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Highlights

Consumption of market goods and wellbeing in small-scale societies: An empirical test among the Tsimane' in the Bolivian Amazon
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► Test of the universality of the association between wellbeing and consumption. ► In early market integration, weekly expenditures are not associated with wellbeing. ► In early market integration, consumption of durables is not associated with wellbeing. ► Support of a degrowth premise: wellbeing is not inevitably linked with consumption of market goods.



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Consumption of market goods and wellbeing in small-scale societies: An empirical test among the Tsimane' in the Bolivian Amazon

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ABSTRACT

Researchers propose sustainable degrowth as an alternative economic model to face current environmental crisis. Standard economic theory criticizes the viability of degrowth under the assumption that there is a causal link between wellbeing and the consumption of goods and services. Here we test the universality of the association between human wellbeing and the consumption of market goods (a standard indicator of economic growth) using a unique body of data collected among 600 adults in a small-scale foraging-horticultural society in the Bolivian Amazon, the Tsimane'. Data include two measures of consumption (weekly expenditures and annual consumption of durables) and two measures of wellbeing (self-reported wellbeing and frequency of smiles). Multivariate analyses suggest that, for this society in the early stages of integration to the market economy, consumption of market goods is not associated with wellbeing. The result is robust to the two measures of wellbeing, to the measurement of consumption at the individual and at the household level, and to other changes in the estimation model. The analysis provides support to one of the social premises in which the theory of sustainable degrowth is based: that human wellbeing does not necessarily bear a direct link with consumption of market goods.

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1. Introduction

Humanity is nowadays facing a dramatic challenge: how to improve human wellbeing without exacerbating environmental pressures. In 1987, the Brundtland Report set *Sustainable Development* in the limelight stating that economic growth and ecological sustainability could be simultaneously achieved (WCED, 1987). The definition, although politically appealing, did not consider ecosystem limits and therefore set the basis for continuing the negative environmental impacts of economic growth (Daly, 1990). More than 20 years later, despite the growing number of environmental policies and eco-efficiency efforts, pressure on the environment continues to increase with economic growth (MEA, 2005; Trauger et al., 2003) and energy and material consumption have increased in the industrial nations surpassing ecosystem limits (Wackernagel, 2002).

In this scenario, a group of researchers and activists have proposed *sustainable degrowth* as an alternative economic model to improve

wellbeing without further threatening the environment (Latouche, 2003; Martinez-Alier, 2009; Victor, 2010). Sustainable degrowth is defined as an “equitable downscaling of production and consumption that increases human wellbeing and enhances ecological conditions at the local and global level, in the short and long term” (Schneider et al., 2010). Sustainable degrowth is mainly aimed at the heart of the consumer society, i.e. the population of developed countries, where the biggest share of world consumption takes place.

A critique to degrowth is that “consumption and radical degrowth are likely to meet strong resistance from the mainstream (or they will just be ignored) and thus will run a serious risk of staying a marginal line of thought” (van den Bergh, 2011). The critique derives from the fact that Western societies are built up upon consumption and it is rooted on standard economic theory predicting a causal link between income and wellbeing mediated by the consumption of goods and services provided through markets. But more than four decades of research on the economics of happiness suggests that the assumed causal link between income and wellbeing is rather weak, especially when it comes to subjective wellbeing (SWB). In a seminal paper published in 1974, Richard A. Easterlin suggested that, across nations, SWB remained stationary despite sharp growth in material conditions. After Easterlin, several researchers have tested the association

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between economic status and SWB, some confirming Easterlin's findings (Blanchflower and Oswald, 2004; Di Tella and MacCulloch, 2008; Diener et al., 2000; Frey and Stutzer, 2002; Inglehart and Klingemann, 2010; Layard, 2005), and some challenging them (Deaton, 2008; Hagerty and Veenhoven, 2003; Stevenson and Wolfers, 2008).

An important issue to consider when examining the association between income and wellbeing is the definition of wellbeing. Researchers have defined wellbeing using two different approaches. The first approach conceptualizes wellbeing as unidimensional and operationalizes it through single and independent indexes that proxy for social, economic, or human aspects. Economists, for example, have traditionally focused on income, consumption, and employment as the outcomes that matter most when examining human wellbeing, whereas psychologists have investigated negative affective states, such as depression, anxiety, and perceived stress, and nutritionists have focused on the consumption of quality foods and on anthropometric measures that summarize an individual's nutritional status as principal markers of wellbeing.

The second approach defines wellbeing as a multidimensional concept encompassing a large range of domains that humans try to satisfy through different strategies and gives more emphasis to subjective appreciation of own's quality of life (Costanza et al., 2007; Cruz et al., 2009; Max-Neef, 1992). For example, the Chilean economist Manfred Max-Neef conceptualizes SWB as the satisfaction of "few, finite and classifiable" human needs (i.e., subsistence, protection, affection, understanding, participation, leisure, creation, identity and freedom) who "are the same in all cultures and all historical periods" (Max-Neef, 1991: p.18). In his words, "what changes, both over time and through cultures, is the way or the mean by which the needs are satisfied," what he calls satisfiers (Max-Neef, 1991).

In this article we use insights from those previous bodies of research to test the universality of the assumed causal link between income (through consumption of market goods) and wellbeing. We do so by using a unique body of data collected in a small-scale society of hunter–horticulturalists on the initial stages of integration to the market economy. If consumption of market goods is only a culturally determined satisfier (for subsistence, leisure, or identity needs), to use Max-Neef terminology, then – in a society where individuals satisfy most of their needs outside the market economy and whose sense of wellbeing does not necessarily center on material aspirations – one should not find an association between consumption of market goods and wellbeing. The lack of association between consumption of market goods and wellbeing would give support to the idea that the improvement of human wellbeing does not necessarily hinge on increasing consumption, one of the basic premises of sustainable degrowth.

2. The Tsimane'

With about 8000 people living around 100 villages, the Tsimane' are one of the largest native Amazonian groups in Bolivia (Instituto Nacional de Estadística, 2003). They live mostly along the Maniqui and the Aperi rivers in the department of Beni. Tsimane' ethnography and history have been documented by Huanca (2008) and Ringhofer (2010), and analysis of their economy and wellbeing can be found in published articles (Godoy et al., 2005a; Reyes-García et al., 2009), so here we discuss two topics that directly deal with the content of this article: wellbeing and consumption.

2.1. Wellbeing

Researchers have used objective and subjective indicators to analyze wellbeing among the Tsimane'. In a recent article analyzing trends in economic, health, psychological, and social indicators of wellbeing between 2002 and 2006, Godoy et al. (2009) find improvement on seven of the 12 standard unidimensional indicators of physical

and mental wellbeing. Particularly, the period 2002–2006 saw an increase in the real (inflation adjusted) value of food consumption; an increase in body mass index, a standard indicator of nutritional status; and a decrease in the frequency of self-reported anger, a sign of mental wellbeing. But the same period also saw a worsening of other wellbeing indicators, such as an increase in the number of self-reported physical ailments.

But researchers have also found that Tsimane' own definition of wellbeing differs from those standard indicators. For example, Reyes-García and colleagues explored the local concept of wellbeing and found that Tsimane' sense of wellbeing centers on social relations and success in subsistence activities (Reyes-García et al., 2009, 2010). Thus, the Tsimane' list as their most important sources of wellbeing social relations (i.e., spending time with close family, drinking home-brewed beer, having visitors) and success in common subsistence activities (i.e., hunting, fishing, agriculture). Possession of material goods, money, and participation in market-based activities (i.e., buying and selling), do not appear as important sources of happiness for the Tsimane'. In a previous study (Reyes-García and TAPS study team, 2011), we found that from the 20 most salient reasons for happiness among the Tsimane', nine relate to social relations and ten to Tsimane' economy. Within the ten reasons related to Tsimane' economy, the first four reasons relate to subsistence, not to market-related economic activities.

2.2. Tsimane' Economy and Consumption

The Tsimane' economy centers on hunting, fishing, plant foraging, and slash-and-burn farming (Vadez et al., 2008). Tsimane' have low levels of monetary income. According to recent estimations, the average Tsimane' adult has a daily personal income from cash earnings and from the imputed value of farm and forest goods consumed from agricultural plots and forests of US\$3.26 (Godoy et al., 2007a). Daily personal income reaches US\$9.05 when expressed with the index of Purchasing Power Parity. Most (59.08%) income comes from the value of consuming farm crops and animal wildlife, followed by monetary earnings (31.52%) from the sale of goods (17.56%) and from wage labor (13.96%). Goods received in barter account for only 2.79% of daily personal income, and social capital—gifts and labor help received—accounts for 3.74% of daily personal income.

Tsimane' use their monetary earnings mostly to acquire market goods. Previous research suggest that Tsimane' value a wide range of durable commercial goods, some, such as metal tools, for their utilitarian value, and others, such as watches, radios, and backpacks, as markers of status. Although consumption of market goods is relatively recent among the Tsimane', researchers have found that Tsimane' total monetary expenditures bear a positive association with the share of expenditures allocated to luxury goods and to highly visible goods and a negative association with expenditures allocated to less visible durable goods (Godoy et al., 2007b).

3. Material and Methods

For the empirical analysis, we used data from a survey conducted between May and October, 2006, in 13 Tsimane' villages. The survey is part of the Tsimane' Amazonian Panel Study (TAPS), a study in progress since 2002. Data were collected by a team of trained researchers and assistants who have worked for TAPS from its inception.

3.1. Definitions

We differentiate between market and non-market goods based on how a product was acquired, not on whether the product had a market price. We defined a good as a market good when it was acquired through transactions such as sale or barter. We defined a good as a non-market good when it was acquired through other means such as

204 self-production, gathering, or gifts. We follow the standard economic
205 approach and divide market goods between necessities and luxuries.
206 We define necessity as a market good for which demand is not related
207 to income, that is, a good that will continue to be acquired at the same
208 level independently of changes in income. An example of a necessity
209 good in the study area is salt. We define luxuries as market goods for
210 which demand increases more than proportionally as income rises, as
211 it is the case of clothing in the study area. Since we do not have data
212 for total income, we define necessities as market goods that decrease
213 in demand when consumption rises and luxury goods as market
214 goods that increase in demand when consumption rises (Heffetz, 2010).

215 3.2. Sample

216 Data were gathered from all Tsimane' adults in 13 villages differing in
217 their proximity to San Borja (mean = 25.96 km; S.D. = 16.70), the only
218 town along the Maniqui river. The sample contains 302 females and
219 298 males over the age of 16 (or younger if they headed a household)
220 with complete data. People came from 243 households.

221 3.3. Dependent Variables: Wellbeing

222 Following previous research (Alesina et al., 2004; Diener, 1994;
223 Ferrer-i-Carbonell and Gowdy, 2007), we used two measures of
224 subjective wellbeing: a self-reported (self-reported wellbeing) and a
225 direct measure (frequency of smiles).

226 3.3.1. Self-reported Wellbeing

227 We used free listing to elicit the full range of items that Tsimane'
228 associate with wellbeing by asking 35 individuals to list reasons that
229 made them happy (Reyes-García and TAPS study team, 2011). From
230 free listing responses, we calculated: 1) the percentage of people
231 who mentioned each reason, 2) the average rank of each reason across
232 lists, and 3) the saliency of each reason, i.e., an index that captures, on
233 a scale from zero to one, the importance of an item across all of the lists
234 (Bernard, 2006). Tsimane' listed 37 causes of happiness mostly related
235 to social relations (i.e., spending time with close family, drinking
236 home-brewed beer, having visitors) and success in common subsistence
237 activities (i.e., hunting, fishing, and agriculture). For the second
238 step, we selected the seven most salient reasons and constructed a
239 survey to be applied to the entire sample about the occurrence of
240 those events in the week prior to the interview. For example, Tsimane'
241 listed "to be visited" as a factor for contentment, so in the survey we
242 asked: "During the last week, how many times did you receive visits
243 from people from outside your household?" We coded responses to
244 those questions as (1) none, (2) a few times, or (3) many times. To
245 generate an individual score of self-reported wellbeing, we multiplied
246 responses by the saliency of the reason, so that items contributing
247 more to Tsimane' wellbeing weighted more heavily in the score.

248 3.3.2. Frequency of Smiles

249 Social psychologists and ethologists have found that, across cultures,
250 the frequency of smiling is positively associated with self-reported
251 happiness (Ekman, 2002; Ekman and Davidson, 1993; Fridlund,
252 1994) and enjoyment (O'Quin and Arono, 1981), so we also proxied
253 wellbeing with direct observations of subjects' smiling. Specifically,
254 at the end of a 45-minute individual-level interview on a variety of
255 topics related to the socioeconomic and health condition of the
256 person and her/his family, interviewers noted whether the subject:
257 (1) neither laughed nor smiled during the interview, (2) only smiled,
258 (3) smiled and laughed, (4) and laughed openly and frequently. We
259 made a distinction between laughter and smile because people might
260 use the two responses in different contexts (Kraut and Johnston,
261 1979), but we did not try surveyors to distinguish between voluntary
262 and involuntary smiles out of enjoyment (Ekman, 1990).

3.4. Explanatory Variables: Consumption

263

We also used two measures of consumption: annual consumption of
durable market goods and weekly expenditures in any market good or
service.

3.4.1. Annual Consumption of Durable Market Goods

267

268 Adults in the sample were asked to list all the monetary expenditures
269 in durable market goods that they had during the 12 months before the
270 interview and to indicate the quantity of goods acquired and the value of
271 each good in Bolivianos (1US\$ = 8.01Bs in 2006). To reduce omissions
272 from faulty recall, when respondents stopped listing market goods, we
273 prompted their memory by reading them a list of goods common in
274 the area. If informants remembered new items, we also recorded them.

3.4.2. Weekly Expenditures on Market Goods and Services

275

276 Our measure of annual consumption does not include consump-
277 tion of non-durable goods or services provided by the market. To
278 obtain a more complete picture of Tsimane' consumption of market
279 goods and services, we asked participants to list all the expenditures
280 they have had during the week previous to the interview and their
281 monetary value. The lists included expenditures that did not appear
282 in the list of durable market goods. We grouped market goods in
283 categories that were divided in (a) necessities and (b) luxuries by
284 calculating the Engel curves of the items consumed by the study
285 population.

3.5. Control Variables

286

287 Controls in our model are individual-level variables that, according to
288 the literature, affect wellbeing, including sex, age, level of schooling,
289 frequency of travels to town, cash income, value of non-market
290 consumption, and social capital (Dolan et al., 2008; Frey and Stutzer,
291 2002). Cash income was defined as the sum of monetary earnings
292 received by the subject in the 7 days before the interview from wage
293 labor, sale of goods, or remittances. The value of non-market consump-
294 tion was estimated as the total value in the local currency of individual
295 farm and forest products consumed by the individual during the 7 days
296 before the interview (Godoy et al., 2007a). Social capital was estimated
297 with the economic value of gifts received from other households during
298 the week previous to the interview (Godoy et al., 2007a). Controls also
299 include household (i.e., household size) and village-level (village size
300 and village income inequality) variables that might affect both con-
301 sumption and wellbeing.

4. Estimation Strategy

302

303 We want to test the association between the consumption of market
304 goods and SWB using data from a subsistence economy society. To do
305 so, we ran a series of regressions between measures of SWB (outcome)
306 and measures of consumption of market goods (explanatory), while
307 controlling for other predictors of SWB. For the empirical analysis, we
308 use the following expression:

$$Y_{ihv} = \alpha + \gamma C_{ihv} + \psi I_{ihv} + \zeta H_{hv} + \beta C_v + \varepsilon_{ihv}. \quad (1)$$

309

310 Assume, first, that Y captures the self-reported wellbeing of a person,
311 where *i* is the subject, *h* the household, and *v* the village. We use self-
312 reported wellbeing for ease of exposition, but the expression also applies
313 to frequency of smiles. C_{ihv} refers to the consumption of market goods.
314 I_{ihv} is a vector of variables for the subject that directly affects wellbeing
315 (e.g., age, sex). H_{hv} stands for household attributes that might affect
316 SWB (i.e., household size). C_v stands for a set of village level variables
317 to control for factors that could directly affect SWB and consumption
318 (e.g., number of households in a village, proximity to market towns).
319 ε_{ihv} is a random error term with standard properties. To be able to assess
320

Table 1
Definition and summary statistics of variables used in regressions.

| Variable | Definition | N | Mean | S.D. |
|--|---|-----|--------|-------|
| <i>I. Outcome variables:</i> | | | | |
| Self-reported wellbeing | Score on a questionnaire on the occurrence of events that contribute to Tsimane' happiness. Range: 0–14 | 600 | 7.41 | 1.8 |
| Frequency of smiles | Smiling during quarterly interviews. Range: 1 (neither laughed nor smiled) to 4 (laughed openly and frequently) | 600 | 2.81 | 0.9 |
| <i>II. Explanatory variable:</i> | | | | |
| Annual consumption of durable market goods | Bs expend by subject in durable market goods during the 12 months before the interview. (1\$ = 8.01 Bs in 2006) | 600 | 211.40 | 408.9 |
| Weekly expenditures on market goods and services | Bs expend by subject in any market good or service during the 7 days before the interview | 600 | 19.85 | 54.4 |
| <i>III. Control variables</i> | | | | |
| Individual level | | | | |
| Male | Participant's gender (male = 1) | 600 | 0.49 | 0.5 |
| Age | Age of participant (years) | 600 | 35.08 | 16.7 |
| Schooling | Maximum education level achieved by the subject | 600 | 2.07 | 2.2 |
| Travel to town | Number of times that the informant visited the closest town during the 12 months previous to the interview | 600 | 15.03 | 16.9 |
| Cash income | Monetary earnings received by the subject in the 7 days before the interview from wage, sales, or remittances | 600 | 71.32 | 135.2 |
| Value of non-market consumption | Total value of individual farm and forest products consumed by the individual during the 7 days before the interview, in Bs | 676 | 259.45 | 138.5 |
| Social capital | Total value of gifts received from other households, in Bs | 600 | 2.79 | 7.8 |
| Household and village level | | | | |
| Household size | Number of people living in the household at the moment of the interview | 243 | 6.17 | 2.82 |
| Village size | Number of households in a village | 13 | 28.07 | 13.5 |
| Income inequality | Coefficient of variation of village cash income | 13 | 1.85 | 0.51 |

the magnitude of the coefficients, in regressions we enter the variables income and consumption as 1000Bs.

Since the Tsimane' do not seem to center their wellbeing on fulfilling material aspirations, we expect to find a non-statistically significant association between the coefficient for the variable that measures consumption of market goods, γ , and our measures of wellbeing. However, since the lack of association between two variables can be due to a number of theoretical and methodological reasons, we submit our data to a number of checks.

First, we explore variation in consumption of market goods in the sample. To do so, we ran a set of tobit regressions with our variables for consumption of market goods as dependent variable and a set of observed variables as regressors. In two of the models ([1] and [3]) we use individual level variables as control, and in two other models ([2] and [4]) we use household aggregates for economic variables. We use results from this analysis to select variables to be included as controls in our model.

Second, to estimate our core model (Eq. (1)), we proceed with a series of specifications increasingly adding controls to the model and observing changes in the coefficient of the variable of interest (consumption). We add as controls 1) variables that seemed to play a role in explaining the distribution of consumption, and 2) variables that have been used in previous research assessing the link between consumption and wellbeing. To ensure the robustness of the finding, we ran those estimations using our two measures of wellbeing (self-reported

wellbeing and frequency of smiles). For the estimations we used ordered probit models.

Third, we further submit the data to a series of robustness checks that include 1) using different specification models, 2) using different proxies for consumption of market goods, and 3) running the regressions with selected parts of the sample.

5. Results

5.1. Description of the Sample

Table 1 shows the descriptive statistics of the variables used in the analysis. Results from the two indicators of wellbeing suggest that Tsimane' wellbeing is slightly above the mathematical mid-point in the scales used. In a scale from 0 to 14 the average subjective wellbeing was 7.4, with low variation across individuals ($SD = 1.8$). In a scale from 0 to 4 the average of the variable frequency of smiles was 2.81 ($SD = 0.98$), with 11.5% of the sample never smiling or laughing, 25.5% smiling but not laughing, 35.5% smiling and laughing, and 28.5% openly laughing during the interview.

The average annual expenditure in durable market goods in the sample was low. On average, Tsimane' spent 211Bs per year ($SD = 408$) in durable market products (Table 1). Most of the annual expenditures correspond to clothing (71Bs/year) and tools (57Bs/year).

Table 2
Tsimane' individual consumption of durable market goods during the 12 months before the interview.

| Category | Description | Mean | SD | Min | Max |
|-----------------------------|--|-------|-------|-----|------|
| Clothing | Bolivianos spent in clothing | 70.80 | 134.4 | 0 | 1480 |
| Domesticated animals | Bs spent in domesticated animal | 8.14 | 130.3 | 0 | 2400 |
| Assets for home improvement | Bs spent in durable assets related to home improvement (e.g., nails, tin roof) | 2.66 | 35.2 | 0 | 650 |
| Higiene assets | Bs spent in durable assets related to hygiene (e.g., mosquito net, comb) | 10.55 | 31.8 | 0 | 350 |
| Kitchen assets | Bs spent in durable assets kitchen (e.g., cooking pots, plastic containers) | 15.64 | 39.3 | 0 | 360 |
| Luxury assets | Bs spent in luxury goods | 24.66 | 102.0 | 0 | 1340 |
| Tools | Bs spent in tools (e.g., machete, fishing net) | 56.78 | 213.5 | 0 | 2015 |
| Transport assets | Bs spent in durable assets related to transport (e.g., canoe, bicycle) | 22.15 | 158.1 | 0 | 3000 |

t3.1 **Table 3**
Tsimane' individual consumption of market goods and services during the 7 days before the interview.

| t3.2 | t3.3 | Category | Description | Mean | SD | Min | Max | % |
|-------|------|----------------------------------|--|-------|-------|-----|-----|------|
| t3.4 | | <i>Necessity goods</i> | | | | | | |
| t3.5 | | Bread/Noodles /Flour | Bolivianos (Bs) spent in bread/noodles/flour | 2.67 | 8.79 | 0 | 86 | 17.4 |
| t3.6 | | Durable assets, Hygiene | Bs spent in durable assets related to hygiene (e.g., mosquito net, comb) | 0.11 | 2.88 | 0 | 75 | 0.4 |
| t3.7 | | Durable assets, Household | Bs spent in durable assets related to the household (e.g., mirror, candles) | 0.06 | 0.12 | 0 | 3 | 0.02 |
| t3.8 | | Hygienic goods | Bs spent in hygienic goods (e.g., soap, toothpaste) | 0.47 | 2.20 | 0 | 28 | 6.2 |
| t3.9 | | Meat | Bs spent in meat | 2.49 | 9.26 | 0 | 84 | 16.4 |
| t3.10 | | Milk/cheese | Bs spent in dietary products | 0.03 | 0.62 | 0 | 18 | 0.1 |
| t3.11 | | Salt/Condiments | Bs spent in salt/condiments | 0.36 | 2.09 | 0 | 30 | 2.9 |
| t3.12 | | School supplies | Bs spent in school supplies | 0.01 | 0.31 | 0 | 8 | 0.03 |
| t3.13 | | Sweets | Bs spent in sweets | 3.34 | 12.94 | 0 | 190 | 23.4 |
| t3.14 | | Transport | Bs spent in transport | 0.72 | 4.58 | 0 | 80 | 4.4 |
| t3.15 | | <i>Luxury goods</i> | | | | | | |
| t3.17 | | Alcoholic beverages | Bs spent in alcoholic beverages | 0.06 | 1.40 | 0 | 36 | 0.3 |
| t3.18 | | Clothing | Bs spent in clothing | 2.22 | 13.65 | 0 | 173 | 6.1 |
| t3.19 | | Durable assets, Kitchen | Bs spent in durable assets kitchen (e.g., cooking pots, plastic containers) | 13.91 | 2.01 | 0 | 40 | 2.8 |
| t3.20 | | Durable assets, Home improvement | Bs spent in durable assets related to home improvement (e.g., nails, tin roof) | 0.15 | 0.38 | 0 | 10 | 0.1 |
| t3.21 | | Durable assets, Luxury | Bs spent in durable assets (e.g., radio, mobile) | 1.09 | 8.30 | 0 | 183 | 5.8 |
| t3.22 | | Durable assets, Tools | Bs spent in tools (e.g., machete, fishing net) | 2.47 | 19.13 | 0 | 350 | 5.3 |
| t3.23 | | Durable assets, transport | Bs spent in durable assets related to transport (e.g., canoe, bicycle) | 0.04 | 0.96 | 0 | 25 | 0.2 |
| t3.24 | | Oil | Bs spent in oil during the 7 days before the interview | 1.04 | 8.68 | 0 | 148 | 3.3 |
| t3.25 | | Other foods | Bs spent in other foods | 1.71 | 21.65 | 0 | 450 | 3.9 |
| t3.26 | | Restaurants | Bs spent in restaurants | 0.93 | 10.82 | 0 | 200 | 3.1 |

366 The amount is low in the local context, as it represents only about
367 10 days of wage labor (at 20Bs/day) (Table 2).

368 The amount of total consumption of market goods and services
369 during the 7 days before the interview is also low compared with the
370 imputed value of non-market consumption. As shown in Table 1, the
371 total value of individual farm and forest products consumed by the
372 average individual during the 7 days before the interview is of 141Bs
373 (versus the 19.8Bs spent in the market place). Therefore, on average,
374 the amount spent in market items by the Tsimane' represents about
375 8% of their total consumption value. Data also suggest that Tsimane'
376 monetary expenditures in necessity goods is almost three-fold the
377 amount of expenditures in luxury goods (71% vs. 29%). Within the
378 category of necessity goods, three types of edible goods stood out:
379 Sweets, Bread/Noodles/Floor, and Meat (Table 3). Other goods and
380 services that represented an important share in Tsimane' monetary
381 expenditures in necessity goods include Hygienic goods and Transport.
382 The category of luxury goods includes types of goods with a lower share
383 in total expenditure. Among luxury goods the largest share was spent in
384 Clothing, followed by Durable assets such as radio and mobile phones.
385 The amount of money expended in the market place by the average
386 Tsimane' is of 19.8Bs/week, or 1049Bs/year.

387 Despite the low values, there is variation on consumption of market
388 goods by the Tsimane'. Minimum and maximum values for annual
389 expenditures in durable market goods ranged from 0 to 3680Bs, and
390 minimum and maximum values for weekly expenditures in market
391 goods ranged from 0 to 548Bs. About 26% of the Tsimane' in our sample
392 had no expenditures in durable market goods and about 63% had no
393 expenditures in the week previous to the interview. The amount of
394 money spent also varied across villages in the sample. For example,
395 the amount spent in durable market goods ranged from 82Bs/adult/
396 year in the village with the lowest average across households to
397 439Bs/adult/year.

398 We found that some socio-demographic characteristics of infor-
399 mants (being a man, younger age, and traveling to town) increased
400 the probability of the person reporting higher annual and weekly
401 expenditures (Table 4). Higher levels of schooling were only associated
402 to annual, but not to weekly expenditures. The total amount of cash
403 income from market activities (i.e., sale, wage labor) received by
404 the person or his/her household was also significantly associated to
405 annual expenditures in durable goods and total weekly expenditures
406 in market goods.

5.2. Regression Results

407
408 Table 5 reports the results of our multivariate analysis for the
409 variables self-reported wellbeing (Columns [1]–[5]) and frequency of
410 smiles (Columns [6]–[10]). We found a positive association between
411 annual expenditures in market goods and self-reported wellbeing.
412 The association, however, was low in real terms and only approaching

t4.1 **Table 4**
Tobit regressions showing variables associated with Tsimane' consumption of market
goods and services (N = 600).

| | Annual consumption of durable market goods, in 1000Bs | | Weekly expenditures on market goods and services, in 1000Bs | |
|--|---|-------------------|---|--------------------|
| | [1] | [2] | [3] | [4] |
| Male | .326*** (.043) | .357*** (.041) | .036*** (.011) | .050*** (.011) |
| Age | .005*** (.001) | .005*** (.001) | .001** (.0003) | .001** (.0003) |
| Schooling | .033*** (.009) | .035*** (.009) | .003 (.002) | .004* (.002) |
| Travels to town | .003** (.001) | .003*** (.001) | .001*** (.0002) | .001*** (.0003) |
| Social capital | -.002 (.002) | -.001 (.002) | .0003 (.001) | .0003 (.0006) |
| Individual cash income, in 1000Bs | .466*** (.143) | ^ | .175*** (.033) | ^ |
| Individual value of non-market consumption, in 1000Bs | -.006 (.149) | ^ | .015 (.036) | ^ |
| Household cash income, in 1000Bs | ^ | .238*** (.080) | ^ | .086*** (.019) |
| Household value of non-market consumption, in 1000Bs | ^ | -.060 (.072) | ^ | .030* (.018) |
| Household size | -.003 (.007) | -.004 (.008) | -.001 (.002) | -.004** (.002) |
| Village size | .008 (.006) | .006 (.006) | -.001 (.001) | -.001 (.001) |
| Income inequality | -.750** (.357) | -.702 (.358) | -.110 (.104) | -.097 (.105) |
| Pseudo-R ² | 0.22 | 0.22 | 4.33 | 4.27 |
| Observations left-censored | 157 | 157 | 378 | 378 |

Note: Cells contain coefficients and standard errors (in parenthesis). For definition of
variables see Table 1. *, ** and *** significant at the 10%, 5%, and 1% level. ^ Variable
intentionally excluded from the analysis. Regressions contain a set of village dummies
and constant not shown.

Table 5
Ordered probit regression results of indicators of wellbeing against Tsimane' individual consumption of market goods (n = 600).

| Explanatory variables: | Self-reported wellbeing | | | | | Frequency of smiles | | | | |
|--|-------------------------|--------------------|-------------------|--------------------|--------------------|---------------------|-----------------|------------------|--------------------|--------------------|
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] |
| Annual consumption of durable market goods (1000Bs) | .163* (.100) | .121 (.103) | .120 (.104) | .120 (.104) | .082 (.102) | .163 (.123) | .077 (.126) | .080 (.126) | .080 (.126) | .091 (.126) |
| <i>Individual level control variables:</i> | | | | | | | | | | |
| Male | ^ | .249** (.098) | .241** (.098) | .241** (.098) | .098 (.099) | ^ | .040 (.026) | .037 (.026) | .037 (.026) | .039 (.028) |
| Age | ^ | -.002 (.003) | -.001 (.003) | -.001 (.003) | -.002 (.003) | ^ | .002* (.001) | .002** (.001) | .002* (.001) | .002** (.001) |
| Schooling | ^ | -.060*** (.023) | -.058** (.023) | -.058** (.023) | -.064** (.025) | ^ | -.001 (.005) | <.001 (.005) | <.001 (.005) | .001 (.005) |
| Travel to town | ^ | .001 (.003) | .002 (.004) | .002 (.004) | .003 (.004) | ^ | <.001 (.001) | <.001 (.001) | <.001 (.001) | <.001 (.001) |
| Cash income (1000Bs) | ^ | ^ | ^ | ^ | .851*** (.302) | ^ | ^ | ^ | ^ | -.411 (.382) |
| Value of non-market Consumption (1000Bs) | ^ | ^ | ^ | ^ | 1.784*** (.336) | ^ | ^ | ^ | ^ | .587 (.375) |
| Social capital | ^ | ^ | ^ | ^ | .003 (.005) | ^ | ^ | ^ | ^ | -.002 (.002) |
| <i>Household and village level control variables</i> | | | | | | | | | | |
| Household size | ^ | ^ | .015 (.015) | .015 (.015) | .026* (.015) | ^ | ^ | .006 (.004) | .006 (.004) | .006 (.004) |
| Village size | ^ | ^ | ^ | .007 (.006) | .005 (.006) | ^ | ^ | ^ | .006*** (.002) | .006*** (.002) |
| Income inequality | ^ | ^ | ^ | -.343*** (.097) | -.251** (.098) | ^ | ^ | ^ | -.195*** (.031) | -.188*** (.032) |

Note: Cells contain coefficients and standard errors (in parenthesis). For definition of variables see Table 1. *, ** and *** significant at the 10%, 5%, and 1% level. ^ Variable intentionally excluded from the analysis. Regressions include a set of village dummies and constant not shown.

statistical significance in the model without controls (Column [1], p = 0.104). Once we add controls for individual (Column [2]), household (Column [3]), and village (Column [4]) characteristics, the association becomes statistically insignificant. The association between annual consumption of market goods and subjective wellbeing is even weaker when controlling for other variables associated to the person's economic status (i.e., cash income, consumption of non-market goods) (Column [5]). In Columns [6]–[10], we repeat the analysis using our second measure of wellbeing, frequency of smiles. We found the same positive, but statistically insignificant association between frequency of smiles and annual consumption of durable market goods.

To test the robustness of the results, we ran additional tests (Table 6). In our first robustness tests, we used different specification models (lines [2]–[5]). Specifically, in line [5] we ran the same model but using a Poisson regression model, and in lines [3]–[5] we ran various models in Table 4 using the variable annual consumption log-transformed.

In our second robustness tests, we used different proxies for consumption of market goods (lines [6]–[8]). In line [6], we present results of the model using our measure of weekly expenditures on market goods and services as main explanatory variable. In line [7] we differentiate between weekly expenditures on goods locally considered necessities and expenditures on goods locally considered luxuries. Since households are the unit of consumption and production for the Tsimane', to run the regression presented in line [8], we aggregate measures of income and consumption at the household level (including the explanatory variable, that in this regression was household consumption of durable market goods).

In our third robustness tests, we ran our core model for selected parts of the sample (lines [9]–[11]). Because men and women have different expenditure patterns, we separated men and women in the sample (lines [9] and [10]). In line [11], we eliminated from the sample individuals without expenditures on durable goods in the last 12 months.

Overall, results from the robustness analyses mostly mesh with results from the core model. Only in three of the 22 models estimated

we find a significant association between a measure of consumption of market goods and a measure of wellbeing, *frequency of smiles* in the three cases. First, when using the log-transformed variables in the model without controls, we find that the annual consumption of durable market goods is associated in a positive and statistically significant way with frequency of smiles. Second, when using weekly expenditures on markets goods and services as the measure for consumption, we also found a positive association between expenditures and frequency of smiles. Third, when separating weekly expenditures

Table 6
Robustness analysis.

| | | Self-reported well-being | Frequency of smiles | |
|------|--|--------------------------|---------------------|-------|
| [1] | Core model, Columns [5] and [10], Table 5 | .163* (.100) | .163 (.123) | t6.4 |
| [2] | Using a Poisson regression model | .017 (.022) | .018 (.028) | t6.5 |
| [3] | Using annual consumption in logs, Columns [1] and [6] (n = 443) | .054 (.034) | .107*** (.039) | t6.6 |
| [4] | Using annual consumption in logs, Columns [2] and [7] (n = 443) | .014 (.042) | .056 (.045) | t6.7 |
| [5] | Using annual consumption in logs, Columns [5] and [10] (n = 443) | -.010 (.042) | .067 (.046) | t6.8 |
| [6] | Using expenditures on market goods and services the week prior to the interview | .430 (1.146) | 2.897*** (1.013) | t6.9 |
| [7] | Separating weekly expenditures on market goods and services considered: | .159 (2.251) | -.512 (2.150) | t6.10 |
| | Luxuries | .546 (1.623) | 4.739*** (1.054) | t6.11 |
| [8] | Using explanatory and control variables aggregated at the household level | -.170 (.175) | -.053 (.182) | t6.12 |
| [9] | Using only men in the sample (n = 298) | .126 (.112) | .0003 (.132) | t6.13 |
| [10] | Using only women in the sample (n = 302) | .157 (.353) | .931 (.571) | t6.14 |
| [11] | Using only people with some expenditures on durable goods through the year (n = 443) | .006 (.110) | .113 (.133) | t6.15 |

458 between necessities and luxuries we found that the association with
459 frequency of smiles is only significant for expenditures in goods that,
460 according to the local definition, are luxuries. In one more case does
461 the examined association approaches statistical significance. When
462 using only the sample of women, we find that the annual consump-
463 tion of durable market goods is associated in a positive and almost
464 statistically significant way ($p=0.103$) with frequency of smiles. The
465 coefficients of those associations, although statistically significant, are
466 low in real terms. For example, in the model with logs (line [3]), a one
467 percent increase in annual consumption would increase the measure
468 of frequency of smiles in 0.11%.

469 6. Discussion and Conclusions

470 We found that, in a society in the first stages of integration to the
471 market economy, the consumption of market goods is not associated
472 to subjective and objective measures of wellbeing. The finding is robust
473 to the two measures of wellbeing used and to changes in the specifica-
474 tion model. Since the lack of association between variables can be due to
475 a number of methodological biases and limitations, we start the discus-
476 sion commenting on potential caveats to our study before we elaborate
477 on the interpretation of our results and its implications for degrowth
478 theory.

479 6.1. Potential Biases and Limitations of the Study

480 Potential biases in our estimations relate to measurement errors of
481 dependent and explanatory variables and omitted variables. We might
482 have systematic errors in the frequency of smiles variable as inter-
483 viewers might have influenced a subject's display of emotions. Subjects
484 may have been more likely to smile with some surveyors because those
485 surveyors laughed and smiled more, inducing subjects to reciprocate. In
486 a previous study in the area, we tested whether the propensity to smile
487 or laugh was affected by the interviewer, and found that it was not
488 (Godoy et al., 2005b), so we assume that interviewer bias does not
489 drive our results.

490 We might also have random measurement error in consumption,
491 as people might either forget to report expenditures (faulty recall
492 bias) or mention items acquired in a period before the framework
493 of the survey question (forward telescoping bias). Random measure-
494 ment error in the explanatory variables would produce an attenua-
495 tion bias and make our estimates more conservative, thus working
496 on the direction of our expected results.

497 Our estimations might also be biased by the role of omitted
498 variables. For example, higher levels of consumption of market goods
499 might grant people higher social status (Godoy et al., 2007b). If so,
500 people with higher levels of consumption of market goods might
501 have a stronger social network, a positive outcome that might, in
502 turn, affect their own subjective wellbeing. Failure to control for social
503 status might bias our estimations. We have included several controls
504 that research suggests are important in determining subjective well-
505 being (i.e., value of non-market consumption, social capital), but we
506 cannot rule out the possibility of the existence of other omitted
507 variables.

508 Since the main goal of this paper is to test the universality of the
509 assumed causal link between income (through consumption of mar-
510 ket goods) and wellbeing, an important limitation of this work refers
511 to the potential endogeneity of the association. Standard economic
512 theory predicts a positive effect of income in wellbeing, but causality
513 could also run in the other direction if, for example, happier people
514 are more active and generate more income for more consumption
515 than less happy people. However, since we found a zero effect in
516 the association, our results suggest that this potential positive bias
517 is not actually driving the results, unless the causal effect of consump-
518 tion is actually negative.

519 6.2. Consumption and wellbeing among the Tsimane'

Bearing those caveats in mind, we now discuss the main finding of
520 this work. We found that, among the Tsimane', the consumption of
521 market goods is not associated to measures of wellbeing in a statistically
522 significant way. Our finding only partially meshes with results from
523 research on the economics of happiness. As mentioned in the intro-
524 duction, previous research has generally found that the link between
525 income and wellbeing is rather weak, especially when measuring
526 wellbeing in subjective terms (Blanchflower and Oswald, 2004; Di
527 Tella and MacCulloch, 2008; Diener et al., 2000; Frey and Stutzer,
528 2002; Inglehart and Klingemann, 2010). But this body of research
529 has also suggested that income does seem to enhance SWB when
530 it means avoiding poverty. Several studies have detected stronger
531 positive associations between economic indicators and measures
532 of wellbeing among poorer than among wealthier samples (Diener
533 et al., 1995; Diener and Biswas-Diener, 2002; Schyns, 2002). For exam-
534 ple, in a study among poor indigenous farmers in Peninsular Malaysia,
535 Howell et al. (2006) found a strong, positive, and significant association
536 between wealth and life satisfaction. Findings along those lines, known
537 as need theory, have led authors to argue that income bears a stronger
538 association with SWB among the poor, because in a situation of poverty
539 income is used to satisfy basic needs (Biswas-Diener and Diener, 2001).
540

541 Our finding that for the Tsimane' and despite the fact that they are
542 just above the poverty line by international standards, consumption
543 of market goods and subjective wellbeing do not seem associated
544 and challenge the argument of need theory. A potential explanation
545 for the mismatch between our finding and findings from previous
546 research on need theory might lay on the Tsimane' concept of well-
547 being. As mentioned, Tsimane' sense of wellbeing does not hinge on
548 market-related activities, or on the acquisition and possession of
549 material goods. Rather, Tsimane' sense of wellbeing centers on social
550 relations and success on subsistence activities. Furthermore, for the
551 Tsimane', the consumption of market goods does not seem to be a
552 culturally determined satisfier, since they satisfy most of their needs
553 with goods and services obtained outside the market economy. Since
554 for the Tsimane' their wellbeing depends on the quality of their social
555 relations and on their success on subsistence activities, and since they
556 are able to satisfy most of their needs outside the market place, it is
557 not surprising that we do not find the association between consumption
558 of market goods and wellbeing.

559 6.3. Implications of This Work

560 Tsimane' exemplify a paradigm of a non-consumer society because
561 they are able to satisfy most of their needs outside the market.
562 While proposing such an economic system as an alternative to the
563 dominant economic model is naïve, unrealistic, and unviable, we think
564 that there is at least one lesson that can be drawn from this society.
565 The analysis of the relations between consumption of material goods
566 and individual wellbeing among the Tsimane' suggest that human well-
567 being does not necessarily bear a direct link with consumption of markets
568 goods, but rather that the link is culturally determined. This lesson, we
569 think, allows for conceptualizing models that increase human wellbeing
570 without depending on consumption of market goods, and in doing so
571 directly informs research on the viability of sustainable degrowth.

572 7. Uncited references

573 Diener et al., 2002
574 Easterlin, 1974

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583 References

584 Alesina, A., Di Tella, R., MacCulloch, R., 2004. Inequality and happiness: are Europeans
585 and Americans different? *Journal of Public Economics* 88, 2009–2042.

586 Bernard, H.R., 2006. *Research Methods in Anthropology. Qualitative and Quantitative*
587 *Approaches*. Altamira Press, Walnut Creek.

588 Biswas-Diener, R., Diener, E., 2001. Making the best of a bad situation: satisfaction in
589 the slums of Calcutta. *Social Indicators Research* 55, 329–352.

590 Blanchflower, D., Oswald, A., 2004. Well-being over time in Britain and the USA. *Journal*
591 *of Public Economics* 88, 1359–1386.

592 Costanza, R., Fisher, B., Ali, S., Beer, C., Bond, L., Boumans, R., Danigelis, N.L., Dickinson,
593 J., Elliott, C., Farley, J., Gayer, D.E., Glenn, L.M., Hudspeth, T., Mahoney, D., McCahill,
594 L., McIntosh, B., Reed, B., Rizvi, S.A.T., Rizzo, D.M., Simpatico, T., Snapp, R., 2007.
595 Quality of life: an approach integrating opportunities, human needs, and subjective
596 well-being. *Ecological Economics* 61, 267–276.

597 Cruz, I., Stahel, A., Max-Neef, M., 2009. Towards a systemic development approach:
598 building on the Human-Scale Development paradigm. *Ecological Economics* 68,
599 2021–2030.

600 Daly, H.E., 1990. Toward some operational principles of sustainable development. *Ecological*
601 *Economics* 2, 1–6.

602 Deaton, A., 2008. Income, health, and well-being around the world: evidence from the
603 Gallup World Poll. *Journal of Economic Perspectives* 22, 53–72.

604 Di Tella, R., MacCulloch, R., 2008. Gross national happiness as an answer to the Easterlin
605 Paradox? *Journal of Development Economics* 86, 22–42.

606 Diener, E., 1994. Assessing subjective well-being: progress and opportunities. *Social*
607 *Indicators Research* 31, 103–157.

608 Diener, E., Biswas-Diener, R., 2002. Will money increase subjective well-being? *Social*
609 *Indicators Research* 57, 119–169.

610 Diener, E., Suh, E.M., Smith, H., Shao, L., 1995. National differences in reported subjective
611 well-being – why do they occur. *Social Indicators Research* 34, 7–32.

612 Diener, E., Oishi, S., Suh, E., 2000. Subjective well-being across cultures. *International*
613 *Journal of Psychology* 35, 300.

614 Diener, E., Lucas, R., Oishi, S., 2002. Subjective well-being: the science of happiness and
615 life satisfaction. In: Snyder, C., Lopez, S.J. (Eds.), *Handbook of Positive Psychology*.
616 Oxford University Press, Oxford, pp. 64–65.

617 Dolan, P., Peasegood, T., White, M., 2008. Do we really know what makes us happy? A
618 review of the economic literature on the factors associated with subjective well-
619 being. *Journal of Economic Psychology* 29, 94–122.

620 Easterlin, R.A., 1974. Does economic growth improve the human lot? Some empirical
621 evidence. In: David, P., Reeder, M. (Eds.), *Nations and Happiness in Economic*
622 *Growth: Essays in Honor of Moses Abramowitz*. Academic Press, New York,
623 pp. 89–125.

624 Ekman, P., 1990. Duchenne and facial expression of emotion. In: Cuthbertson, R. (Ed.),
625 *The Mechanism of Human Facial Expression*. Cambridge University Press, New
626 York, pp. 270–284.

627 Ekman, P., 2002. *Telling Lies. Clues to Deceit in the Marketplace*. Norton, New York.

628 Ekman, P., Davidson, R.J., 1993. Voluntary smiling changes regional brain activity. *Psychological*
629 *Science* 4, 342–345.

630 Ferrer-i-Carbonell, A., Gowdy, J.M., 2007. Environmental degradation and happiness.
631 *Ecological Economics* 60, 509–516.

632 Frey, B., Stutzer, A., 2002. *Happiness and Economics: How the Economy and Institutions*
633 *Affect Well-Being*. Princeton University Press, Princeton, NJ.

634 Fridlund, A.J., 1994. *Human Facial Expression. An Evolutionary View*. Academic Press,
635 New York.

636 Godoy, R., Reyes-García, V., Byron, E., Leonard, W.R., Vadez, V., 2005a. The effect of market
637 economies on the well-being of indigenous peoples and on their use of renewable
638 natural resources. *Annual Review of Anthropology* 34, 121–138.

639 Godoy, R., Reyes-García, V., Huanca, T., Tanner, S., Leonard, W.R., McDade, T., Vadez, V.,
640 2005b. Do smiles have a face value? Panel evidence from Amazonian Indians. *Journal*
641 *of Economic Psychology* 26, 469–490.

642 Godoy, R., Reyes-García, V., Huanca, T., Leonard, W.R., McDade, T., Tanner, S., Seyfried, C.,
643 2007a. On the measure of income and the economic unimportance of social capital –

evidence from a native Amazonian society of farmers and foragers. *Journal of Anthropological*
644 *Research* 63, 239–260.

645 Godoy, R., Reyes-García, V., Huanca, T., Leonard, W.R., McDade, T., Tanner, S., Vadez, V.,
646 Seyfried, C., 2007b. Signaling by consumption in a native Amazonian society. *Evolution*
647 *and Human Behavior* 28, 124–134.

648 Godoy, R., Reyes-García, V., Gravlee, C.C., Huanca, T., Leonard, W.R., McDade, T.W., Tanner,
649 S., 2009. Moving beyond a snapshot to understand changes in the well-being of native
650 Amazonians Panel Evidence (2002–2006) from Bolivia. *Current Anthropology* 50,
651 560–570.

652 Hagerty, M.R., Veenhoven, R., 2003. Wealth and happiness revisited – growing national
653 income does go with greater happiness. *Social Indicators Research* 64, 1–27.

654 Heffetz, O., 2010. A test of conspicuous consumption: visibility and income elasticities.
655 *The Review of Economics and Statistics*.

656 Howell, C.J., Howell, R.T., Schwabe, K.A., 2006. Does wealth enhance life satisfaction for
657 people who are materially deprived? Exploring the association among the Orang
658 Asli of peninsular Malaysia. *Social Indicators Research* 76, 499–524.

659 Huanca, T., 2008. Tsimane' Oral Tradition, Landscape, and Identity in Tropical Forest.
660 Imprenta Wagui, La Paz.

661 Inglehart, R., Klingemann, H., 2010. *Genes, Culture and Happiness*. MIT, Boston.

662 Instituto Nacional de Estadística, 2003. *Bolivia: Características sociodemográficas de la*
663 *población indígena*. INE, La Paz.

664 Kraut, R.E., Johnston, R.E., 1979. Social and emotional messages of smiling: an ethological
665 approach. *Journal of Personality and Social Psychology* 37, 1539–1553.

666 Latouche, S., 2003. *Décoloniser l'imaginaire: La Pensée créative contre l'économie de*
667 *l'absurde*. Parangon, Paris.

668 Layard, R., 2005. *Happiness: Lessons from a New Science*. Penguin Press, New York.

669 Martínez-Alier, J., 2009. Socially sustainable economic de-growth. *Development and*
670 *Change* 40, 1099–1119.

671 Max-Neef, M., 1991. *Human Scale Development. Conception, Application, and Further*
672 *Reflections*. The Apex Press, New York and London.

673 Max-Neef, M., 1992. Development and human needs. In: Etkin, P., Max-Neef, M. (Eds.),
674 *Real Life Economics: Understanding Wealth Creation*. Routledge, London, pp. 97–213.

675 Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Synthesis*.
676 Washington, DC.

677 O'Quin, K., Arono, J., 1981. Humor as a technique of social influence. *Social Psychology*
678 *Quarterly* 44, 349–357.

679 Reyes-García, V., TAPS study team, 2011. Happiness in the Amazon: Folk explanations
680 of happiness in a hunter-horticulturalist society in the Bolivian Amazon. In: Selin,
681 H. (Ed.), *Happiness across Cultures: Views of Happiness and Quality of Life in Non-*
682 *Western Cultures*. Springer, The Netherlands.

683 Reyes-García, V., Godoy, R.A., Vadez, V., Ruiz-Mallen, I., Huanca, T., Leonard, W.R., McDade,
684 T.W., Tanner, S., 2009. The pay-offs to sociability. *Human Nature—An Interdisciplinary*
685 *Biosocial Perspective* 20, 431–446.

686 Reyes-García, V., Gravlee, C.C., McDade, T.W., Huanca, T., Leonard, W.R., Tanner, S.,
687 2010. Cultural consonance and psychological well-being: estimates using longitudinal
688 data from an Amazonian Society. *Culture, Medicine and Psychiatry* 34,
689 186–203.

690 Ringhofer, L., 2010. *Fishing, Foraging And Farming In The Bolivian Amazon: On A Local*
691 *Society In Transition*. Springer, London.

692 Schneider, F., Kallis, G., Martínez-Alier, J., 2010. Crisis or opportunity? Economic
693 degrowth for social equity and ecological sustainability. Introduction to this special
694 issue. *Journal of Cleaner Production* 18, 511–518.

695 Schyns, P., 2002. Wealth of nations, individual income and life satisfaction in 42 countries:
696 a multilevel approach. *Social Indicators Research* 60, 5–40.

697 Stevenson, B., Wolfers, J., 2008. Economic growth and subjective well-being: reassess-
698 ing the Easterlin paradox. *Brookings Papers on Economic Activity*, pp. 1–102.

699 Trauger, D.L., Czech, B., Erickson, J.D., Garrettson, P.R., Kernohan, B.J., Miller, C.A., 2003.
700 The relationship of economic growth to wildlife conservation. Technical review
701 03–1. The Wildlife Society, Bethesda.

702 Vadez, V., Reyes-García, V., Huanca, T., Leonard, W.R., 2008. Cash cropping, farm tech-
703 nologies, and deforestation: what are the connections? A model with empirical
704 data from the Bolivian Amazon. *Human Organization* 67, 384–396.

705 van den Bergh, J.C.J.M., 2011. Environment versus growth – a criticism of “degrowth”
706 and a plea for “a-growth”. *Ecological Economics* 70, 881–890.

707 Victor, P., 2010. Questioning economic growth. *Nature* 468, 370–371.

708 Wackernagel, M., 2002. Tracking the ecological overshoot of the human economy.
709 Proceedings of the National Academy of Sciences of the United States of America 99,
710 9266–9271.

711 WCED, 1987. Our common future. Published as Annex to General Assembly document A/
712 42/427, Development and International Co-operation: Environment August 2, 1987.
713