



# Sustainable consumption and wellbeing: Does on-line shopping matter?

Mònica Guillen-Royo

Centre for Technology, Innovation and Culture, Postboks 1108, Blindern, 0317 Oslo, Norway



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## ABSTRACT

Empirical evidence indicates that practices linked to reducing the environmental impact of travelling, heating, cooling and food consumption are compatible with high levels of wellbeing. More and more people are shopping on-line, which increases the efficiency of consumption, expands choice and information – while also intensifying exposure to consumerism and materialistic messages. This article explores the relationship between sustainable consumption and wellbeing and the role of on-line shopping in moderating the relationship, analysing survey data from a representative sample of the Norwegian population in 2017. Wellbeing is addressed in its hedonic (happiness), cognitive (satisfaction) and eudaimonic dimensions (subjective vitality). Sustainable consumption practices are investigated through a variable that captures the extent to which respondents choose sustainable alternatives as regards travel, household energy use and food. Results based on regression analysis of cross-sectional data indicate that sustainable consumption is positively associated with happiness and life satisfaction in Norway, but that the relationship weakens when psychological and lifestyle factors are taken into account. Subjective vitality maintains its strong association with sustainable consumption. Two alternative explanations are proposed: that those who feel energetic engage more in sustainable practices; and that the effort and socialization inherent in sharing, reusing and reducing promote the conditions for increased psychological health and vitality. The study also shows that internet shopping does not weaken the strength of the relationship, and might even increase life satisfaction by lowering the costs of engaging in sustainable consumption practices.

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## 1. Introduction

Following the definition in the Brundtland Report, sustainable development has traditionally been associated with the provision of wellbeing<sup>1</sup> now and in the future, and with the existence of environmental limits (WCED, 1987). Assumptions about the direction of the relationship between environmental sustainability and the wellbeing of current generations depend on whether a ‘weak’ or a ‘strong’ approach to sustainability is favoured (Wilhite and McNeill, 2015). Those aligning with the weak sustainability discourse see natural resources as somehow substitutable by human-made resources; they prioritize technological and organizational solutions for addressing environmental challenges, to

enable high quality of life now and in the future. By contrast, those favouring a ‘strong’ sustainability approach do not consider decoupling economic activity from environmental impact as feasible in absolute terms (Jackson, 2009) and advocate global reductions in material and resource consumption. In the short run and for high-consuming individuals or countries, this might lead to a decline in wellbeing (Büchs and Koch, 2017).

Empirical studies of the relationship between consumption and wellbeing do not support the idea that sustainable consumption – including ‘strong’ measures like reducing the intake of meat and fish and ‘weak’ measures such as recycling – is negatively linked to quality of life. Unlike the effects of economic recessions, which have proven harmful for health and life expectancy (Büchs and Koch, 2017), consuming less or consuming low-impact products and services does not seem to reduce wellbeing (Andersson et al., 2014; Binder and Blankenberg, 2017; Brown and Kasser, 2005; Welsch and Kühling, 2011). This applies to the different dimensions of wellbeing: subjective, including moods and emotions (hedonic)

E-mail address: [monica.guillen@sum.uio.no](mailto:monica.guillen@sum.uio.no).

<sup>1</sup> In the introductory section, ‘wellbeing’ and ‘quality of life’ are used interchangeably, to encompass hedonic and eudaimonic approaches to wellbeing as well as perspectives based on objective indicators.

and life or domain satisfaction (cognitive); and *eudaimonic* concerning meaning in life and basic psychological needs (Delle Fave et al., 2011; Diener et al., 1999).

Kasser (2017) suggests three possible explanations for this general result. The two first relate to the fact that most studies use cross-sectional data: they might not have accounted for personal and lifestyle factors influencing both sustainable consumption and wellbeing, or might not have considered the fact that those who score high on wellbeing also tend to follow sustainable consumption practices. The third argument points to a theoretical explanation, as engaging in sustainable consumption practices might contribute to fulfil the basic psychological needs for competence, relatedness and autonomy<sup>2</sup>-and result in higher levels of wellbeing (Kasser, 2017; Ryan and Deci, 2000).

One aspect of consumption undergoing rapid change is how we shop: on-line shopping is increasingly replacing in-store shopping in certain categories. In Europe, 85% of those surveyed in 2017 used the internet, and 68% of them bought or ordered goods on-line. Clothes and sports goods (64% of those shopping on-line), travel and holiday accommodation (53%) and household goods and appliances (46%) were the categories most frequently bought on-line. In addition, buying food on-line is becoming increasingly popular among younger generations.<sup>3</sup> How this trend can modify consumption practices or their relationship with wellbeing is still unexplored. Castellacci and Tveito (2018) suggest that greater information on product characteristics and greater availability of 'green' products might facilitate engaging in sustainable consumption practices, thereby strengthening their positive impact on wellbeing. Sabatini (2011) holds that the time saved by engaging in e-commerce might be used for wellbeing-enhancing activities like exercising, socializing or spending time outdoors.

This paper contributes to the discussion on the relationship between sustainable consumption and wellbeing in two ways. First, it investigates the positive association found in previous correlational studies by examining the hedonic, cognitive and *eudaimonic* dimensions of wellbeing and by discussing Kasser's (2017) methodological and theoretical explanations. This is done in order to provide a deeper understanding on the relationship between sustainable consumption practices ('weak' as well as 'strong') and wellbeing that can help to identify possible policy measures enhancing both human wellbeing and environmental sustainability. Second, and drawing on evidence that indicates to the growing importance of e-commerce, the study examines the role of on-line shopping in moderating the relationship between sustainable consumption practices and the three dimensions of wellbeing.

The paper starts by introducing the concept of 'wellbeing' and its usages in the sustainability debate. Section 2 reviews empirical evidence on the relationship between sustainable consumption and wellbeing. Studies of on-line shopping and its significance for sustainable consumption practices and wellbeing are also noted here. Section 3 expands on the Norwegian context and presents the research questions and hypotheses. Section 4 describes the survey and the data used for the analysis and introduces the empirical model. Regression results of the cross-sectional study are presented

in Section 5. The discussion section relates the findings to the main research questions and hypotheses, offers policy-related implications and reflects on limitations and further research opportunities. The final section concludes this article.

## 2. Literature background

### 2.1. The concept of wellbeing and the sustainability debate

'Wellbeing' is an umbrella term that encompasses people's assessments of their emotions and their personal, socio-economic and political situations, as well as expert-based appraisals of what makes a life 'good' (Gough and McGregor, 2007). 'Sustainable' development has been defined by the World Commission on Environment and Development (WCED) as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987:43). In the WCED report, needs were not linked to a specific theory of wellbeing, but were generally associated with the basic requirements for food, water, clothing, shelter, sanitation and jobs. Needs were not explicitly opposed to wants either, as 'fulfilling wants or aspirations' was included as a legitimate goal of sustainable development.

The social science literature operates with two main categorizations of wellbeing. The first is used in social psychology, where scholars distinguish between *hedonia* or subjective wellbeing, and *eudaimonia* or psychological wellbeing (Delle Fave et al., 2011). The second, used in the economics of happiness and welfare economics traditions, differentiates between *subjective* and *objective* perspectives (Gasper, 2005). Hedonic approaches, *senso stricto*, account for feelings, moods and emotions; however, they are generally considered together with cognitive appraisals of life or domain satisfaction as constituting 'subjective wellbeing' (SWB) (Diener et al., 1999). In contrast, the *eudaimonic* tradition in psychology defines wellbeing in terms of meaning, self-actualization and personal growth, following Aristotle's definition of happiness as living in accordance with one's true self and realizing one's true potential (Delle Fave et al., 2011; Ryff, 1989). Eudaimonic theories like Ryff and Singer's (1998) multidimensional approach to psychological wellbeing and Ryan & Deci's (2000) Self-Determination Theory (SDT) rely on specific prerequisites for experiencing a well-functioning life. The latter is also the case with objective theories like the basic or human needs approaches (Doyal and Gough, 1991; Max-Neef, 1991), and Sen (1985) and Nussbaum's (2000) capability approach. These perspectives assess wellbeing from theoretical or empirically-based evidence of what constitutes a good life; a life without serious impediments to social participation.

The fact that the WCED definition of 'sustainable development' refers to the concept of needs, which is usually associated with limited, satiable and universally applicable requirements for effective functioning, indicates that it aligns with objective wellbeing approaches based on universal prerequisites (Büchs and Koch, 2017; Gough, 2018). This is supported by the type of indicators used in assessing development (like the Human Development Index), and sustainable development (like the seventeen UN Sustainable Development Goals, SDGs). However, the WCED report and later references to sustainable development (see Guillen-Royo, 2016, for a review) include as a legitimate goal 'people's aspirations for a better life', with the explicit assumption that needs are constantly changing. Moreover, the recently endorsed SDGs stress the importance of economic growth and material prosperity, even in rich countries, indicating that people's own perceptions and feelings are also incorporated in the concept of sustainable development.

Determining the approach to wellbeing that most accurately

<sup>2</sup> Ryan and Deci's (2000) Self-Determination Theory (SDT) defines personal wellbeing in terms of the level of satisfaction of the psychological needs for competence, relatedness and autonomy. 'Competence' concerns the capacity to engage in activities valued by the person; 'relatedness' is defined as feeling close to and accepted by others; and autonomy concerns being able to decide one's own actions and behaviours.

<sup>3</sup> In 2017, 27% in the 17–25 age group bought food and groceries on-line. Data on internet use and on-line shopping build on Eurostat's 2017 Survey on ICT (information and communication technology) usage in households and by individuals (<http://ec.europa.eu/Eurostat>).

captures the concept of sustainable development is beyond the scope of this paper and has been discussed elsewhere (Büchs and Koch, 2017; Gough, 2018; Guillen-Royo, 2016; Rauschmayer et al., 2011). Both hedonic and eudaimonic (and subjective and objective) perspectives can provide important information about people's quality of life and that of their communities. On the one hand, relying on people's own assessments might mask the fact that individuals adapt to their circumstances and often report levels of wellbeing not necessarily reflecting their actual situation (Büchs and Koch, 2017; Frederick and Loewenstein, 1999; Gough, 2018; Nussbaum, 2000). On the other hand, applying eudaimonic or objective approaches to wellbeing alone might be perceived as paternalistic and disregarding local and individual understandings of what makes a life 'good' (Doyal and Gough, 1991; Frey and Stutzer, 2002). It is advisable to recognize the challenges and limitations of the different dimensions, rather than simply taking one of them as the sole legitimate measure of wellbeing.

## 2.2. Sustainable consumption and wellbeing

Linking with the 'weak' and 'strong' approaches to sustainability outlined above, Lorek and Spangenberg (2014) distinguish between weak and strong sustainable consumption perspectives. 'Weak' sustainable consumption approaches involve energy-saving behaviours and the consumption of energy and materially efficient products with low impact in terms of emissions and pollution. 'Strong' sustainable consumption perspectives are associated with a culture of simplicity, entailing absolute reductions in the total level of consumption, not merely improvements in material or energy efficiency (Jackson, 2009). Much of the sustainable consumption literature focuses on *practice*, understood in terms of habitual or routinized interactions with goods and services (Wilhite, 2016). However, many studies of the relationship between sustainable consumption and wellbeing employ the less comprehensive concept of *behaviour* or *activity*, and do not necessarily take into account the role of habits and socio-technical constraints in shaping behaviour.

The empirical literature on the relationship between sustainable consumption and wellbeing is conceptually and methodologically diverse. Concerning wellbeing, most studies focus on subjective approaches, using as the outcome variable the hedonic (happiness and moods) and/or cognitive (satisfaction with life) dimensions of subjective wellbeing (Andersson et al., 2014; Brown and Kasser, 2005; Verhofstadt et al., 2016; Welsch and Kühling, 2011). Sustainable consumption is generally defined in terms of 'behaviour' or 'lifestyle', which may overlap with the meaning of 'practice' but generally concern purchases (e.g., buying water-saving devices) or activities (e.g. recycling). How sustainable consumption is measured also varies greatly. Some studies base their analyses on the ecological footprint of households<sup>4</sup> (Brown and Kasser, 2005; Verhofstadt et al., 2016), but most draw on measures of people's engagement in sustainable consumption practices or behaviours (Andersson et al., 2014; Binder and Blankenberg, 2017; Suarez-Varela et al., 2016; Welsch and Kühling, 2011). Researchers generally use correlational or regression analysis of cross-sectional data – with the exception of Binder and Blankenberg (2017), who drew on panel data to investigate the causal effect of pro-environmental consumption on life satisfaction. Despite this diversity, most

studies find that engaging in a set of 'soft' and/or 'strong' sustainable consumption practices<sup>5</sup> is not detrimental to wellbeing (see Kasser, 2017, for an extensive review).

The compatibility of high levels of subjective wellbeing and low-impact lifestyles found in the literature does not necessarily apply when practices or behaviours are examined in isolation. For example, Welsch and Kühling (2011) found that pro-environmental consumption approximated by several indices capturing the frequency of engaging in five pro-environmental behaviours was positively linked to life satisfaction in Germany. This positive relationship held concerning single behaviours like buying low-energy light bulbs and household appliances, but not with regard to buying organic food. Similarly, in a study from Flemish Belgium, Verhofstadt et al. (2016) found that at the aggregate level, lower ecological footprints were not significantly associated with life satisfaction – but, in isolation, some practices were good for wellbeing (e.g. consuming seasonal and fresh products) whereas others were detrimental (e.g. not having or using a car). Notwithstanding the analytical relevance of particular goods, practices or behaviours, the extent to which people engage in sustainable consumption in general and/or reduce their GHG emissions at the aggregate level might be more important for sustainable development – especially as it is widely acknowledged that rebound effects are many, and isolated measures to reduce environmental impact in one domain are often followed by increases in environmental impact in other consumption domains (Chitnis et al., 2014; Jackson, 2009; Wilhite and Nørgaard, 2004).

The few studies using eudaimonic or objective approaches support previous claims of the compatibility of low-impact lifestyles and high levels of wellbeing. Corral-Verdugo et al. (2011), studying a small Mexican urban sample, found that greater engagement in ecological behaviours was associated with enhanced psychological wellbeing, the latter defined in terms of self-acceptance, purpose in life, environmental mastery, personal growth, autonomy and positive relationships. Drawing on Sen's capability approach, Hirvilammi et al. (2013) found that even low-income households in Finland were able to achieve approximately the same high level of *functionings*<sup>6</sup> with second-hand products (reusing) as they would have achieved by buying new goods. Blaitt González (2010) compared the ecological footprint of people living in three Australian eco-villages and the satisfaction of their human needs for subsistence, protection, affection, understanding, participation, idleness, creation, identity and freedom (Max-Neef, 1991). As in other studies, living in eco-villages with a low ecological footprint was found *not* to be associated with low levels of needs satisfaction.

Kasser (2017) suggests three possible explanations for the positive association between sustainable consumption and subjective wellbeing found in the literature. First, the problem of omitted variables, which emerges when important factors influencing both sustainable consumption and wellbeing are not considered. Kasser notes that personal goals, the experience of mindfulness and choosing a life of voluntary simplicity (variables generally omitted in empirical studies) can explain the positive association found in correlational research (Brown and Kasser, 2005). Second, bidirectionality or reverse causation affects all correlational studies: it is difficult to rule out, except in experimental settings. As happier people are more likely to engage in altruistic behaviours, to cooperate and volunteer, there is a higher probability of their

<sup>4</sup> The *ecological footprint* 'measures the ecological assets that a given population requires to produce the natural resources it consumes (including plant-based food and fibre products, livestock and fish products, timber and other forest products, space for urban infrastructure) and to absorb its waste, especially carbon emissions' (Global Footprint Network, 2012).

<sup>5</sup> In this section, 'practice' is used as a general term that includes behaviour, activity and lifestyle.

<sup>6</sup> Sen (1985:10) defines 'functionings' in terms of 'what people manage to do or to be'.

participating in pro-environmental behaviours (Lyubomirsky et al., 2005). Lastly, Kasser notes an indirect path through the satisfaction of the three psychological needs identified in self-determination theory (SDT), a eudaimonic theory of wellbeing developed by psychologists Ryan and Deci (2000). Kasser argues that engaging in sustainable behaviours such as sharing, reusing or reducing total consumption might enhance the basic psychological needs for competence (mastering tasks that are valued), relatedness (connecting with others) and autonomy (having control over one's actions) and result in higher levels of subjective wellbeing.

### 2.3. On-line shopping<sup>7</sup> and the wellbeing of current and future generations

Increasingly, consumption practices and behaviours involve shopping for products or services on-line. This trend could modify the relationship between sustainable consumption practices and wellbeing in several ways. Castellacci and Tveito (2018) identify four main avenues whereby the use of internet can affect subjective wellbeing in the consumption domain: 1) increasing the efficiency of shopping, 2) enabling the emergence of new consumption activities, 3) facilitating access to information and 4) improving communication among consumers and between consumers and producers. However, it is difficult to say which of these mechanisms predominates when people engage in on-line shopping.

First, the time potentially saved from replacing brick-and-mortar shopping with on-line shopping does not seem to have a clear positive or negative relationship with subjective wellbeing. Castellacci and Tveito (2018) and Sabatini (2011) argue that on-line shopping can trigger wellbeing if the time saved is used to engage in activities known to increase wellbeing, like exercising or volunteering. Conversely, it may detract from wellbeing if people shop more than before and become indebted (Wang et al., 2015) or/and increase the extent to which their lives revolve around materialistic pursuits like shopping (Kasser, 2002). Second, the emergence of new services, especially opportunities to consume sustainably by reusing products (e-Bay, etc.) and sharing goods such as houses (Airbnb) and cars (Lyft, Uber, etc ...) might exert a positive influence on personal wellbeing by promoting socialization and relatedness (Kasser, 2017).

Concerning the third and fourth mechanisms, facilitating information access and communication with producers and fellow consumers can be linked to various outcomes as regards wellbeing and sustainability. On the one hand, the opportunities offered by greater transparency in product information enable consumers to purchase according to their preferences and personal values (Rezabakhsh et al., 2006). On the other hand, the internet, through blogs and social networks, for example, might act as an 'agenda-setter' (Reisch, 2001), perhaps disseminating information that modifies initial preferences towards more or less eco-friendly products. Demarque et al.'s (2015) experimental study of French students found that when consumers got information about the extent to which other consumers bought ecological grocery products, they tended to increase the amounts they purchased. However, agendas can also be set against sustainable consumption practices. The lifestyles portrayed in advertisements, celebrity blogs and social media rarely promote low-carbon lifestyles: instead, they stimulate consumption (Reisch, 2001; Taylor and Strutton, 2016).

Sabatini's (2011) study in Italy indicates that the relationship

between on-line shopping and subjective wellbeing is positive. Using a binary variable identifying whether the respondent had bought any goods or services on-line during that year, and a global happiness question, he found a positive causal association between on-line shopping and subjective wellbeing. Sabatini mentions efficiency and the greater choice as two of the mechanisms that explain the positive effect. In addition, he notes that on-line shopping focuses on experiences linked to socialization and leisure, and that the most common payment method is prepaid cards. Both these add to the positive contribution of on-line shopping to wellbeing – the former by substituting material goods for experiences, and the latter by reducing levels of indebtedness. These aspects had not been considered previously, and might not apply to other socio-cultural contexts or historical periods. However, efficiency and greater choice are two fairly universal features of on-line shopping that might support the positive effect on wellbeing of engaging in sustainable consumption practices by reducing the costs involved.

## 3. This study: context and hypotheses

### 3.1. Research context

Norway is known for its abundant natural resources (including oil and gas), its well-functioning welfare state, and for ranking very high in terms of wellbeing and quality of life. The latter applies to rankings generated from subjective indicators such as life evaluation (see Helliwell et al., 2018), objective measures like those of the UN Human Development Index, and multi-dimensional indices combining both subjective and objective wellbeing approaches, like the OECD Better Life Index. However, this positive image is called into question when ecological footprint or consumption practices are analysed. Norwegian consumption patterns are energy-intensive; air travel, maintaining high indoor temperatures in roomy first, second and third dwellings is widespread (Hylland Eriksen, 2015; Wilhite, 2016). The *Happy Planet Index*,<sup>8</sup> developed by the New Economics Foundation in the UK accounting for life expectancy, average life satisfaction and ecological footprint, reflects this reality. Although Norway ranks high (number 12 of 140 countries) when the three variables are considered, it falls to 114th place when only the ecological footprint is taken into account (Jeffrey et al., 2016).

Travel, heating/cooling, food and drinks are consumption domains with major environmental impact at the household and individual levels (European Environmental Agency, 2010). Daily commuting is increasingly done by public transport in Oslo and other medium-large Norwegian cities.<sup>9</sup> Norway is also a world leader in electric vehicles, although they still constitute less than 4% of the fleet. Air travel has become an entrenched habit, particularly for holidays and weekends abroad (76% journeys are done by plane). Domestic energy consumption is relatively high, as cultural practices concerning space heating and lighting are based on the belief that energy use is an environmentally benign practice (Wilhite et al., 1996). Norwegians know that almost all electricity production in their country is hydropower-based, and use this argument to justify their liberal, even lavish, use of electricity (Westkog and Winther, 2014; Wilhite et al., 1996). Regarding local, organic and vegetarian food, a study by Niva et al. (2014) in four Nordic countries showed that Norwegians were the least involved. The most-cited practices were buying local food (35%) and eating

<sup>7</sup> Following Sabatini (2011), 'on-line shopping' is used here as synonymous with e-shopping, business-to-consumer (B2C) e-commerce, and computer-mediated consumption.

<sup>8</sup> See <http://happyplanetindex.org/>.

<sup>9</sup> For data on modes of transportation and internet use in Norway, see the Statistics Norway webpage <https://www.ssb.no>.

meat at most twice a week, or little at a time (29%). By contrast, only 5% reported avoiding food products imported by air transport.

Although sustainable consumption practices are not prevalent, Hellevik (2015) claims that, since the early 2000s, Norwegians report increasing willingness to make personal efforts to protect the environment. This differs across generations, with young people more keen to spend money on and engage in sustainable consumption practices than older generations. Young people also use Information and Communication Technologies (ICTs) more intensively. In 2017, 98% of Norwegians aged 16 to 24 reported using the internet daily (90% between 16 and 79), and 94% households had broadband available at home.<sup>9</sup> On-line shopping is increasingly popular: 75% of those sampled said they had shopped on-line in the past 12 months (87% in the 16 to 24 year-old bracket). The products and services most often bought on-line were travel and accommodation (54%), tickets to events (45%), clothes and sports equipment (44%) and films and music, including streaming (42%). Only 14% reported buying food on-line.

### 3.2. Research hypotheses

Drawing on the literature reviewed in section 2, this study examines the relationship between sustainable consumption and wellbeing, and the role of on-line shopping in moderating the relationship (see Fig. 1). Recent studies find that engaging in sustainable consumption practices is compatible with experiencing high levels of wellbeing; further, that this applies to the *hedonic* (Brown and Kasser, 2005; Binder and Blankenberg, 2017), *cognitive* (Binder and Blankenberg, 2017; Verhofstadt et al., 2016; Welsch and Kühling, 2011) and *eudaimonic* (Blaitt González, 2010; Corral-Verdugo et al., 2011) dimensions of wellbeing. Kasser (2017) justifies this widespread finding in cross-sectional studies drawing on three methodological and theoretical explanations. The first concerns the fact that psychological and lifestyle factors may influence both engaging in pro-environmental behaviours and the experience of wellbeing. The second concerns bi-directionality or reverse causation, as feeling happy, vital or satisfied may lead to greater engagement in pro-social and pro-environmental behaviours. The third is linked to the fact that sustainable practices often require critical enquiry, personal engagement and political activism, all of which have been found to boost psychological need fulfilment and in consequence personal wellbeing. Thus, from earlier studies, a

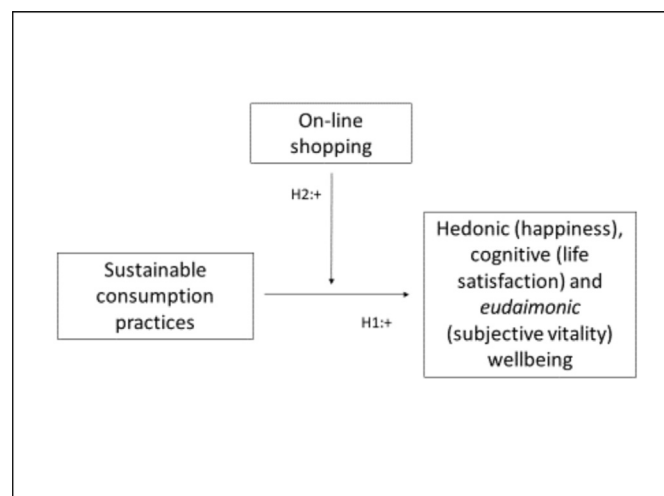


Fig. 1. Conceptual framework and hypotheses.

positive relationship between sustainable consumption and the hedonic, cognitive and *eudaimonic* dimensions of wellbeing is expected.

**Hypothesis 1.** Engaging in sustainable consumption practices is positively associated with the hedonic, cognitive and *eudaimonic* dimensions of wellbeing.

The second hypothesis links with recent literature on on-line shopping and investigates, for the first time, the potential moderating role of shopping on-line on the relationship between sustainable consumption and wellbeing. On-line shopping might support sustainable practices by focussing on experiences, facilitating access to product information, improving access to green products and by enabling sharing and repairing (Castellacci and Tveito, 2018; Sabatini, 2011), which would strengthen the positive link between sustainable consumption and wellbeing. These effects, suggested by Sabatini (2011) in his study of on-line shopping and happiness in Italy, might apply to subjective wellbeing as well as to *eudaimonic* wellbeing. It is not unlikely that the increased sense of competence associated with greater shopping efficiency and easier access to green or low-carbon products results in psychological needs fulfilment. Thus, it is predicted that on-line shopping will strengthen the relationship between sustainable consumption and hedonic, cognitive and *eudaimonic* wellbeing.

**Hypothesis 2.** On-line shopping strengthens the positive association between sustainable consumption and the hedonic, cognitive and *eudaimonic* dimensions of wellbeing.

## 4. Survey and data

### 4.1. Data collection

The empirical analysis is based on an individual survey that captures, among other variables, several measures of wellbeing, sustainable consumption practices linked to food, energy saving at home, and transportation and on-line shopping. The survey was conducted on-line from mid-September to mid-October 2017 on a representative sample of the adult Norwegian population. In addition, 120 persons, mainly over 65 years of age, were interviewed by phone. Respondents were recruited from an on-line panel of 80,000 people using a stratified random sampling technique by gender, age and geographical region in accordance with data from the 2017 census produced by Statistics Norway. People were contacted by e-mail with a link to the online questionnaire. All links were unique and could be used only once by one respondent. Overall, 2383 questionnaires were completed, weights were applied to achieve similarity with the frequency distribution among the Norwegian population for the three criteria used for stratification: gender, age and geographical region. 2019 questionnaires were deemed valid as questions on personal and household income, considered most sensitive in such surveys, had been answered. In line with the population, the weighted sample consisted of 49% women and 51% men, with an average age of 48 and regional distribution following the general pattern in the country for persons aged 18 and over in 2017.

### 4.2. Measures

**Sustainable consumption practices.** The variable capturing sustainable consumption practices was calculated as the arithmetic mean of the scores given to six questions asking about how often respondents engaged in sustainable practices concerning short-distance travel/commuting, long-distance travel (with overnight

stay), energy saving when at home, energy saving when away, shopping for energy-efficient appliances, and buying food with lower carbon footprint. Answers to each item were on a 5-point scale, with 0 for 'never' and 4 for 'always' engaging in the practice. Most respondents engaged in some sustainable consumption practices, the most common being energy saving at home. Only 1% reported not practising any of the environmental behaviours, whereas 54% reported practising all of them. The average frequency of engagement varied from a score of 3 (between 'sometimes' and 'always') on reducing household energy use when away, to less than 2 ('sometimes') concerning long-travel practices. The sustainable consumption index had a Cronbach's alpha of 0.63, indicating moderate internal consistency of the measure.

Wellbeing was assessed through a single-item happiness variable (hedonic), the Satisfaction With Life Scale (SWLS) (Diener et al., 1985) (cognitive) and the Subjective Vitality Scale (SVS) (Bostic et al., 2000; Ryan and Frederick, 1997) (eudaimonic). 'Happiness' addressed the extent to which respondents felt generally happy or unhappy, with answers on an 11-point scale, with the two extremes being 'very happy' (*svært lykkelig*) (10) and 'very unhappy' (*svært ulykkelig*) (0). The SWLS involved five general statements on people's assessments of their lives rated on a 7-point scale of the extent of agreement or disagreement<sup>10</sup> (Cronbach's alpha = 0.91: high internal consistency of this measure). The six-item subjective vitality scale (SVS) captured the extent to which a person reported feeling 'alive' and 'energetic', with answers on a 5-point scale (from 'not at all true' = 1 to 'very true' = 5) (Cronbach's alpha = 0.87). As expected, happiness and SWLS, two measures of subjective wellbeing, were highly mutually correlated ( $r^p = 0.79$ ,  $p < 0.001$ ) and moderately correlated with subjective vitality ( $r^p = 0.64$  and  $0.63$   $p < 0.001$  respectively), an aspect of eudaimonic wellbeing (see Table A.2 in the Appendix for the correlation matrix).<sup>11</sup>

On-line shopping was approximated through an indicator capturing the extent to which people used the internet to buy goods and services. Respondents were asked how often in the past year they had shopped on-line concerning 14 product categories.<sup>12</sup> Answers were on a 7-point semantic scale that ranged from 'never' (1) to 'every day' (7). The on-line shopping intensity indicator gave a Cronbach's alpha = 0.87: high internal consistency of the measure. Only 3% of respondents said they had not shopped on-line during the past year (most of them in the 50 + group), whereas 4% reported having shopped in all the reference categories. On average, respondents had engaged on-line shopping regarding half of the categories – most frequently, travel (86%), accommodation (78%), tickets to events (77%), and clothes and sports equipment (61%). Lowest were food (21%) and medicines (15%).

Psychological, lifestyle factors. The survey collected information on values through 14 questions on personal goals as per Kasser and Ryan's (1996) Aspiration Index (AI). Standard procedures were followed in computing measures for extrinsic (financial success, popularity and image) and intrinsic (self-acceptance, affiliation, community and physical health) goals (Kasser and Ryan, 1996) and

the classification supported by high-order factor analysis (see factor loadings in Table A.1 in the Appendix). Relative intrinsic goal orientation was calculated by subtracting average extrinsic scores from average intrinsic scores. 'Mindfulness' defined in terms of being aware and present (Ericson et al., 2014) is akin to the restorative experiences encompassing clarity of thoughts, concentration and alertness found to stem from spending time in and feeling connected with nature (Howell et al., 2011; Korpela et al., 2014).<sup>13</sup> The survey included a question on how often the respondent had spent time outdoors during the previous month, on a 7-point verbal scale (from never = 1 to every day = 7), which was used as a proxy for mindfulness. Finally, a variable capturing the total amount of hours worked the previous week approximated 'voluntary simplicity', as persons who downshift generally choose to work fewer hours, among other lifestyle changes (Alexander and Ussher, 2012).

Socio-demographic, economic and geographical characteristics commonly covered in subjective wellbeing studies were included in the survey, and were used as control variables in the regression analysis (Frey and Stutzer, 2002) (see Table A.5 for list of variables and descriptive statistics). Household income was captured through a question presenting respondents with ten income brackets (from less than NOK 19,000 to more than NOK 88,000 net per month). The variable was treated as ordinal in the regressions but was also transformed in per capita terms using the OECD (2008) square root equivalence scale and calculating the natural logarithm, to account for the decreasing marginal utility of income (Clark et al., 2008). Results of this latter transformation are not presented here, as they did not considerably change the significance or sign of the coefficients of the variables employed.

#### 4.3. The empirical model

Three model specifications were used to explore the relationship between sustainable consumption practices and wellbeing and the role of on-line shopping in modifying the relationship. Each specification was estimated for the three wellbeing variables: SWLS, the single-item happiness question, and the SVS.

Model a) and specification b) were used to test the first hypothesis. Basic model a) studied whether individuals' sustainable consumption practices ( $SC_i$ ) explained wellbeing ( $WB_i$ ) controlling for socio-economic and demographic characteristics ( $X_i$ ) and region of residence ( $R_i$ ).  $\beta_1 > 0$  was predicted in the three wellbeing regressions. Specification b) added three variables to the basic model, to capture the factors suggested by Kasser (2017) as influencing both wellbeing and pro-environmental behaviours: personal goals ( $G_i$ ) – relative intrinsic goal orientation –, working hours ( $H_i$ ) and time spent outdoors ( $TN_i$ ). As bi-directionality and the psychological needs-enhancing characteristics of sustainable practices were not yet accounted for in specification b), a positive association between wellbeing and sustainable consumption was still expected. Thus  $\beta_1 > 0$  would be predicted concerning the three wellbeing variables in specification b).

$$WB_i = \beta_0 + \beta_1 SC_i + \gamma_1 X_i + \gamma_2 R_i + \varepsilon_i \quad (a)$$

$$WB_i = \beta_0 + \beta_1 SC_i + \beta_2 G_i + \beta_3 H_i + \beta_4 TN_i + \gamma_1 X_i + \gamma_2 R_i + \varepsilon_i \quad (b)$$

<sup>10</sup> The version used for the survey was the Norwegian translation from Ed Diener's webpage <https://internal.psychology.illinois.edu/~ediener/SWLS.html>.

<sup>11</sup> Ryan and Frederick (1997) argue that the same type of context supports both basic psychological needs such as competence, autonomy relatedness (Ryan and Deci, 2000) and vitality; moreover, that some subjective states, like acceptance, contentment and serenity, are not necessarily associated with feeling 'alive' and 'alert'.

<sup>12</sup> The categories were travel, accommodation, tickets to events, clothes and sports equipment, books and written press, film and music, ICT services, household goods, other electronics, games and software, hardware, e-learning, food, and medicines.

<sup>13</sup> Other aspects of spending time outdoors, such as physical activity and socialization, are not found equally relevant for subjective wellbeing (Korpela et al., 2014). Unlike the awareness dimension, the acceptance dimension of mindfulness is not found to be connected with spending time outdoors in natural surroundings (Howell et al., 2011).

**Table 1**  
Wellbeing and sustainable consumption in Norway (OLS).

Independent variables	SWLS		Happiness		SVS	
	(a)	(b)	(a)	(b)	(a)	(b)
<b>Sustainable consumption</b>						
SusCom frequency	0.0860**		0.168***	0.116*	0.183***	0.160***
<b>Psychological and lifestyle Factors</b>						
Relative intrinsic goal orientation		0.0660***		0.0847***		–0.00186
Working hours		0.000744		0.00143		0.00292***
Time spent outdoors/in natural surroundings		0.0529***		0.0516*		0.0839***
<b>Socio-demographic controls</b>						
Age	–0.0248**	–0.0300***	–0.0457***	–0.0528***	0.0099	–0.00005
Age2	0.000391***	0.000419***	0.000636***	0.000684***	–4.54e–05	4.94e–05
Female dummy	0.100**	0.0778	0.0676	0.0427	0.0521	0.0572
Civil status: married	0.415***	0.405***	0.450***	0.439***	0.0576	0.0605
Civil status: widowed	0.140	0.152	–0.249	–0.235	0.0134	–0.00224
Civil status: divorced	–0.0446	–0.0367	–0.195	–0.186	0.0269	0.0189
Health status	0.474***	0.457***	0.728***	0.710***	0.639***	0.602***
Education: primary	0.0370	0.0550	0.336*	0.361*	–0.118	–0.0952
Education: secondary	0.00626	0.0275	0.0146	0.0397	–0.00616	0.0159
Education: masters	–0.00586	–0.0118	–0.0692	–0.0759	0.0175	0.00808
Education: doctorate	0.144	0.134	0.0993	0.0877	0.137	0.119
Unemployed dummy	–0.617***	–0.561***	–0.599*	–0.529	–0.210	–0.115
Born in Norway dummy	–0.0187	–0.0480	0.0910	0.0614	–0.0385	–0.0728
Household size	0.0551**	0.0526*	0.0476	0.0457	0.0250	0.0246
Household income	0.0528***	0.0554***	0.0535***	0.0559***	0.0322***	0.0271**
<b>Region</b>						
North	0.0614	0.00415	0.208	0.144	–0.0235	–0.0694
Central	–0.0151	–0.0532	0.116	0.0737	–0.0141	–0.0468
West	–0.0591	–0.109	0.0137	–0.0411	–0.0872	–0.131*
East	–0.122	–0.160**	–0.0519	–0.0914	–0.0685	–0.116
South	–0.147	–0.191*	–0.0323	–0.0796	–0.0381	–0.0784
Constant	2.504***	2.436***	3.817***	3.756***	0.913***	0.916***
Observations	1976	1976	1976	1976	1976	1976
R-squared	0.293	0.305	0.231	0.238	0.321	0.333

Notes: Civil status (Single as reference category), Education (Bachelor's degree as reference category), region of residence (Oslo as reference category). \*\*\*significant at the 99% level, \*\* significant at the 95% level, \* significant at the 90% level.

Hypothesis 2 was addressed in specification c) including the variable  $O-LS_i$  capturing the extent to which people engage in on-line shopping and the interaction term ( $SCOLS_i = SC_i \cdot O-LS_i$ ) studying the potential moderating effect of on-line shopping on the relationship between sustainable consumption and wellbeing. As yet, this question has not been explored empirically; but, following  $H_2$ ,  $\delta_2 > 0$  is expected concerning all three dimensions of wellbeing.

$$WB_i = \beta_0 + \beta_1 SC_i + \beta_2 G_i + \beta_3 H_i + \beta_4 TN_i + \delta_1 O-LS_i + \delta_2 SCOLS_i + \gamma_1 X_i + \gamma_2 R_i + \varepsilon_i \quad (c)$$

The basic model a) and the two additional specifications b) and c) were estimated by means of ordinary least squares (OLS) for the three wellbeing variables. OLS is the technique most suited for the estimation of SWLS and SVS equations, as their response scale can be treated as cardinal. In addition, and due to the ordinal nature of the happiness variable, estimations were also made using an ordered probit model. Ferrer-i-Carbonell and Frijters (2004) found that OLS and ordered probit models produced similar results. That was also the case here, with coefficients and significance of the main independent variables remaining unchanged across models (results not shown).<sup>14</sup>

<sup>14</sup> All models were estimated with robust standard errors, as disturbances might not be independently and identically distributed. The presence of multicollinearity, potentially leading to unstable predictors, was explored through the collinearity statistics available in the program StataSE 15.

## 5. Results

### 5.1. Sustainable consumption and wellbeing

Table 1 presents the results of OLS estimations of wellbeing equations for the basic model (a) and specification (b). As shown in Table 1, R-squared values indicate that 33%, 31% and 24% of the variation in SVS, SWLS and happiness, respectively, is accounted for the predictors in model (b). In general, the signs of the coefficients of the control variables are consistent with those commonly found in the happiness literature. Thus, and probably due to the cross-sectional nature of the data, we find the traditional U-shaped relationship of SWLS and happiness to age (Frijters and Beaton, 2012); a positive relationship of all wellbeing variables with health status and household income; and a negative link between unemployment and SWLS (Frey and Stutzer, 2002).

Table 1 shows that the variable capturing frequency of engagement in sustainable consumption practices is positively and significantly related to the three wellbeing variables in specification (a). To indicate the magnitude of the effects, health status, a variable consistently found to affect SWB and whose positive effects cut across hedonic and eudaimonic measures, is taken as reference. As health status is perceived to increase by 1 unit, SWLS increases by 0.47 units, happiness by 0.73 units and SVS by 0.64 units. In turn, every unit increase in the average engagement in sustainable consumption practices has an effect corresponding to roughly one-fifth ( $b = 0.086$ ,  $t = 2.31$ ,  $p < 0.05$  and  $b = 0.168$ ,  $t = 2.80$ ,  $p < 0.01$ ) of a one-unit improvement in health status concerning SWLS and

**Table 2**  
Wellbeing, sustainable consumption and on-line shopping (OLS).

Independent variables	SWLS	Happiness	SVS
	(c)	(c)	(c)
<b>Sustainable consumption</b>			
SusCom frequency	0.0313	0.0873	0.139***
<b>On-line shopping</b>			
On-line shopping frequency	0.0711*	0.270***	0.148***
Interaction (SC*O-LS)	0.0928**	0.0386	0.0488
<b>Psychosocial and life-style factors</b>			
Relative intrinsic orientation	0.0717***	0.101***	0.00536
Working hours	0.000759	0.00117	0.00336***
Time spent outdoors/in natural surroundings	0.0537***	0.0499*	0.0836***
Vector of controls	Yes	Yes	Yes
Observations	1976	1976	1976
R-squared	0.307	0.245	0.336

Notes: All regressions were run controlling for age, age squared, gender, civil status (single as reference category), health status, education (Bachelor as reference category), unemployment dummy, born in Norway dummy, household size, household income and region of residence (Oslo as reference category). \*\*\*significant at the 99% level, \*\* significant at the 95% level, \* significant at the 90% level. The variables identifying sustainable consumption and on-line shopping in specification (c) were mean-centred. The interaction term was calculated with the two mean-centred variables in order to counter multicollinearity at the level of individual predictors (Iacobucci et al., 2016). The significance and the sign of the coefficient of the interaction term did not change when a non-centred interaction was included in the model (results not shown here).

happiness, and nearly one-third ( $b = 0.183$ ,  $t = 5.30$ ,  $p < 0.001$ ) concerning subjective vitality. These are modest but important effects that resonate with the literature (Binder and Blankenberg, 2017).

Specification (b) improves the general model by including the psychological and lifestyle factors indicated by Kasser (2017) as influencing wellbeing and pro-environmental behaviours. The variables are: personal goals (relative intrinsic goal orientation), a life of voluntary simplicity (approximated by weekly working hours) and the experience of mindfulness (approximated by the frequency of spending time outdoors). As Table 1 shows, adding the three variables yields a marginal increase of the variability in SWB explained by the predictors, as the value of the determination coefficient ( $R^2$ ) in specification (b) improves compared to basic model (a). *Time spent outdoors* emerges as the sole variable that explains all dimensions of wellbeing, but the coefficient is only marginally significant regarding happiness. A relative emphasis on intrinsic goals compared to extrinsic goals is positively associated with SWLS and happiness, and working hours are significantly related only to subjective vitality. As Table 1 shows, including psychological and lifestyle factors renders the coefficient of the sustainable consumption variable non-significant in the SWLS regression ( $b = 0.041$ ,  $t = 1.06$ ,  $p > 0.1$ ) and marginally significant in the happiness equation (and  $b = 0.116$ ,  $t = 1.88$ ,  $p < 0.1$ ). However, it retained its sign and significance concerning the SVS equation ( $b = 0.160$ ,  $t = 4.54$ ,  $p < 0.001$ ).

## 5.2. The role of internet shopping as moderator

As Table 2 shows, specification (c) includes a variable capturing the frequency of shopping on-line<sup>15</sup> and adds an interaction term exploring the extent to which e-shopping modifies the relationship between sustainable consumption practices and wellbeing. Regression results indicate that when people engage in on-line shopping, their perceived wellbeing improves. When the frequency of on-line shopping increases by 1 unit, SWLS increases by 0.071 units, happiness by 0.27 units and SVS by 0.15 units. Again, compared with the effect of a unit increase in health status, a one-

unit increase in the frequency of e-shopping has 16% of the impact on satisfaction with life, 38% on happiness and 24% on subjective vitality. The positive association of on-line shopping with wellbeing might be explained, as per Sabatini (2011), by the fact that e-shopping focuses on experiences, expands choices and saves time.

To explore whether a relative focus on experiences underlies the positive association found in this study, the variable 'frequency of on-line shopping' was split into two variables. The first captured the frequency of buying consumer goods on-line (food, household goods, clothing and sports equipment, computers, other electronics, books, magazines and medicines) and the second the frequency of on-line shopping for 'experiences' (travel, accommodation, ICT services, films and music, tickets to events, games and software, courses and e-learning). As expected, both variables were highly correlated ( $r^p = 0.74$ ,  $p < 0.001$ ) but when introduced in model (c), buying 'experiences' on-line emerged as a significant determinant only as regards subjective vitality (see Table A.3 in the Appendix). Next, two dummies were generated, identifying respondents whose frequency of on-line shopping was higher than the sample average in each of the two categories. The coefficient of the dummy variable capturing high frequency of buying 'experiences' on-line did not significantly explain any of the wellbeing variables. This suggests that saving time and having greater choice might be more relevant explanations of the positive association between on-line shopping and wellbeing found in the Norwegian sample.

After controlling for psychological and life style factors, engaging in sustainable consumption practices remained significantly associated only with subjective vitality. Nevertheless, it might be that a relationship between sustainable practices and SWLS and happiness emerged as people engaged more in on-line shopping. The fact that a wide array of platforms enables individuals to share transport and accommodation; to reuse household appliances, furniture, clothes and books; and to buy directly from local food producers or distributors might facilitate personal commitment to sustainable consumption, thus contributing to wellbeing. As regression results indicate, satisfaction with life (the cognitive aspect of subjective wellbeing) emerged as positively associated with higher levels of engagement in both on-line shopping and sustainable consumption. That was not the case for happiness and subjective vitality, neither of which was significantly associated with the interaction term.

<sup>15</sup> An alternative specification including frequency of internet use as a control variable was also explored (results not shown). No significant changes emerged in the sign and coefficients of the on-line shopping variable.



## 6. Discussion and policy considerations

### 6.1. Discussion of findings

The econometric analysis presented here supports the claim that engaging in a set of ‘weak’ and ‘strong’ sustainable consumption practices is compatible with high levels of human wellbeing. Specifically, the first hypothesis of this study predicted a positive association between sustainable consumption practices and the hedonic, cognitive and eudaimonic dimensions of wellbeing. Initially, this was investigated by studying the relationship between the three dimensions of wellbeing and an indicator of engagement in sustainable consumption practices as regards travel, household energy use and food, controlling for socio-demographic variables. As in earlier research (Andersson et al., 2014; Corral-Verdugo et al., 2011; Suarez-Varela et al., 2016; Welsch and Kühling, 2011), a significant association was found between sustainable consumption and the wellbeing variables.

Further, indicators for personal goals, experiences of mindfulness and simplicity lifestyles were introduced in the study: according to Brown and Kasser (2005), they influence both pro-environmental behaviours and wellbeing. Similar factors had also been indicated in previous studies, for example people's perceptions of their lifestyles as green in Binder and Blankenberg (2017), personality traits in Verhofstadt et al. (2016) or time pressure and exercising in Andersson et al. (2014). As in previous studies (Andersson et al. 2014; Binder and Blankenberg, 2017; Verhofstadt et al., 2016), the inclusion of psychological and lifestyle factors in the wellbeing equations reduced the predictive power of pro-environmental behaviours. This was particularly the case concerning life satisfaction and happiness, as the coefficients of the sustainable consumption variable became either non-significantly different from zero (SWLS) or only marginally significant (happiness). In contrast, engaging in sustainable consumption practices remained a positive predictor of subjective vitality.

By bringing people in contact with others, and increasing their feelings of mastery and agency, sustainable consumption practices like reusing, repairing, sharing, and consuming less might cater to psychological needs for competence, relatedness and autonomy (Kasser, 2017). Thus, engaging in sustainable consumption practices might provide the type of context that enhances both vitality and psychological needs: according to Ryan and Frederick (1997), these two aspects of eudaimonic wellbeing are closely related. In addition, cycling, walking, living in relatively less-heated homes and basing one's diet on foods perhaps not readily accessible, demand a higher level of engagement and effort. This indicates the possibility of reverse causation raised by Kasser (2017): when people feel energetic and alive, they are more able to engage in physically or cognitively demanding practices. Taken together, results of estimating subjective wellbeing equations for the basic model (a) and specification (b) refute the hypothesis of a positive relationship between engaging in sustainable consumption practices and the hedonic and cognitive dimensions, but confirm the positive association with the eudaimonic aspect of wellbeing.

The second hypothesis concerned the expected positive effect of engaging in on-line shopping on the relationship between sustainable consumption and wellbeing. Sabatini (2011), in his study of e-commerce in Italy, posited that shopping on-line emphasizes experiences, enables access to comprehensive product information and helps people save time, resulting in increased wellbeing. Thus, it was expected that by focussing on non-material products, reducing the costs of shopping and increasing access to green products, on-line shopping would strengthen the positive relationship between sustainable consumption and wellbeing. The study of the moderating effect of on-line shopping was investigated

by adding a variable capturing the interaction between frequency of on-line shopping and frequency of engaging in sustainable consumption in specification (b). Regression results indicate that on-line shopping does not have a significant effect in the relationship between sustainable consumption and happiness or subjective vitality, but it contributes to life satisfaction the more people engage in sustainable consumption. In addition, the analysis indicates that the time-saving aspect of on-line shopping can explain the positive coefficient of the interaction term in the life satisfaction equation. Hence, the hypothesis of on-line shopping strengthening the relationship between sustainable consumption and wellbeing can be confirmed only for the cognitive dimension.

### 6.2. Policy implications

In Norway, ‘soft’ sustainability policies are prioritized over ‘strong’ policies, in line with the widely shared belief that higher levels of consumption have positive effects on wellbeing. As Hylland Eriksen (2015: 246) remarks, ‘even in incredibly rich Norway it could have amounted to political suicide to propose reduced consumption and a reduced material standard of living.’ This study opens the possibility of an alternative rhetoric on reduced consumption, recognizing measures that enhance *both* wellbeing and sustainability. Reducing exposure to commercials and advertising, which tend to foster materialistic goals and generate overwork (Kasser, 2002; Molinari and Turino, 2018), and stressing the importance of outdoor activities in natural surroundings are two ‘low-hanging fruits’ readily available to policymakers. In Norway, measures like banning advertising in public spaces or eliminating tax deductions for commercials, and facilitating access to outdoor activities through worktime reductions, green infrastructures and programmes targeted at minorities and children might increase wellbeing as well as engagement in sustainable consumption practices. These and other locally meaningful eco-social measures, although not traditionally seen as ‘environmental’ policy, are increasingly discussed in the sustainability debate, and merit further investigation (Büchs and Koch, 2017; Gough, 2017; Guillen-Royo, 2016; Hoff-Elimari, 2016; Wilk, 2002).

Specific policies aimed at reducing the costs of engaging in sustainable consumption practices might also strengthen their effects on wellbeing. As examination of the moderating role of on-line shopping has shown, reducing transaction costs by facilitating access to green products and sustainable consumption practices such as sharing and reusing can contribute to life satisfaction. However, the risks involved in ICTs – like increased individualization, waste generation and energy use – call for critical appraisal of the opportunities and challenges linked to digitalization (Belkhir and Elmeli, 2018; Guillen-Royo, 2018; Reisch, 2001; Røpke, 2012). Further, various features of engaging in sustainable consumption practices that in principle might seem burdensome are worth promoting and maintaining, due to their wellbeing-enhancing properties. Sharing tools, means of transport, exchanging clothing and repairing household goods are practices associated with skills development and socialization. They are characterized by personal interaction, knowledge exchange and co-creation, all of which help to meet the psychological need for competence and affiliation. The need for autonomy, ‘feeling personal value and interest with respect what one does (Ryan and Sapp, 2007:76), is unlikely to be supported in competitive and materialistic environments (Kasser et al., 2007). Changing to a low-impact diet, repairing household goods and finding low-energy alternatives to private transport and household heating, for example, may well prove more autonomy-enhancing than following the beaten track of consumerism.

### 6.3. Limitations and further research

The use of data from a specific time-point entails limitations in terms of endogeneity, which affects the consistency of the estimators and restricts the possibility of interpreting the regression results in causal terms (Wooldridge, 2013). Endogeneity involves the existence of measurement error, omitted variables bias or reverse causality. The presence of measurement error in survey-based studies is expected, as subjective variables may have been imperfectly captured through survey questions. Social desirability, answering behavioural questions in ways that respondents feel are socially acceptable, might have also influenced responses. However, the fact that the coefficients and signs of the main variables are similar to those identified in previous research, and that social desirability has been found not to drive responses on pro-environmental behaviours (Kaiser 1998) support the robustness of the main findings. To provide additional evidence of the validity of the measures, model specification (b) was run with household income as dependent variable (see Table A.4 in the Appendix). As expected, sustainable consumption practices and a relative emphasis on intrinsic goals were negatively associated with household income, whereas longer working hours and on-line shopping emerged as positive determinants. This indicates that the scales used in the study were indeed valid approximations of the concepts they were intended to capture. Furthermore, since measurement error results in a reduced coefficient, the challenges posed here are quite limited.

Possible challenges associated with omitted variables were addressed in specifications (b) and (c) by including in the model the three psychosocial and life-style factors proposed by Kasser (2017). This eliminated or reduced the significance of the coefficients of the sustainable consumption variable in the SWLS and happiness regressions, while reducing only marginally the value of the coefficient concerning subjective vitality. The fact that engaging in sustainable consumption practices was still significantly associated with subjective vitality indicated the risk of reverse causation or simultaneity. This concerns the fact that causal relationships run from the independent to the dependent variables and vice-versa. However, it could also indicate that engaging in pro-environmental behaviours exposes people to circumstances that enhance relatedness, autonomy and competence, which simultaneously support vitality and alertness (Ryan and Frederick, 1997). Both these arguments seem plausible, and call for studies based on experimental or longitudinal designs to clarify the direction of causality.

The study of on-line shopping concerning its impact on wellbeing and its potential moderating role in influencing the relationship between sustainable behaviours and wellbeing is still in its infancy. This paper finds that increased frequency of on-line shopping is associated with higher levels of subjective and eudaimonic wellbeing, expanding Sabatini's finding of a positive association with happiness. However, unlike Sabatini's work, which used instrumental variables – a technique that incorporates the logic of an experimental design in the econometric analysis of cross-section data (Wooldridge, 2013) – this study cannot confirm a causal link between shopping on-line and wellbeing. This would call for further research that identifies variables likely to be used as instruments for on-line shopping (correlated with on-line shopping but uncorrelated with the error term of the wellbeing equation) or uses panel data (repeated cross-section with the same respondents), for causal claims to be possible. Further, given the increasing importance of on-line shopping across Western and non-Western societies, research comparing national contexts

where internet shopping is either more prevalent or involves greater turnouts than in Norway – for instance, the UK, the USA and China – might be needed to investigate concerns about the potential negative impact on environmental sustainability and personal wellbeing.

## 7. Conclusions

This study has explored the relationship between sustainable consumption practices and wellbeing with cross-sectional data from a representative sample of the Norwegian population. Three dimensions of wellbeing were considered: satisfaction with life, happiness, and subjective vitality – an aspect of *eudaimonic* wellbeing focussing on psychological and physical functioning. As in earlier studies, regression results indicate a positive and significant relationship between sustainable consumption practices and wellbeing, which extends to the three outcome variables. However, the relationship weakens when psychological and lifestyle variables influencing both wellbeing and sustainable behaviours are included in the regressions. Relative intrinsic goal orientation and high frequency of outdoor activity account for the positive associations found in the happiness and life satisfaction regressions. Subjective vitality maintains its strong association with sustainable consumption practices, indicating bi-directionality and the fact that the characteristics of sustainable practices might promote both psychological needs and vitality as alternative explanations. On-line shopping makes it easier to engage in sustainable consumption practices by providing greater access to green products and socio-environmental information, and by helping to save time when shopping. Indeed, regression results suggest that internet shopping might even increase life satisfaction among those who engage frequently in sustainable consumption practices.

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## Appendix

**Table A.1**  
Factor loadings of aspiration subscale scores

	Factor 1	Factor 2
Affiliation	0.790	0.149
Self-acceptance	0.812	0.116
Community feeling	0.758	0.037
Physical fitness	0.694	0.218
Financial success	0.153	0.842
Attractive appearance	0.197	0.725
Social recognition	0.048	0.861

Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

**Table A.2**  
Zero-order correlations (Pearson) of main variables

	SWLS	Happiness	SVS	Suscom	On-line shopping	Relative intrinsic goal orientation	Working hours	Time spent outdoors	Health status	Household income
SWLS	1									
Happiness	0.79**	1								
SVS	0.643**	0.632**	1							
Suscom	0.079**	0.096**	0.178**	1						
On-line shopping	−0.013	0.03	0.082**	0.066**	1					
Relative intrinsic goal orientation	0.133**	0.114**	0.04	0.200**	−0.219**	1				
Working hours	0.044	0.035	0.132**	−0.067**	0.196**	−0.125**	1			
Time spent outdoors	0.222**	0.182**	0.243**	0.162**	−0.072**	0.182**	−0.066**	1		
Health status	0.412**	0.397**	0.543**	0.149**	0.037	0	0.182**	0.211**	1	
Household income	0.262**	0.189**	0.177**	−0.120**	0.120**	−0.071**	0.309**	0.065**	0.166**	1

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

**Table A.3**  
Wellbeing and shopping experiences and goods on-line

Independent variables	SWLS	Happiness	SVS	SWLS	Happiness	SVS
<b>Sustainable consumption</b>						
SusCom frequency	0.0338	0.0918	0.144***	0.0414	0.105*	0.148***
<b>On-line shopping</b>						
On-line shopping (experiences)	−0.0281	−0.0108	0.112**			
On-line shopping (goods)	0.123**	0.302***	0.0355			
On-line shopping dummy (experiences)				−0.0743	0.0312	0.0588
On-line shopping dummy (goods)				0.111**	0.189**	0.0512
<b>Psychological and lifestyle factors</b>						
Relative intrinsic goal orientation	0.0719***	0.102***	0.00661	0.0662***	0.0896***	−0.00146
Working hours	0.000603	0.00103	0.00277**	0.000629	0.00115	0.00341***
Time spent outdoors	0.0517***	0.0482*	0.0828***	0.0513***	0.0498*	0.0840***
Constant	2.289***	3.279***	0.631**	2.427***	3.676***	0.871***
Observations	1976	1976	1976	1976	1976	1976
R-squared	0.307	0.246	0.338	0.306	0.241	0.332

Notes: <sup>a</sup> All regressions were run controlling for age, age squared, gender, civil status (Single as reference category), health status, education (Bachelor's degree as reference category), unemployment dummy, born in Norway dummy, household size, household income and region of residence (Oslo as reference category). <sup>b</sup>\*\*\*significant at the 99% level, \*\* significant at the 95% level, \* significant at the 90% level.

**Table A.4**  
Household income and sustainable consumption in Norway

Independent variables	(b)
<b>Sustainable consumption</b>	
SusCom frequency	−0.218*** <sup>b</sup>
<b>Psychological and lifestyle factors</b>	
Relative intrinsic goal orientation	−0.0921***
Working hours	0.0229***
Time spent outdoors	0.0128
<b>Socio-demographic variables</b>	
Age	0.0598***
Age2	−0.000384*
Female dummy	−0.0405
Civil status <sup>a</sup> : married	1.316***
Civil status: widowed	−0.234
Civil status: divorced	−0.379**
Health status	0.202***
Education: primary	−0.477*
Education: secondary	−0.510***
Education: master	0.388***
Education: doctorate	0.783***
Unemployed dummy	−0.937***
Born in Norway dummy	0.315
Household size	0.728***
<b>Region</b>	
North	−0.473**
Central	−0.514***
West	−0.289*
East	−0.370**
South	−0.507**
Constant	−0.123
Observations	1976

Table A.4 (continued)

Independent variables	(b)
R-squared	0.422

Notes: Reference category for civil status is *Single*, for education is *Bachelor's degree*, and for region of residence is *Oslo*. <sup>b\*\*\*</sup>significant on 99% level, <sup>\*\*</sup> significant on 95% level, <sup>\*</sup> significant on 90% level.

Table A.5

Descriptive statistics of variables in main regressions

Variable	Mean	Std. Dev.	Min	Max	Obs (N)
<b>Wellbeing</b>					
SWLS	4.855015	1.201354	1	7	2014
Happiness	7.059086	1.824921	0	10	2014
SVS	4.200017	1.133243	1	7	2014
<b>Sustainable consumption</b>					
SusCom frequency	2.167908	.6801388	0	4	2014
<b>On-line shopping</b>					
On-line shopping frequency	1.741524	.5915766	1	7	2014
<b>Psychological and lifestyle factors</b>					
Relative intrinsic goal orientation	2.698382	1.611063	−3.25	7.5	2014
Working hours	25.00943	21.82595	0	330	2014
Time spent outdoors	5.139027	1.467155	1	7	2014
<b>Socio-demographic control variables</b>					
Age	48.37537	16.84723	18	89	2014
Age2	2623.865	1670.666	324	7921	2014
Female dummy	.4900695	.5000255	0	1	2014
Civil status: married	.6345581	.4816735	0	1	2014
Civil status: widowed	.0342602	.1819419	0	1	2014
Civil status: divorced	.0893744	.2853542	0	1	2014
Civil status: single	.2418073	.4282845	0	1	2014
Health status	3.65144	.8789956	1	5	2014
Education: primary	.0436941	.2044645	0	1	2014
Education: secondary	.285998	.4520007	0	1	2014
Education: Bachelor's degree	.3321748	.4711103	0	1	2014
Education: Master's degree	.2696127	.4438688	0	1	2014
Education: PhD	.0685204	.2526995	0	1	2014
Unemployed dummy	.0263158	.1601125	0	1	2014
Born in Norway dummy	.9307031	.2540226	0	1	1977
Household size	2.314456	1.146771	1	5	2013
Household income (ordinal)	4.772095	2.617568	1	10	2014
North	.0948361	.2930612	0	1	2014
Central	.1370407	.3439757	0	1	2014
West	.204568	.4034858	0	1	2014
East	.3470705	.4761566	0	1	2014
South	.0888779	.284638	0	1	2014
Oslo	.1276068	.3337543	0	1	2014

Note: Variable content is described in Section 4.

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