life satisfaction, an oft-cited aspect of SWB, it is useful to set up a simple model of two goods and two time periods. In doing so, we compared the consumers' utility levels in two distinct contexts. Imagine two kinds of consumer goods. Good 1 is a general, perishable good that needs to be continually repurchased, such as food. Good 2 is still a consumer good, but durable to a certain extent, so that some people purchase it every time period, while others continue to use what they bought in the previous period. Examples include clothing, personal computers, and smartphones.

In the benchmark model, the consumer purchases Goods 1 and 2 in both periods, t and t + 1. In the extended model, the consumer purchases both goods in period t, but in the subsequent period, purchases only Good 1 and continues to use Good 2 bought in the previous period. Our strategy was simply to compare the two indirect utilities achieved in both models, other things being equal.

Before diving into the details, we came up with at least four relationships between the use of goods and SWB, as described in the Introduction. Formally, life satisfaction (LS), an oft-cited aspect of SWB, may be composed of material and non-material LS (e.g., [47]):

$$LS = ML + NML.$$

ML consists of traditional economic incentives, whereas *NML* includes a wide variety of non-economic incentives, such as endowment and attachment effects, prosocial/pro-environmental

behavior, and the spirit of *mottainai*. In the remainder of this conceptual section, we focus on the LS-equivalent of money-derived (intertemporal) utility, *ML*.

First, in the benchmark model, the representative consumer was assumed to maximize their (intertemporal) utility, *ML*, with regard to Goods 1 and 2 in both periods. Second, in the extended model, we wanted to see what would happen if the consumer continued to use Good 2 in the second period. As detailed in Appendix A, the comparison of the benchmark and extended model led us to our central finding:

Proposition. *In the given framework, indirect utility is strictly higher in the extended model than in the benchmark model.*

This proposition tells us that, in a basic model that strips away behavioral features, the first channel, having fewer, durable goods, is positively correlated with SWB, as mentioned in the Introduction. In particular, not having to purchase Good 2 induces both income and substitution effects. The income effect means that the money that could have been used to purchase Good 2 in the subsequent period is now freed up to enhance effective income, which increases consumption of both Goods 1 and 2. The substitution effect from/to Goods 1 and 2 depends on their relative prices as well as the discounting and interest rate.

2.2. Empirical Strategy

In the previous subsection, we demonstrated that, other conditions being equal, consumers who use the same material goods for longer may report higher intertemporal SWB. In the following, we empirically test this expectation by measuring the hypothesized effects all together, leaving separate identification of the aforementioned four effects to future research. Our empirical model is as follows:

$$LS_i = \gamma_1 + g(C_{1i}) + \sum_j \beta_j Y_{ij} + \epsilon_1 \quad (1)$$

Here, i represents the individual, and LS_i represents life satisfaction. Material consumption (C_1) is on the right-hand side of Equation (1), which is assumed to determine LS on the left-hand side. γ_1 is a constant, ϵ_1 is the uncorrelated error term, and Y_{ij} stands for other control variables with β_j as their coefficients. As control variables, we used variables that have been used in prior studies of SWB (i.e., age, gender, level of subjective health, education, marriage, having children, and number of family members). We also included residual consumption (i.e., consumption other than material consumption), $(total\_consumption_i - (C_{1i}))$ as a control variable. We intended to decompose the effect of total consumption into material consumption (C_1) and non-material consumption (residual consumption), which is in line with our theoretical model in the previous subsection.

This study followed [48]'s model, which utilizes nonparametric functions for consumption, so as to clearly and visually explore its different functional forms. As for the other explanatory variables, we used parametric functions. Thus, we applied semiparametric regression. We used generalized additive models (GAMs; [49]), in which the linear predictor depends not on a weighted sum of explanatory variables, as in linear regressions, but on unknown smooth functions, g. As such, GAMs enabled us to identify non-linear, locally diverse relationships between consumption and SWB.

2.3. Data

This study relied on a dataset originally obtained from a field survey conducted by the authors in March 2020 in two rural areas (Thieu Ngoc and Darsal) in Vietnam. The data that supported this study's findings are available from the corresponding author on reasonable request.

Due to the difficulty of obtaining a sufficient sample size using internet panels in rural areas of Vietnam, we conducted face-to-face surveys. We had the full cooperation of the local government of both Thieu Ngoc and Darsal, and the opportunity to conduct face-to-face surveys in all households in

both villages. We chose these two areas because the local population is mainly engaged in primary industries, especially farming. Therefore, they are typical rural villages where people live in the traditional Vietnamese way. The main crops are rice in Thieu Ngoc, and coffee in Darsal.

Thieu Ngoc is in the Thieu Hoa district of Thanh Hóa province in the North Central Coast region, while Darsal is in the Dam Rong district of Lam Dong province in the central highlands. As shown in Table 1, per capita income in Thieu Ngoc in 2018 was US$1075, which is significantly lower than the US$2093, US$3036, and US$1615 for the whole country, urban areas, and rural areas, respectively (General statistics office of Vietnam). Thus, per capita income in Thieu Hoa is lower than in most rural areas in Vietnam. On the other hand, the per capita income in Darsal in 2018 was US$1753, which is nearly the same as all rural areas in Vietnam (US$1615).

Table 1. Official statistics of Thieu Hoa and Darsal in 2018.

	Thieu Hoa	**Darsal**
Population	6508	4485 (over 18 years old)
Per capita income (US$)	1075	1753
Area (km^2)	7.47	84.76

Note: The exchange rate was calculated at 0.000043 US$/dong, which was the average exchange rate in 2018. Data were sourced from the local governments of Thieu Hoa and Darsal.

In the face-to-face survey, we attempted to ensure the accuracy of responses through translations and multiple checks by Vietnamese native speakers, as well as by providing extensive training to our field agents, in which they received consistent instructions directly from one of the authors. We originally had participants of 1824 and 3043 from Thieu Hoa and Darsal, respectively. After eliminating the subjects who responded with "I don't know/I don't want to answer this question" to questions regarding consumption and other subjects that were deemed invalid, 1250 and 2435 eligible subjects from Thieu Hoa and Darsal remained, respectively.

To understand the general details of Thieu Hoa and Darsal residents, we conducted the following questionnaire, as shown in Table 2.

Figure 1 shows the distribution of annual household income. The average annual household income is US$6395, and the median is US$4719.

Next, Figure 2 shows material possessions per household. Most households possess two or three motorcycles, while only a few own automobiles. Concerning home appliances, more than 90% of households own televisions and rice cookers, about 74% own refrigerators, less than 50% own washing machines, and only about 20% own air conditioners. Regarding personal computers and mobile phones, about 14% of households own personal computers, while more than 95% own mobile phones.

Figure 3 shows the degree of food self-sufficiency. We found that 43% of respondents answered 3 (quite frequently) and about 25% answered 4 (very frequently). This implies that many people in the sample do not spend all of their money on food, so they are able to buy other things or put money into savings.

Figure 4 shows the frequency of bartering with other neighborhood residents. It shows that more than 34% of respondents frequently barter with other neighborhood residents. As shown in Figure 5, typical bartering goods are food (34%), furniture (16%), and clothes (12%), implying that people in the areas barter a variety of material goods.

Table 3 shows the survey questionnaire used for the main analysis. Concerning consumption, we asked questions pertaining to total monthly household consumption and material consumption. Material consumption represents the household consumption of "goods" (electrical appliances, furniture, clothes, shoes, publications, and other sundries, excluding expenditure related to housing, cars, and motorbikes). Monthly household consumption expenditure includes not only expenditures on "goods", which we have defined above, but also expenditures on housing, cars, motorbikes, medical expenses, insurance, and education, among others. As shown in Section 2.2, in our empirical

model, we divided total monthly household consumption into material consumption, defined above, and residual consumption, and focused on the relationship between material consumption and SWB, while controlling residual consumption in the empirical model.

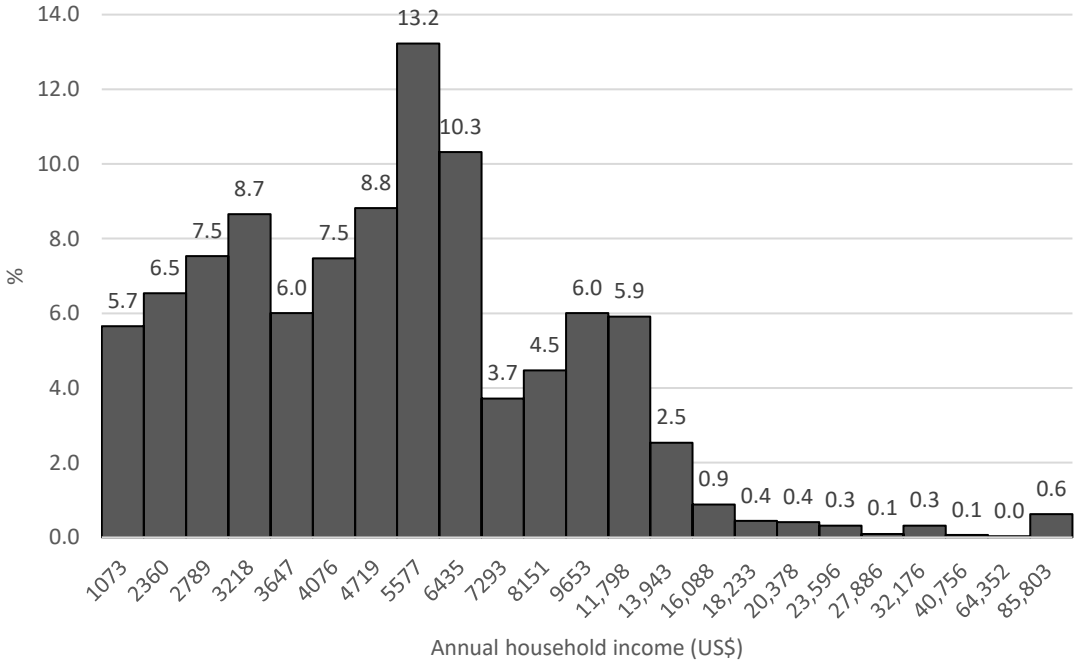


Figure 1. Annual household income in Thieu Hoa and Darsal (US$; N = 3685).

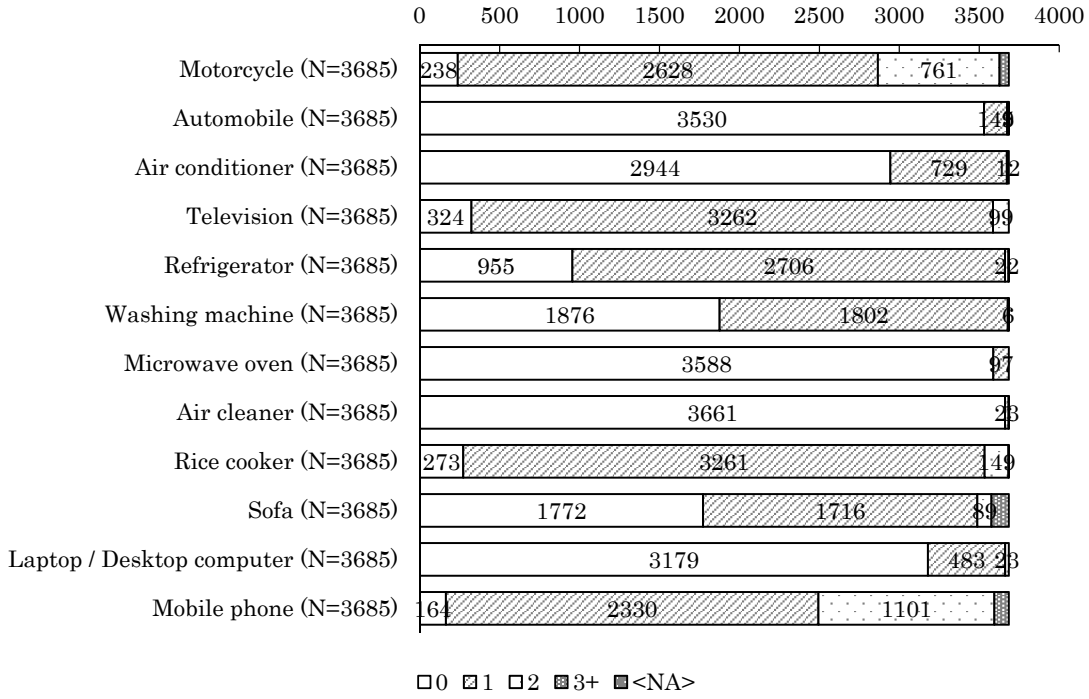


Figure 2. Material possessions per household (N = 3685).

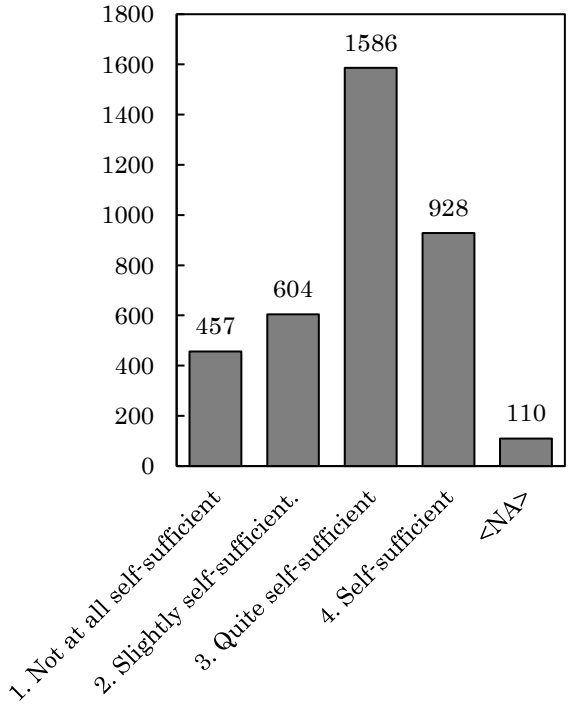


Figure 3. Food self-sufficiency (N = 3685).

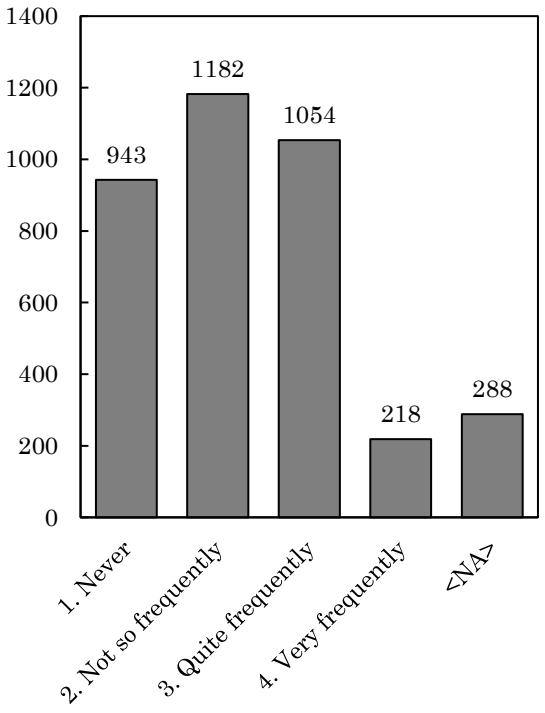


Figure 4. Frequency of bartering with neighborhood residents (N = 3685).

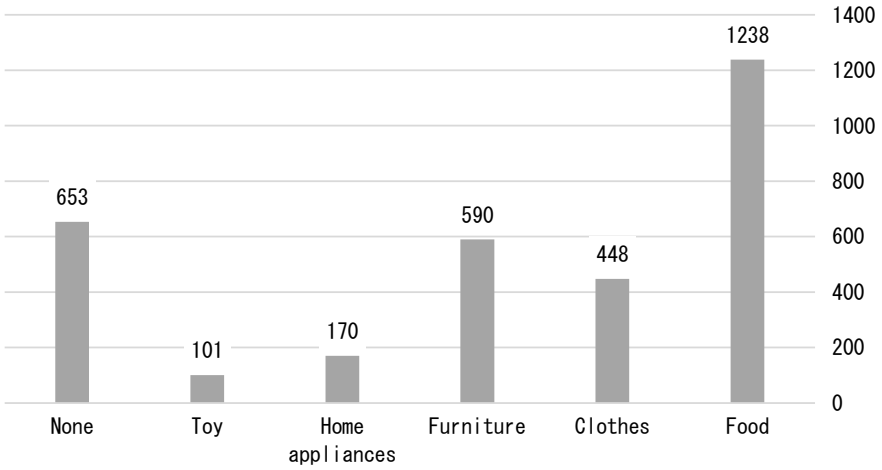


Figure 5. Type of goods bartered (N = 3685).

Table 2. Survey questionnaire to obtain basic information from the sample.

	Survey Question	Notes
Household Income: Unit (US$)	Please tell us your yearly household income.	
Household material possessions	How many of the following goods does your household have? * Motorcycle * Automobile * Air conditioner * Television * Refrigerator * Washing machine * Microwave oven * Air purifier * Rice cooker * Sofa * Laptop/desktop computer * Mobile phone	
Self-sufficiency	Please tell us your household's degree of food self-sufficiency.	1. Not at all self-sufficient 2. Slightly self-sufficient. 3. Quite self-sufficient 4. Self-sufficient
Frequency of barter with other neighborhood residents	How often do you barter with other neighborhood residents?	1. Never 2. Not so frequently 3. Quite frequently 4. Very frequently
Bartering goods	What kind of material goods do you barter with other neighborhood residents? (Multiple choice)	1. Food 2. Clothes 3. Furniture 4. Home appliances 5. Toys 6. None

Table 3. Survey questionnaire for the main analysis.

	Survey Question	Notes
Life satisfaction	Overall, how satisfied are you with your life?	"5: completely satisfied"; "1: not at all satisfied"; five-point scale (standardized 0 to 1).
Material consumption (US$)	What is the average monthly amount spent in your household to purchase "goods" (electrical appliances, furniture, clothes, shoes, publications, and other sundries, excluding expenditure related to housing, cars, and motorbikes)?	
Monthly household consumption expenditure: unit (US$)	Overall, approximately how much does your household spend monthly on consumption? Please see the consumption categories under "Reference" and include all these expenses before answering this question. * Reference. Consumption categories in the "Public Opinion Survey on the Life of the People" conducted by the Cabinet Office in Japan: Apparel (clothes and shoes) Food expenses (foodstuff and dining costs) Housing expenses (loans, rent, land fees, equipment repairs/maintenance expenses, construction, other housing-related services, and utility fees) Durable consumer goods (electrical appliances, furniture, bedding, automobiles/motorcycles/bicycles, etc.) Miscellaneous expenses (sundries, consumables, and hairdressing) Medical expenses Transportation expenses Social expenses Insurance Communications expenses (postage, mobile phone, and Internet) Educational expenses Entertainment expenses	
Age	Please tell us your age.	Unit: age.
Gender	Please tell us your gender.	(1: man; 0: woman)
Marriage	Are you married?	(1: married; 0: other)
Children	Do you have children?	(1: yes; 0: no)
Number of family members	Including yourself, how many people live in your household?	
Education	Please tell us your highest academic qualification (if a student, please tell us which school you graduated from most recently).	(college graduate or higher: 1; other: 0).
Attachment	Please select all items that are applicable. * I want to utilize "goods" and look after them for as long as possible.	(1: applicable; 0: not applicable)

Tables 4–6 show descriptive statistics for the survey questionnaire used for the main analysis. The average monthly household material consumptions are US$179, US$188, and US$175; these distributions are shown in Figures 6–8, respectively. We found similar descriptive statistics for variables used for analysis and the distribution of monthly household material consumption among the overall sample and Subsamples.

Table 4. Descriptive statistics for the overall sample.

	Obs.	Mean	S.D.	Min.	Max.
Darsal dummy	3685	0.661	0.474	0	1
Life satisfaction (standardized: 0 to 1)	3685	0.751	0.181	0	1
Monthly household material consumption (US$)	3685	179	124	32	965
Monthly household total consumption (US$)	3685	255	426	54	1931
Age	3685	39.9	12.8	18	101
Gender	3685	0.499	0.500	0	1
Marriage	3685	0.871	0.335	0	1
Children	3685	0.906	0.292	0	1
Number of family members	3685	4.01	1.28	1	10
Education	3685	0.044	0.206	0	1
Attachment dummy	3685	0.242	0.428	0	1

Table 5. Descriptive statistics for overall sample for Subsample 1 (Attachment dummy = 1, N = 892).

	Obs.	Mean	S.D.	Min.	Max.
Darsal dummy	892	0.646	0.479	0	1
Life satisfaction (standardized: 0 to 1)	892	0.747	0.244	0	1
Monthly household material consumption (US$)	892	188	122	32	965
Monthly household total consumption (US$)	892	259	435	54	1931
Age	892	39.4	13.6	18	100
Gender	892	0.524	0.500	0	1
Marriage	892	0.859	0.348	0	1
Children	892	0.898	0.303	0	1
Number of family members	892	4.17	1.45	1	10
Education	892	0.052	0.221	0	1

Table 6. Descriptive statistics for overall sample for Subsample 2 (Attachment dummy = 0, N = 2689).

	Obs.	Mean	S.D.	Min.	Max.
Darsal dummy	2689	0.667	0.471	0	1
Life satisfaction (standardized: 0 to 1)	2689	0.752	0.220	0	1
Monthly household material consumption (US$)	2689	175	124	32	965
Monthly household total consumption (US$)	2689	254	443	54	1931
Age	2689	40.2	12.5	18	100
Gender	2689	0.490	0.500	0	1
Marriage	2689	0.332	0.874	0	1
Children	2689	0.907	0.290	0	1
Number of family members	2689	3.96	1.22	1	10
Education	2689	0.043	0.202	0	1

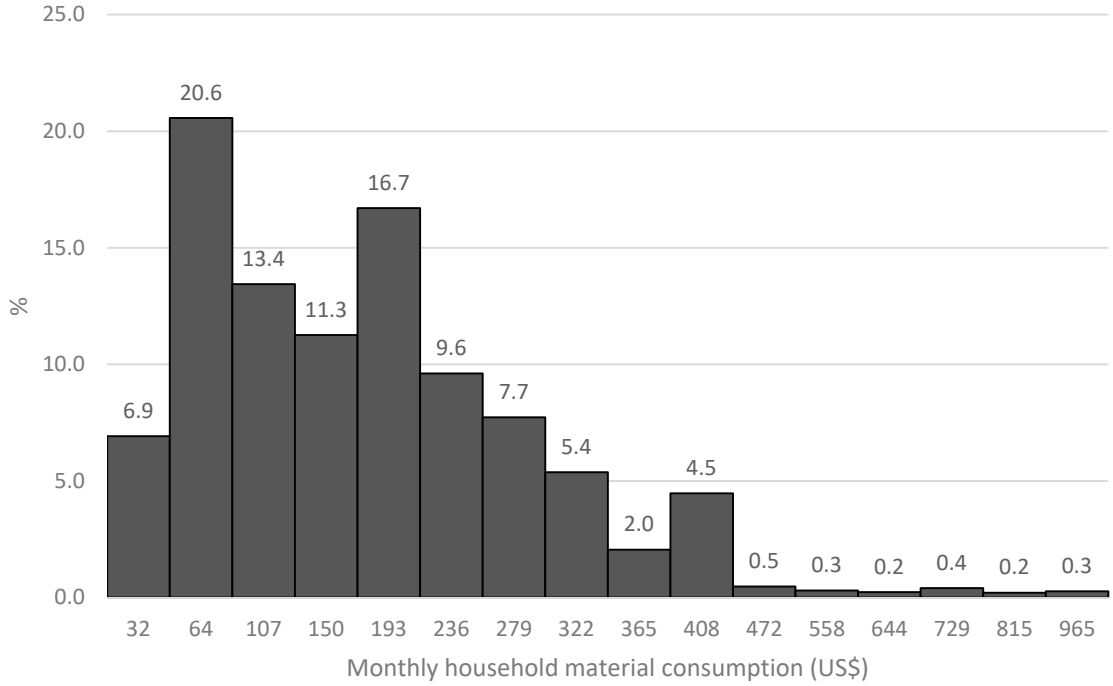


Figure 6. Monthly household material consumption for overall sample (US$; N = 3685).

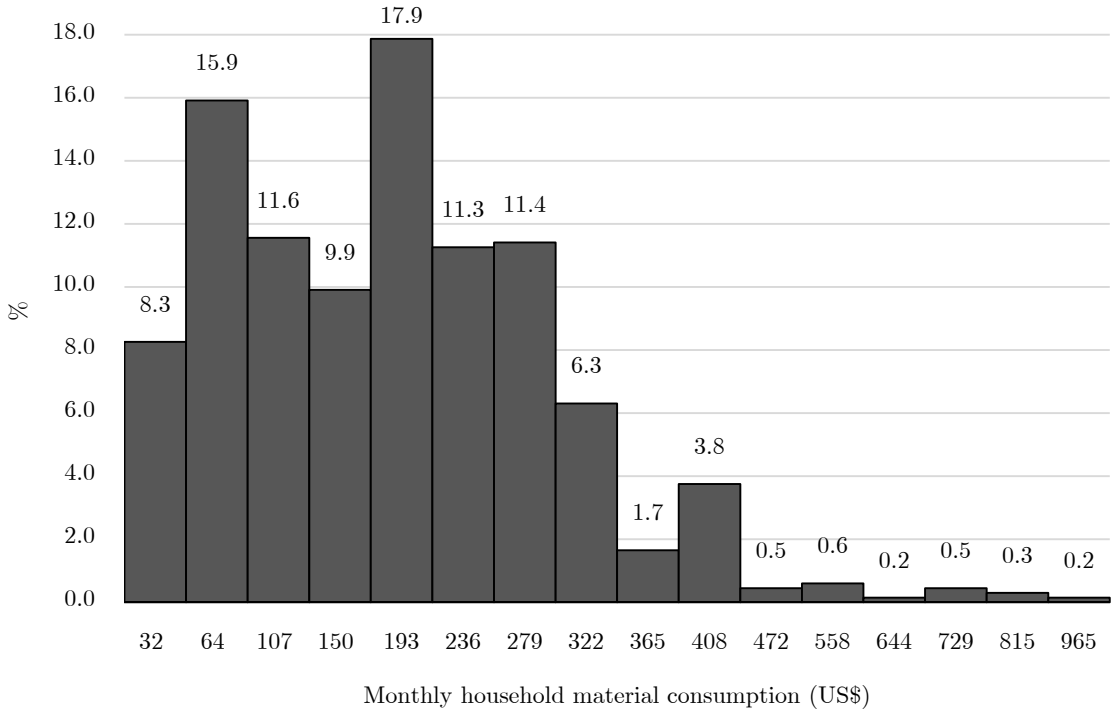


Figure 7. Monthly household material consumption for Subsample 1 (US$, Attachment dummy = 1, N = 892).

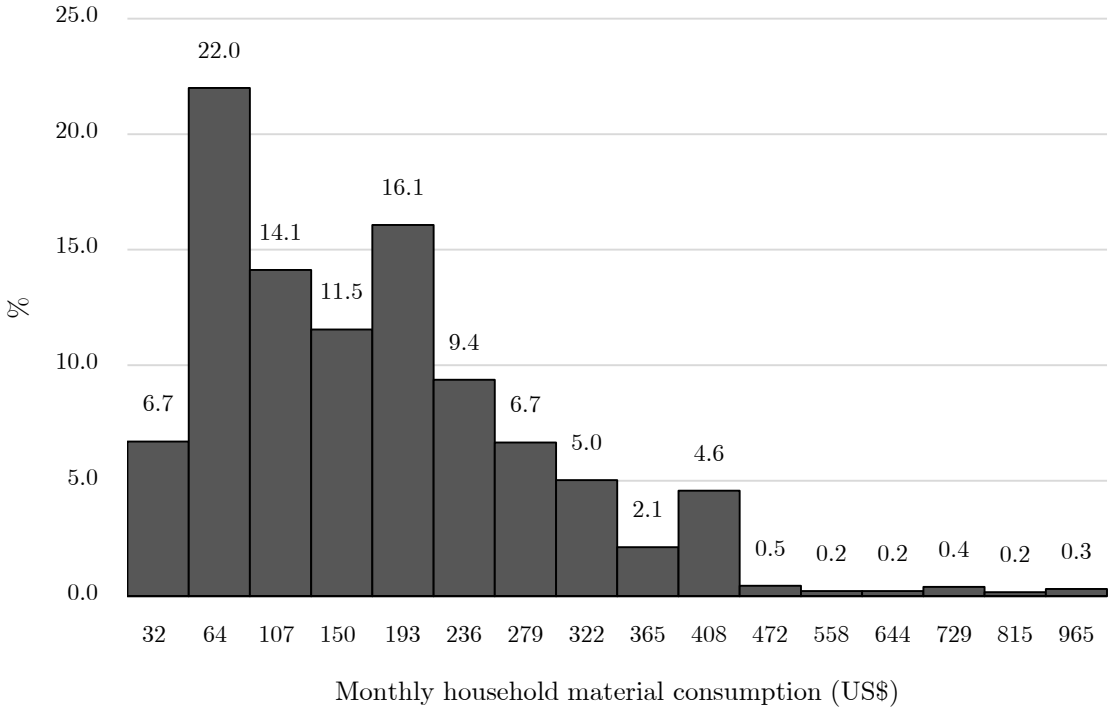


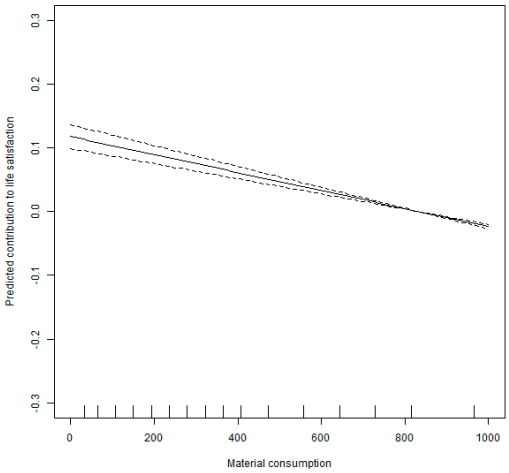
Figure 8. Monthly household material consumption for Subsample 2 (US$, Attachment dummy = 0, N = 2689).

3. Results

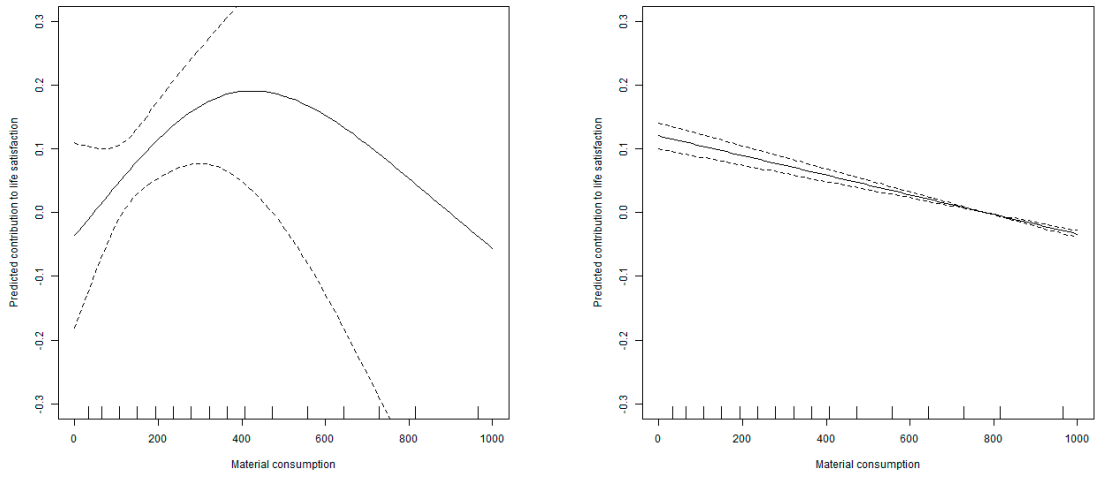
Figure 9 shows the estimation results of Equation (1), which includes all samples, Subsample 1 (Attachment dummy = 1), and Subsample 2 (Attachment dummy = 0). In these figures, monthly material consumption expenditure (unit: US$) is shown on the horizontal axis, while life satisfaction, which was standardized from 0 to 1, is shown on the vertical axis. The solid line is the estimated SWB function curve, while the dotted lines represent 95% confidence intervals. The "0" on the vertical axis denotes the samples' average life satisfaction. As shown in Table 7, all estimated nonparametric functions are statistically significant. We found a monotonous decreasing trend for the pooled overall sample in the upper panel of Figure 9. For a robustness check, we applied additional estimation using Subsamples A (men) and B (women). The estimation results for Subsamples were almost the same as our main result using the overall sample in Figure 9. For Subsample 1, whose attachment dummy equals 1, although the confidence interval is relatively wide due to the relatively small sample, meaning the estimation result must be interpreted with caution, we found an increasing trend from US$138 to US$468. For Subsample 1, the upper and lower confidential intervals were both more than 0 from US$138 to US$468 with regard to the vertical axis, which corresponds to the situation where the predicted contribution to life satisfaction is larger than its sample mean. The predicted contribution to life satisfaction of Subsample 1 was 0.101 for the samples' average monthly household material consumption (US$179). Although the confidence interval is too wide to interpret, we found a decreasing trend over US$468. For Subsample 2, whose attachment dummy equals 0, we found a decreasing trend.

Table 8 reports the parameter estimates for control variables. We found the expected signs for most variables, with the exception of age, gender, and marriage. Regarding age, we found an inverted-U relationship between age and life satisfaction for Subsample 2, which is not in line with the literature. The exceptions may indicate unique characteristics for rural developing countries. The negative coefficients of marriage and the number of family members can be interpreted as an increase in economic burdens in budget constraints. Furthermore, the absolute value of the negative coefficient of the number of family members for Subsample 1 is larger than that for Subsample 2. This might imply

that those who have an attachment to material goods tend to have a stronger scarcity consciousness of income. There is a possibility that those who have an attachment to material goods tend also to have an attachment to family or importance of family and, thus, have higher standards of expenses for each family member, which increases the sense of income scarcity. Another possibility is that Subsample 1 is attached to material goods, so much so that the expenditures on a marginal increase of family members would be more painful than Subsample 2. The positive coefficients of residual consumption imply that non-material consumption is positively correlated with life satisfaction, which is in line with [50].



Overall sample (N = 3685).



Subsample 1 (Attachment dummy = 1, N = 892); Subsample 2 (Attachment dummy = 0, N = 2689)

Figure 9. Material consumption (US$) and life satisfaction in Vietnam.

Table 7. Model fit statistics.

	Approximate Significance of Smooth Term (F Value)
Overall sample	137.8 ***
Subsample 1 (Attachment dummy = 1)	4.426 *
Subsample 2 (Attachment dummy = 0)	141.9 ***

Note: *** and * denote statistical significance at the 1% and 10% levels, respectively.

Table 8. Parametric estimation results for control variables.

Variable	Overall Sample	Subsample 1	Subsample 2
Age	0.030 (0.12)	−0.022 * (0.010)	0.011 (0.0073)
Age squared	−0.10 (0.15)	0.00022 * (0.00011)	−0.00016 * (0.000079)
Gender (Male dummy)	0.010 (0.0069)	−0.042 (0.056)	0.019 * (0.0086)
Marriage	−0.042 * (0.026)	−0.072 (0.10)	−0.088 (0.059)
Children	−0.014 (0.016)	−0.016 (0.13)	−0.0086 (0.076)
Number of family members	−0.11 *** (0.025)	−0.084 *** (0.020)	−0.029 * (0.013)
Education	0.018 (0.017)	0.23 * (0.12)	0.025 (0.080)
Residual consumption	0.023 ** (0.011)	0.019 * (0.009)	0.021 ** (0.010)
Darsal dummy	−0.12 *** (0.0079)	−0.99 *** (0.016)	−0.34 *** (0.037)
Constant term	0.89 *** (0.020)	1.04 *** (0.038)	4.33 *** (0.25)
Adjusted R squared	0.15	0.31	0.12
No. of observation	3685	892	2689

Note: Standardized coefficients are shown. Standard errors are in parenthesis. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

4. Discussion

If developing countries succeeded in emulating the prevailing consumption patterns of developed countries, the entire world would be on an equal footing in terms of consumer behavior. This possible conversion brings us on the right track to alleviating poverty in low-income countries, but without decoupling material consumption and income, it may also run the risk of exacerbating fears of increasing environmental burdens through over-consumption. In order to generate the sustainable consumption advocated for by the ongoing discourse on ecological footprints, planetary boundaries, and sustainable development goals (SDGs), current consumption styles in developing countries need to be reexamined so that we can grasp how consumption and subjective well-being interact.

In this context, Tsurumi et al. [48,50] showed that SWB saturation through material consumption can be observed not only in developed countries (like Japan) but also in developing countries (like Vietnam), in both urban and rural areas. Furthermore, ref [50] identified that a negative correlation between material consumption and SWB can be observed in rural areas in Vietnam. These findings imply that regardless of the stage of economic development, SWB saturation through material consumption can occur. In light of sustainable consumption, the situation where SWB saturation through consumption exists may correspond to be a "rampant or vain consumption" in terms of SWB. To accomplish sustainable consumption, we need to avoid meaningless consumption, which does not contribute to increasing SWB. Furthermore, if we can identify ways to increase our marginal utility from consumption, we can sustain or even increase our SWB by consuming less, thereby lowering our environmental burden.

In this study, we investigated whether attachment to material goods can interact with SWB in terms of life satisfaction. To that aim, we have constructed a two-good, two-period model and

considered whether the level of utility increases if the potentially durable good is carried over to the second period. The result demonstrates that the consumer's utility does spike, due to the combined effect of substitution (between general consumption and the durable good) and income. The latter income effect arises because income that could have been used for the purchase of the durable good is now freed up. We have also discussed other oft-cited important channels: endowment effect, pro-social behavior, and latent factors such as the mottainai spirit.

Our theoretical model also relies on a number of assumptions, which can be relaxed in follow-up studies. The utility function is confined to the additive specification. Although our basic insights do not alter, this can be formally extended to the constant-elasticity-of-substitution and Cobb–Douglas types, which are more common in the literature. Sensitivity analysis of important parameters, such as the discount rate, the relative price of the durable good, and wages, may be relevant in considering what shapes less material-intensive economies. Moreover, an interesting setting would be where a consumer may choose to keep using the durable good or not, depending on its relative price, discounting, and other factors.

Consistent with this theoretical prediction, our empirical estimation results show that, while the marginal contribution of material consumption to life satisfaction is declining on average in rural Vietnam, it is increasing for people who utilize material goods possessed for a long time with good care. This implies that they obtain higher life satisfaction by less consumption of material goods than the average sample. There is a possibility that the quality of goods affects the relationship between material consumption and life satisfaction. However, in our survey areas of Thieu Hoa and Darsal, people have few options to select goods. In these villages, there are only several small shops people can use. In addition, people in the area cannot use Internet shopping services like Amazon because there is no delivery service. Furthermore, it takes a long time to reach urban areas where there are large shops and people usually do not have cars and therefore cannot bring home the goods purchased, and they have no delivery services to their village. Here, we note that, even if material consumption is low, total consumption and residual consumption (such as relational consumption shown in [50]) can be high, since our model divides total consumption into material consumption and residual consumption. Although our sample is limited to rural areas in Vietnam, and what we have demonstrated is not causality, this may point to a promising channel to sustain life satisfaction even if—or perhaps because—less material is consumed by households in developing countries. Considering that we found similar descriptive statistics for the control variables used in our analysis among the subsamples and that we did not obtain statistically significant coefficients for most of the control variables, as shown in Table 8, the observed differences between the subsamples in Figure 9 are thought not to be due to differences in control variables and that attachment to material goods is the most likely the cause of the results shown.

Consumerist motivations and relative consumption are also expected to be prevalent in developing countries. The literature recognizes that the consumption of some goods is conspicuous in rural households in developing countries (e.g., [51,52]). It is well known that the rural poor spend much on festivals and ceremonies in India [53] and in African countries, which [51] suggests they may be a substitute for the consumption of material goods, such as radio and television. Moreover, in a survey of poor rural households in India, ref [54] reports that individuals who spend more on conspicuous consumption have lower levels of SWB, while their income relative to others does not affect SWB. Thus, while the evidence is scarce and mixed, our results shown in Subsample 2 in Figure 7 do not seem to support the hypothesis that individuals with consumerist motivations and relative consumption have higher SWB. This implies that people who consume material goods less tend to be those who have stronger social capital, and they tend to barter material goods such as food. The strong social capital can significantly improve people's life satisfaction (e.g., [55]). Our result is in line with [50] and reveals the positive correlation between relational consumption based on strong social capital and life satisfaction in rural Vietnam.

We have theoretically and empirically demonstrated that using the same good longer correlates with sustained or higher SWB in terms of life satisfaction, other conditions being equal. To bridge our results with environmental sustainability, we also need to clarify how goods attachment, SWB, and environmental burden interrelate with each other. Attachment to goods does not necessarily reduce environmental burden if attachment leads to far more possession than necessary. This relationship may also be dynamically complicated by the recent emergence of sharing economies. Studying these relationships may produce an important implication for directing ourselves toward circular economies.

Other channels than those we have discussed thus far, connecting SWB and the continued use of material goods, may exist, even if they have not yet been discussed in the literature. For example, people who own less may experience higher SWB, as they may have less clutter and are able to focus on the "here and now." This may also be related to the ethics of minimalism. Minimalism stresses the importance of the non-material aspects of life and is sometimes characterized by anti-consumerism (i.e., "less is more") [56] (p. 67). A minimalist lifestyle may be deemed as environmentally friendly; however, the overall environmental impacts are still ambiguous, as those lifestyles may either trigger more throwing away or reduced purchasing at the outset. In fact, having fewer goods is becoming more common, enhanced by recent popular movements focusing on organization methods that involve disposing of things when they no longer bring joy [57]. Some studies actually point to preserving utility by retaining the memory of certain goods, rather than their physical possession [58], or by "social recycling" instead of throwing away [59].

To take another recent example, in an increasingly popular sharing economy, purchasing a durable good may be replaced by subscribing to a sharing program or purchasing a service. One direction of the mode of consumption in the sharing economy is collaborative consumption [60–64], which contrasts with individualistic consumerism and may contribute to sustainable consumption within the planetary boundaries [65]. Mobility services as a substitute for car ownership are a case in point. These recent and important discussions may be expanded upon in future research.

A limitation of the current study is that we did not consider the effect of the burden of long working hours on life satisfaction. Higher material consumption can be related to having a stressful or demanding job. Therefore, having long working hours is a potential explanation for the negative correlation between material consumption and life satisfaction observed in Figure 7. However, considering that we found a positive correlation between material consumption and life satisfaction for Subsample 1 in Figure 7, the potential negative effects of long working hours may be surpassed by the positive effects of the attachment to material goods on life satisfaction.

Another limitation of the current study is that we only show a correlation between material consumption and life satisfaction, not causality. However, looking after material goods may give people life satisfaction, or more satisfied people may tend to look after material goods better. This can be explored in future research.

Our study shows that for people who take better care of material goods, increased consumption is linked to increased life satisfaction in the study sample. This finding has a useful policy implication for developing countries to improve their well-being.

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Appendix A

Here we present a formal model that led us to the Proposition in Section 2.1, that utility is higher when a durable good is possessed longer, all else being equal. In the basic model, let C_{1t}, C_{2t}, C_{1t+1}, and C_{2t+1} denote Goods 1 and 2 bought at t and $t+1$, respectively. As described in the main text, to fix ideas, imagine that Good 1 is a mix of general consumer material good, whereas Good 2 is a relatively durable, but still material consumer good. The prices of both goods are constant and certain, expressed by p_1 and p_2, respectively. Because this is an intertemporal problem, we wrote $\delta > 0$ for the utility discount rate and $r > 0$ as the interest rate. For analytical ease, the (instantaneous) utility function is further specified as additive: $U(C_{1t}, C_{2t}) = C_{1t}^2 + C_{2t}^2$. Other typical specifications such as Cobb–Douglas or the constant elasticity of substitution (CES) utility functions do not alter our basic insights. Finally, the consumer earns income

w only in t, part of which is saved for the period $t+1$. Formally, our problem is

$$\max_{C_{1t},\, C_{2t}, C_{1t+1},\, C_{2t+1}} U(C_{1t}, C_{2t}) + \frac{1}{1+\delta} U(C_{1t+1}, C_{2t+1})$$

subject to

$$p_1 C_{1t} + p_2 C_{2t} + \frac{1}{1+r}(p_1 C_{1t+1} + p_2 C_{2t+1}) = w$$

A regular optimization exercise enabled us to solve for the consumption of two goods in both periods and to write indirect utility as a function of wage, prices, discount rate, and interest rate.

In the extended model, where Good 2 continues to be possessed, our problem changes slightly to the following:

$$\max_{C_{1t},\, C_{2t}, C_{1t+1}} U(C_{1t}, C_{2t}) + \frac{1}{1+\delta} U(C_{1t+1}, C_{2t+1})$$

subject to

$$p_1 C_{1t} + p_2 C_{2t} + \frac{1}{1+r}\, p_1 C_{1t+1} = w$$

and

$$C_{2t} = C_{2t+1}.$$

Observe that the first constraint lacks Good 2 in the second period, as it does not have to be purchased. In addition, the second constraint states that the quantity of Good 2 consumed in the next period remains the same. It is commonplace to assume that investment goods are subject to depreciation; this assumption can be applied to our example. On the other hand, we have already seen that some behavioral literature suggests a positive endowment effect can also be attained from durable goods, in which case the value of the good being studied actually appreciates for that person. In any case, we bypassed the endowment effect here, as it is contained in M in the current formulation. Thus, temporal changes in the value of Good 2 to the consumer may be either positive or negative. We relegated more general cases to our future research, and simply assumed the second constraint in the current study.

References

1. Geissdoerfer, M.; Savaget, P.; Bocken, N.M.P.; Hultink, E.J. Circular Economy Sustainability Paradigm. *J. Clean. Prod.* **2019**, *143*, 757–768. [CrossRef]
2. Korhonen, J.; Honkasalo, A.; Seppälä, J. Circular Economy: The Concept and its Limitations. *Ecol. Econ.* **2018**, *143*, 37–46. [CrossRef]
3. Kirchherr, J.; Reike, D.; Hekkert, M. Conceptualizing the circular economy: An analysis of 114 definitions. *Resour. Conserv. Recycl.* **2017**, *127*, 221–232. [CrossRef]
4. Bowlby, J. *A Secure Base: Clinical Applications of Attachment Theory*; Routledge: Abingdon, UK, 1988.

5. Giuliani, M.V. Theory of Attachment and Place Attachment. In *Psychological Theories for Environmental Issues*; Bonnes, M., Lee, T., Bonaiuto, M., Eds.; Ashgate: Farnham, UK, 2003; pp. 137–170.
6. Hidalgo, M.C.; Hernández, B. Place attachment: Conceptual and empirical questions. *J. Environ. Psychol.* **2001**, *21*, 273–281. [CrossRef]
7. Gerson, K.; Stueve, A.; Fischer, C.S. Attachment to Place. In *Networks and Places: Social Relations in the Urban Setting*; Fischer, C.S., Jackson, R.M., Stueve, C.A., Gerson, K., Jones, L.M., Baldassare, M., Eds.; The Free Press: Wong Chuk Hang, Hong Kong, 1977; pp. 139–161.
8. Kleine, S.S.; Baker, S.M. An integrative review of material possession attachment. *Acad. Mark. Sci. Rev.* **2004**, *1*, 1–39.
9. Kahneman, D.; Knetsch, J.L.; Thaler, R.H. Experimental tests of the endowment effect and the Coase theorem. *J. Political Econ.* **1990**, *98*, 1325–1348. [CrossRef]
10. Thaler, R. Toward a positive theory of consumer choice. *J. Econ. Behav. Organ.* **1980**, *1*, 39–60. [CrossRef]
11. Kahneman, D.; Knetsch, J.L.; Thaler, R.H. The Endowment Effect, Loss Aversion, and Status Quo Bias. *J. Econ. Perspect.* **1991**, *5*, 193–206. [CrossRef]
12. Knetsch, J.L. The Endowment Effect and Evidence of Nonreversible Indifference Curves. *Am. Econ. Rev.* **1989**, *79*, 1277–1284.
13. Knetsch, J.L.; Sinden, J.A. The Persistence of Evaluation Disparities. *Q. J. Econ.* **1987**, *102*, 691–696. [CrossRef]
14. Mugge, R.; Schoormans, J.P.L.; Schifferstein, H.N.J. Product Attachment: Design Strategies to Stimulate the Emotional Bonding to Products. In *Product Experience*; Schifferstein, H.N.J., Hekke, P., Eds.; Elsevier: Amsterdam, The Netherlands, 2008; pp. 425–440.
15. Schifferstein, H.N.J.; Zwartkruis-Pelgrim, E.P.H. Consumer-Product Attachment: Measurement and Design Implications. *Int. J. Des.* **2008**, *2*, 1–13.
16. Dommer, S.L.; Winterich, K.P. Disposing of the self: The role of attachment in the disposition process. *Curr. Opin. Psychol.* **2020**, *39*, 43–47. [CrossRef] [PubMed]
17. Ting, H.; Thaichon, P.; Chuah, F.; Tan, S.R. Consumer Behavior and Disposition Decisions: The Why and How of Smartphone Disposition. *J. Retail. Consum. Serv.* **2019**, *51*, 212–220. [CrossRef]
18. Andreoni, J. Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving. *Econ. J.* **1990**, *100*, 464–477. [CrossRef]
19. Cherepanov, V.; Feddersen, T.; Sandroni, A. Revealed Preferences and Aspirations in Warm Glow Theory. *Econ. Theory* **2013**, *54*, 501–535. [CrossRef]
20. Menges, R.; Schroeder, C.; Traub, S. Altruism, Warm Glow and the Willingness-to-Donate for Green Electricity: An Artefactual Field Experiment. *Environ. Resour. Econ.* **2005**, *31*, 431–458. [CrossRef]
21. Taufik, D.; Bolderdijk, J.W.; Steg, L. Acting Green Elicits a Literal Warm Glow. *Nat. Clim. Chang.* **2015**, *5*, 37–40. [CrossRef]
22. Morelli, S.A.; Lieberman, M.D.; Zaki, J. The Emerging Study of Positive Empathy. *Soc. Personal. Psychol. Compass* **2015**, *9*, 57–68. [CrossRef]
23. Maathai, W. *Unbowed: A memoir*; Anchor: New York, NY, USA, 2007.
24. Sirola, N.; Sutinen, U.M.; Närvänen, E.; Mesiranta, N.; Mattila, M. Mottainai!-A practice theoretical analysis of Japanese consumers' food waste reduction. *Sustainability* **2019**, *11*, 6645. [CrossRef]
25. Clark, A.E.; Frijters, P.; Shields, M.A. Relative income, happiness, and utility: An explanation for the Easterlin paradox and other puzzles. *J. Econ. Lit.* **2008**, *46*, 95–144. [CrossRef]
26. Diener, E. Subjective Well-Being. *Psychol. Bull.* **1984**, *95*, 542–575. [CrossRef] [PubMed]
27. Diener, E.; Sandvik, E.; Seidlitz, L.; Diener, M. The relationship between income and subjective well-being: Relative or absolute? *Soc. Indic. Res.* **1993**, *28*, 195–223. [CrossRef]
28. Easterlin, R.A. Does Economic Growth Improve the Human Lot? Some Empirical Evidence. In *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*; David, P.A., Reder, M.W., Eds.; Academic Press: New York, NY, USA, 1974; pp. 89–215.
29. Diener, E.; Diener, M.; Diener, C. Factors Predicting the Subjective Well-Being of Nations. *J. Personal. Soc. Psychol.* **1995**, *69*, 851–864. [CrossRef]
30. Myers, D.G.; Diener, E. The Pursuit of Happiness. *Sci. Am.* **1996**, *274*, 54–56. [CrossRef] [PubMed]
31. Argyle, M. Causes and Correlates of Happiness. In *Well-Being: The Foundations of Hedonic Psychology*; Kahneman, D., Diener, E., Schwarz, N., Eds.; Russell Sage Foundation: New York, NY, USA, 1999; pp. 353–373.

32. Easterlin, R.A. Will raising the incomes of all increase the happiness of all? *J. Econ. Vehavior Organ.* **1995**, *27*, 35–47. [CrossRef]
33. Easterlin, R.A. Feeding the illusion of growth and happiness: A reply to Hagerty and Veenhoven. *Soc. Indic. Res.* **2005**, *74*, 429–443. [CrossRef]
34. Cheng, Z.; Wang, H.; Smyth, R. Happiness and job satisfaction in urban China: A comparative study of two generations of migrants and urban locals. *J. Econ. Vehavior Organ.* **2014**, *51*, 2160–2184. [CrossRef]
35. Stevenson, B.; Wolfers, J. Subjective well-being and income: Is there any evidence of satiation? *Am. Econ. Rev.* **2013**, *103*, 598–604. [CrossRef]
36. Stevenson, B.; Wolfers, J. Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox. *NBER Work. Paper Ser.* **2008**, *14282*, 1–28.
37. Ferrer-i-Carbonell, A. Income and well-being: An empirical analysis of the comparison income effect. *J. Public Econ.* **2005**, *89*, 997–1019. [CrossRef]
38. Dolan, P.; Peasgood, T.; White, M. Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *J. Econ. Psychol.* **2008**, *29*, 94–122. [CrossRef]
39. Rickardsson, J.; Mellander, C. Absolute vs Relative Income and Life Satisfaction. *CESIS Electron. Work. Pap. Ser.* **2017**, *451*, 1–29.
40. Foye, C.; Clapham, D.; Gabrieli, T. Home-ownership as a social norm and positional good: Subjective wellbeing evidence from panel data. *Urban Stud.* **2018**, *55*, 1290–1312. [CrossRef]
41. Donati, P. *Relational Sociology: A New Paradigm for the Social Sciences*; Routledge: London, UK, 2010.
42. Gokdemir, O. Consumption, savings and life satisfaction: The Turkish case. *Int. Rev. Econ.* **2015**, *62*, 183–196. [CrossRef]
43. DeLeire, T.; Kalil, A. Does consumption buy happiness? Evidence from the United States. *Int. Rev. Econ.* **2010**, *57*, 163–176. [CrossRef]
44. Zhang, J.; Xiong, Y. Effects of multifaceted consumption on happiness in life: A case study in Japan based on an integrated approach. *Int. Rev. Econ.* **2015**, *62*, 143–162. [CrossRef]
45. Dumludag, D. Consumption and life satisfaction at different levels of economic development. *Int. Rev. Econ.* **2015**, *62*, 163–182. [CrossRef]
46. Pandelaere, M. Materialism and well-being: The role of consumption. *Curr. Opin. Psychol.* **2016**, *10*, 33–38. [CrossRef]
47. Levitt, S.D.; List, J.A. What do laboratory experiments measuring social preferences reveal about the real world? *J. Econ. Perspect.* **2007**, *21*, 153–174. [CrossRef]
48. Tsurumi, T.; Yamaguchi, R.; Kagohashi, K.; Managi, S. Are cognitive, affective, and eudaimonic dimensions of subjective well-being differently related to consumption? Evidence from Japan. *J. Happiness Stud.* **2020**. [CrossRef]
49. Hastie, T.J.; Tibshirani, R.J. *Generalized Additive Models*; CRC Press: Boca Raton, FL, USA, 1990; Volume 43.
50. Tsurumi, T.; Yamaguchi, R.; Kagohashi, K.; Managi, S. The role of social capital in improving subjective well-being through consumption: Evidence from rural and urban Vietnam. Under review.
51. Banerjee, A.V.; Duflo, E. The economic lives of the poor. *J. Econ. Perspect.* **2007**, *21*, 141–168. [CrossRef]
52. Roychowdhury, P. Visible inequality, status competition, and conspicuous consumption: Evidence from rural India. *Oxf. Econ. Pap.* **2016**, *69*, 36–54. [CrossRef]
53. Bloch, F.; Rao, V.; Desai, S. Wedding celebrations as conspicuous consumption signaling social status in rural India. *J. Hum. Resour.* **2004**, *39*, 675–695. [CrossRef]
54. Linssen, R.; Van Kempen, L.; Kraaykamp, G. Subjective well-being in rural India: The curse of conspicuous consumption. *Soc. Indic. Res.* **2011**, *101*, 57–72. [CrossRef]
55. Bjørnskov, C. The happy few: Cross-country evidence on social capital and life satisfaction. *Kyklos* **2003**, *56*, 3–16.
56. Dopierała, R. Minimalism—A New Mode of Consumption? *Przegląd Socjol.* **2017**, *66*, 67–83.
57. Kondō, M. *The Life-Changing Magic of Tidying up: The Japanese Art of Decluttering and Organizing*; Ten Speed Press: Berkeley, CA, USA, 2014.
58. Winterich, K.P.; Reczek, R.W.; Irwin, J.R. Keeping the memory but not the possession: Memory preservation mitigates identity loss from product disposition. *J. Mark.* **2017**, *81*, 104–120. [CrossRef]
59. Donnelly, G.E.; Lamberton, C.; Reczek, R.W.; Norton, M.I. Social recycling transforms unwanted goods into happiness. *J. Assoc. Consum. Res.* **2017**, *2*, 48–63. [CrossRef]

60. Albinsson, P.A.; Perera, B.Y. Alternative Marketplaces in the 21st Century: Building Community through Sharing Events. *J. Consum. Behav.* **2012**, *11*, 303–315. [CrossRef]
61. Belk, R. Sharing. *J. Consum. Res.* **2010**, *36*, 715–734. [CrossRef]
62. Botsman, R.; Rogers, R. Beyond Zipcar: Collaborative Consumption. *Harv. Bus. Rev.* **2010**, *88*, 30.
63. Felson, M.; Spaeth, J.L. Community Structure and Collaborative Consumption: A Routine Activity Approach. *Am. Behav. Sci.* **1978**, *21*, 614–624. [CrossRef]
64. Möhlmann, M. Collaborative consumption: Determinants of satisfaction and the likelihood of using a sharing economy option again. *J. Consum. Behav.* **2015**, *14*, 193–207. [CrossRef]
65. Steffen, W.; Richardson, K.; Rockström, J.; Cornell, S.E.; Fetzer, I.; Bennett, E.M.; Biggs, R.; Carpenter, S.R.; De Vries, W.; De Wit, C.A.; et al. Planetary boundaries: Guiding human development on a changing planet. *Science* **2015**, *347*. [CrossRef] [PubMed]

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