


Promoting Sustainable Hotel Guest Behavior: A Systematic Review and Meta-Analysis

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Abstract

Unsustainable patterns of tourist behavior produce a massive environmental burden. Nevertheless, it is unknown which behavioral strategies can be implemented to foster resource-efficient behavior in customers of leisure and travel services. This article aims to identify and summarize the evidence about the interventions which have been tested to promote sustainable hotel guest behavior. Electronic searches were performed in the main databases from inception to September 2016. Papers deemed eligible for inclusion were experimental field studies, reporting factual changes in guest behavior. The final sample was composed of nine papers comprising 13 studies in a total of 5,859 hotel stays. Results showed that all included interventions targeted towel reuse. Five different types of interventions were identified including environmental appeals, messages prompting commitment for conservation, donation to charity, social norms, and nudges. Only the last two forms of interventions (social norms: effect size [ES] = -0.25 , 95% confidence interval [CI] = $[-0.39, -0.12]$, $p = .004$ and nudges: ES = -0.43 , 95% CI = $[-0.72, -0.13]$, $p = .009$) showed significant positive effects in promoting towel reuse. Particularly regarding social norms, our work shows an effect weaker than reported in previous meta-analyses but consistent (low between-study heterogeneity) in producing modest increases in the levels of towel reuse.

Keywords

towel reuse; sustainability; behavior change; field experiment; meta-analysis

Motivation

Most individuals have internalized the need to switch off the lights when leaving a room, to recycle, and to stop the faucet when not using the sink. However, many of these proenvironmental habits may be lost during travel and leisure times. Turning into hotel guests and getting immersed in the tourist experience often means leaving sustainable habits at home, just as easily as habitual work and daily routines are put on hold (Miao & Wei, 2013; Ram, Nawijn, & Peeters, 2013).

However, unsustainable tourist behavior and, in the specific case of this article, hotel guest behavior, produces a massive environmental burden given the growing force of this economic sector. International tourist arrivals have increased from 25 million globally in 1950 to 1,133 million in 2014 (United Nations World Tourism Organization [UNWTO], 2011). While being a driver of economic and social development—international tourism receipts have increased from US\$ 2 billion in 1950 to US\$ 1,245 billion in 2014 (*idem*)—each touristic accommodation stay involves a high consumption of several natural resources. It is estimated that, per hotel stay, 272 megajoules of energy, 350 L of water by direct use (6,000 L counting indirect effects of fuel and food), and 42 m²

of land use are consumed, producing a total of 13.8 kg CO₂ emissions (Gössling & Peeters, 2015 based on 2010 global estimates). Despite efforts to implement sustainable tourism practices, the global demand for natural resources is expected to grow by 92% for water and 189% for land use up to 2050 (*idem*). Whereas efficiency gains are expected from improved technological solutions, guest behavior plays a fundamental role in the efforts to promote sustainability given that there is evidence that individuals tend to adjust their behavior to more resource-efficient technologies, often increasing demand in a rebound effect (Gillingham et al., 2016).

This article aims to identify and summarize the evidence about the behavioral strategies or interventions that have been tested to promote sustainable hotel guest behavior. From a services research perspective, such interventions

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targeting guests pose an interesting challenge. On one hand, excellence in customer service is a critical aspect of hospitality, more so than in organizations from other activity sectors (Duggal & Verma, 2013). On the other hand, promoting sustainable behavior in hotel guests may require “breaking character” or being detrimental to the affective delivery of customer service (Chi et al., 2011; Grandey, 2003; Groth, Hennig-Thurau, & Walsh, 2009) by asking guests to impose restraint in the use of resources. It is, therefore, essential to understand how a yardstick service sector such as hospitality can create an environment that fosters sustainability practices without becoming detrimental to its core business (Barber & Deale, 2014; Buckley, 2012; Susskind, 2014).

Even though several reviews and meta-analyses have already been published about the determinants of proenvironmental behavior, two important research gaps remain to be addressed. First, the majority of previous reviews on this topic are prone to biased estimates due to the inclusion of a heterogeneous mixture of papers reporting attitudes and intentions as well as tangible behavior, in addition to combining estimates from observational and experimental studies (Abrahamse & Steg, 2013; Delmas, Fischlein, & Asensio, 2013; Lokhorst, Werner, Staats, van Dijk, & Gale, 2011; Miafodzyeva & Brandt, 2013; Osbaldiston & Schott, 2012). These meta-analyses have identified as effective a range of interventions such as cognitive dissonance, goal setting, social modeling, prompts, and social norms. However, there are well-documented discrepancies between self-reported behavior and factual behavior in the sustainability domain (Andreasen, 2011, 2012). Thus, the accuracy of these previous estimates to identify the most effective interventions to elicit behavior changes remains to be established.

Second, to the best of our knowledge, Scheibehenne, Jamil, and Wagenmakers (2016) is to date the only one meta-analysis specific to hotel guest behavior. Focusing the analysis of proenvironmental interventions in hotel guest is important because the hospitality sector has distinctive features which may modulate the effectiveness of interventions implemented in other contexts. Nonetheless, the work of Scheibehenne et al. (2016) includes a small number of papers, less than half of the studies suitable for evidence synthesis available in the literature. The incomplete inclusion of relevant papers reduces the internal validity and generalizability of conclusions from this review. Moreover, Carlsson et al. (in press) criticize the results from this meta-analysis due to the assumptions regarding the Bayesian synthesis used. These authors reply that estimates obtained from Bayesian synthesis depend on the assumption of a fixed effect size and even a small amount of between-sample variability renders the evidence inconclusive. Furthermore, Carlsson and colleagues refer that Scheibehenne et al. acknowledged that their results could have been inflated by publication bias but did not assess the presence of publication bias. Thus, it remains

unclear whether messages conveying social norms are effective to promote sustainable behavior in hotel guests—and if so, to what extent.

To address these two research gaps, we perform a systematic review targeting behavioral field interventions that have been performed to increase hotel guest sustainable behavior. The interventions to be included were not defined a priori but identified bottom-up from the literature, which allowed mapping the predominant strategies that have been tested in the field. Therefore, we will include not only social norms that were the selected topic of Scheibehenne et al. (2016) but also other interventions that may have been tested and reported in the literature. To address the first research gap, we will perform meta-analysis only pooling studies with an experimental design, reporting changes in tangible behavior (not intentions or other self-reported measures). The second research gap will be addressed by using a frequentist random-effects meta-analysis, allowing for and measuring heterogeneity between-studies, and performing statistical tests for small-study effects—an estimate for publication bias.

This article is structured as follows. We start by presenting the methods used to identify eligible studies and the statistical procedures employed to pool the effect sizes from different papers. Next we present our results, describing the interventions that have been implemented in the field and estimating their relative effectiveness. We then conclude by discussing the implications of our findings for service research, management practice, and policy recommendations.

Method

Following Cochrane Collaboration procedures (Higgins & Green, 2011), electronic searches were conducted from inception¹ to September 30, 2016, in EBSCO Business Source Complete, EconLit, PsycArticles, JSTOR, and Google (Scholar) for unpublished gray literature. References from previous reviews were hand-searched. The electronic search strategy was performed in title, abstract, and keywords [(tourism OR hotel OR camping OR restaurant OR hospitality) AND (energy OR water OR towel OR linen OR waste OR recycl*) AND (experiment OR intervention OR (field study))]. Only papers written in English were included.

The outcomes we primarily looked at were objective behavioral changes measured as factual variations in resource use, such as in energy and water consumption as well as frequency or likelihood to reuse towels and linen. We restricted the analysis to randomized field experiments to estimate effect sizes with the lowest risk of bias and with the highest external validity. We excluded observational studies and quasi-experiments.

A random-effects meta-analysis was performed, pooling study-level data using STATA to provide more conservative confidence intervals (CIs) incorporating between-study

variability (Harris et al., 2008). Statistical heterogeneity was assessed with the I^2 metric interpreted as a signal-to-noise ratio and defined as the percentage of true heterogeneity to total variation of observed effects (Higgins & Thompson, 2002). Estimates are reported with 95% CIs and are presented by subgroups of interventions. Publication bias, defined as the tendency for (smaller) studies reporting significant results having a higher likelihood to be published, was visually explored using funnel plots. A funnel plot is a scatterplot used for detecting systematic heterogeneity by presenting the distribution of treatment effect against a precision measure (standard error). We assessed the impact of small sample studies in potentially biasing overall estimates of effectiveness with the Egger's statistical test (Harbord, Harris, & Sterne, 2009) which regresses the intervention effect estimates on their standard errors, weighting by $1 /$ (variance of the intervention effect estimate).

The estimates inputted in the meta-analysis were standardized mean differences (SMD; more details in the appendix) given the large variation in outcomes reported between studies (e.g., frequencies, means and standard deviations, regression coefficients). SMD converts the results of multiple studies into a standard comparable scale before these can be combined, and it expresses the size of the intervention effect in each study relative to its observed variability. SMD below 0.2 tends to be interpreted as a very small effect, 0.3 to 0.4 a small effect, 0.5 to 0.6 a moderate effect, and from 0.7 and above a large effect (Higgins & Green, 2011).

Results

Descriptive Analysis

Initial searches held 9,338 studies, steeply decreasing after duplicates were removed ($n = 6,229$). At a first stage of screening ($n = 3,139$), the criterion of behavioral interventions decreased the sample to 35 papers, of which only 12 papers reported data collected in the field. This sharp reduction illustrates the dominance of studies approaching sustainability in the hospitality sector from a technological perspective and, when social and behavioral variables are examined, papers mostly report research using qualitative and observational research designs. There is a scarcity of field experiments from which estimates with high internal and external validity can be drawn.

These 12 papers were screened regarding their study design (only experimental designs were retained) and type of dependent variable (self-reported outcomes were excluded). We also excluded studies reporting group-level changes (e.g., per floor, hotel) without any link to individual-level guest behavior. According to all our inclusion criteria, the final sample was reduced to nine papers (Baca-Motes,

Brown, Gneezy, Keenan, & Nelson, 2013; Bapuji, Hora, & Saeed, 2012; Bohner & Schlüter, 2014; Goldstein, Cialdini, & Griskevicius, 2008; Goldstein, Griskevicius & Cialdini, 2011; Mair & Bergin-Seers, 2010; Reese, Loew, & Steffgen, 2014; Schultz, Khazian, & Zaleski, 2008; Terrier & Marfaing, 2015). The latter two studies were absent from previous recently published meta-analyses (Carlsson et al., in press; Scheibehenne et al., 2016). These nine papers comprised a total of 13 studies collecting data from 5,859 hotel stays (Figure 1).

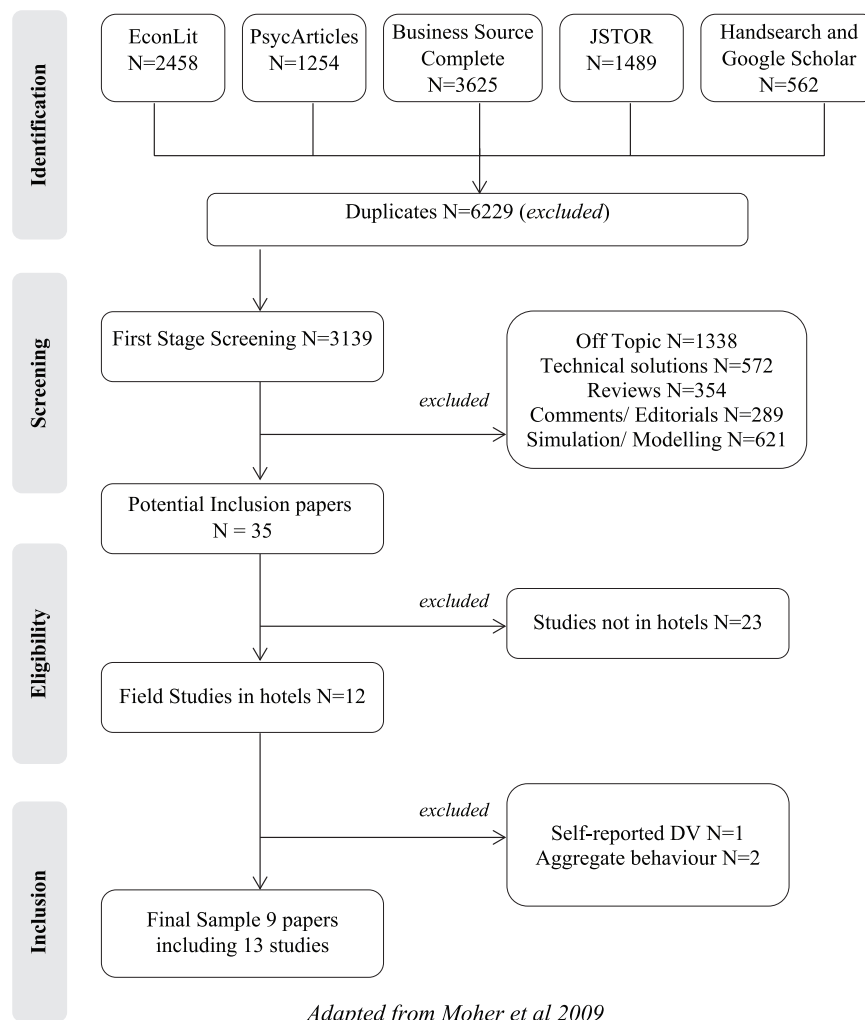
All included studies were related to towel reuse, and the large majority of studies was performed in the United States (80%). Given that most papers tested more than one intervention, 19 interventions were identified. These were categorized into five groups of strategies: social norms ($n = 9$), commitment ($n = 3$), donations to charity ($n = 3$), environmental appeal ($n = 3$), and choice architecture ($n = 1$).

Social norms are shared rules about how to behave as a member of society (Cialdini et al., 2006) and can be expressed in descriptive terms, stating the prevalence of some behavior in comparable others, or in injunctive terms, providing guidance of what is considered the "right" behavior from an ethical standpoint. These have largely been the most frequent approach taken to change hotel guest behavior. Messages based on social norms usually take the following form of descriptive norms; for example, "75% of past guest in the hotel have reused their towels."

Commitment-based interventions are attempts to increase guest engagement or perceived responsibility to behave proenvironmentally through verbal or written contracts or binders, either privately or publicly agreed upon. Such interventions can be operationalized using, for example, pins or door hangers that expressed one's commitment to the environment: "I support this hotels' ecofriendly actions."

Donations to charity are strategies based on the assumption of reciprocal exchanges (Belmi & Pfeffer, 2015; Gouldner, 1960) that may extend to a third party. In a traditional reciprocal exchange (Goldstein et al., 2011), Party A provides resources to Party B, making Party B feel indebted to Party A, which in turn may feel obligated to return the favor. This rationale can be extended to Party A creating in Party B a sense of obligation to reciprocate by providing resources on Party B's behalf to a third party (Party C). This has been operationalized in interventions informing hotel guests that, for example, "in line with our efforts to promote sustainability, a donation has been [or will be made] to a proenvironmental charity if you reuse your towels".

Environmental appeals are some of the most traditional forms of messages aiming to change sustainable behaviors (UNWTO, 2012). These take the form of pleas and requests in leaflets or flyers asking for compliance with sustainable natural resources use, or messages invoking the need for reduced consumption or increased reuse of resources based

**Figure 1.****PRISMA Flow Diagram.**

Source. Adapted from Moher et al. (2009).

Note. DV = dependent variable.

on ecofriendly reasons; for example, “Please save the environment, reuse your towels which will save energy and water.”

Choice architecture is grounded in the idea that behavior can be influenced by altering the environments within which people make choices (Thaler & Sunstein, 2008). The environment alterations are usually not consciously perceived and processed but influence the selection behavior due to simple heuristic information processing. These interventions remove barriers, expedite access, or facilitate pro-environmental behavior, making sustainable choices easier or the most salient option, for example, setting by default the AC in hotels rooms to 25°C (the recommended temperature for energy saving) or installing low-flow shower heads in hotel bathrooms that work as water saving mechanisms.

Meta-Analysis

Figure 2 shows the graphical representation of treatment effects in a forest plot, reporting average effect sizes and 95% CIs per type of intervention. Results show that, on average, environmental appeals (effect size [ES] = -0.35 , 95% CI = $[-0.96, 0.26]$), commitment messages (ES = -0.15 , 95% CI = $[-0.42, 0.13]$), and donations to charity (ES = -0.01 , 95% CI = $[-0.31, 0.29]$) are no effective interventions. With respect to environmental appeals, despite the null overall effect, there is one study reporting a strong positive impact (Bohner & Schlüter, 2014). This is the only study performed in Europe (Germany) among all three included studies in this section—The other studies were performed in the United States (Baca-Motes et al., 2013)

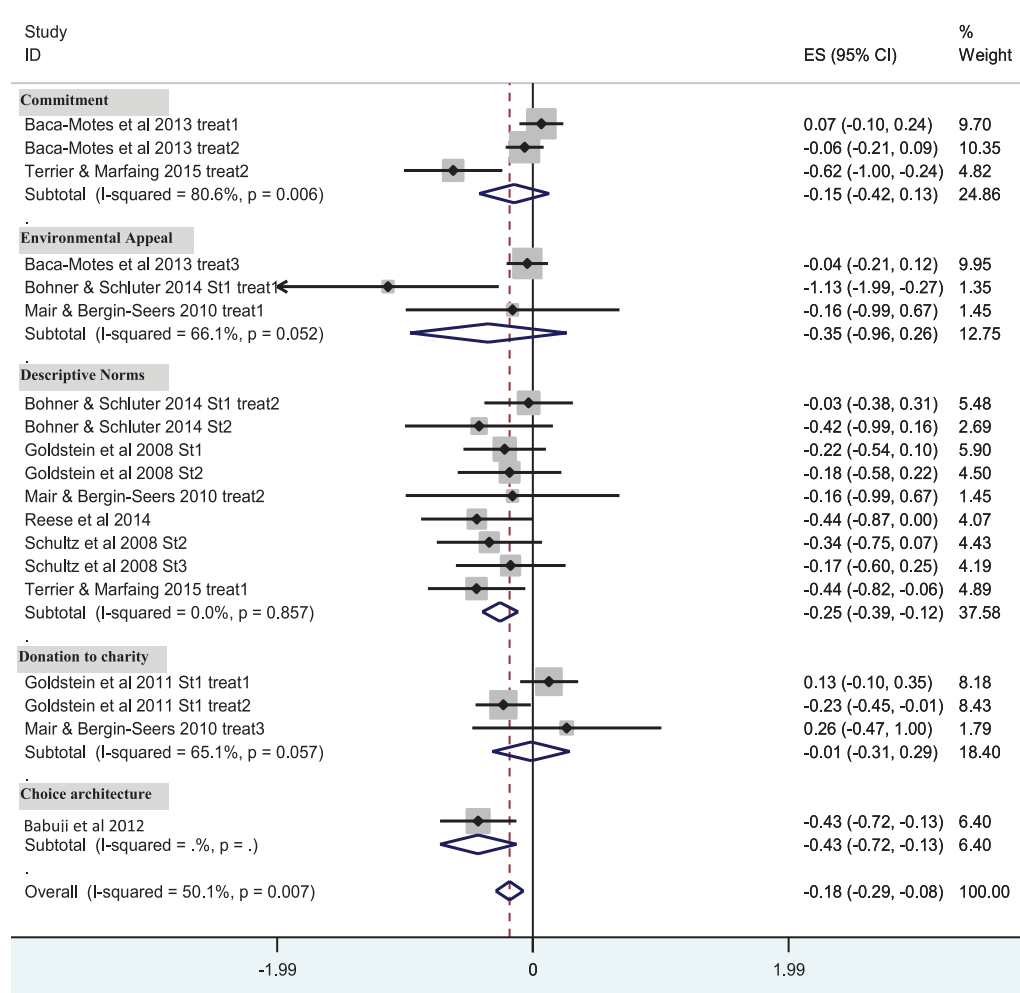


Figure 2.

Forest Plot Displaying Effect Sizes and 95% CIs.

Note. Weights are from random-effects analysis. CIs = confidence intervals; ES = effect size.

and Australia (Mair & Bergin-Seers, 2010). On the contrary, the study performed in Australia (Mair & Bergin-Seers, 2010) shows a null effect on an environmental appeal, but the baseline was already much higher (around 80% towel reuse) by comparison with the other studies (around 30%-40%), suggesting that a ceiling effect may have been produced an absence of impact. This heterogeneity suggests that culture may modulate the sensitivity to environmental appeals, a mechanism yet to be fully understood.

With regard to the effect of donations to charity, the overall null effect similarly covers the heterogeneous impact of different types of donation. Messages informing that a donation to charity will be made if guests reuse their towels have a null to negative effect (Goldstein et al., 2011; Mair & Bergin-Seers, 2010), whereas messages informing

that, in line with hotel environmental policies, a donation on behalf of the guest has already been made to charity has a strong positive effect in increasing towel reuse (Goldstein et al., 2011). These donation studies serve also to highlight the importance of measuring factual behavior and not (only) self-reported preferences (Bloese, Mack, & Pitts, 2015; Millar & Baloglu, 2011). In a study with more than 1,200 hotel guests, Shang Basil, and Wymer (2010) concluded that guests would increase their towel reuse if a donation was offered to charity as a consequence of their behavior. This conclusion, nonetheless, is based on guests' self-reported intentions and contrast with data from Goldstein et al. (2011), based on observed behavior.

Effective interventions were both descriptive social norms (ES = -0.25, 95% CI = [-0.39, -0.12], $p = .004$) and choice architecture (ES = -0.43, 95% CI = [-0.72, -0.13],

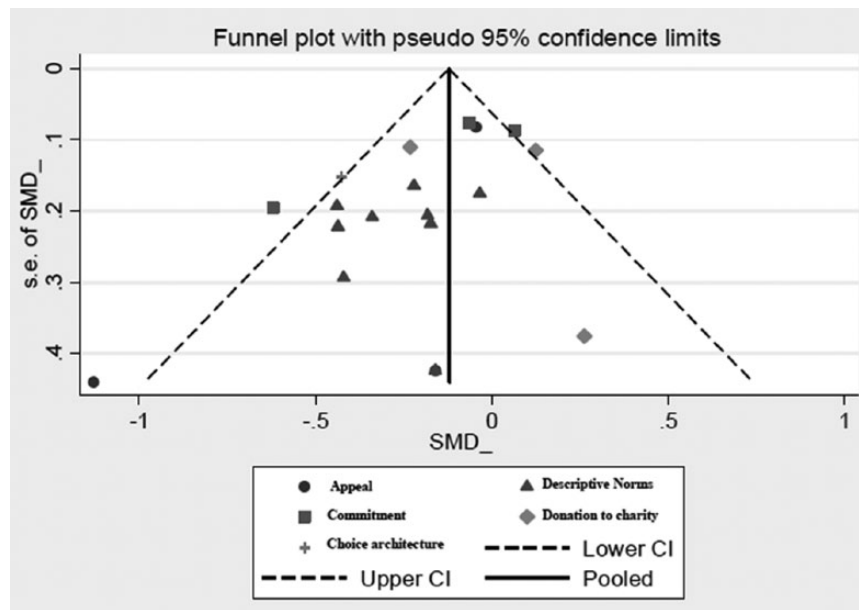


Figure 3.

Funnel Plot.

Note. CI = confidence interval; SMD = standardized mean differences.

$p = .009$), significantly increasing towel reuse. The key intervention with a significant effect (descriptive norms) shows low heterogeneity ($p > .05$ for the I^2 statistics), suggesting that this estimate is robust and papers testing this strategy tend to report similar results. Nonetheless, this effect is small in magnitude ($ES = -0.25$), suggesting that social norms are consistently effective in promoting modest towel reuse rates.

Regarding the latter (choice architecture), however, there is one study from which conclusions can be drawn. This study (Bapuji et al., 2012) simply placed a towel bin in the hotel bathroom and asked guests to keep their towels out of the bin if they wanted to keep reusing them. This simple spatial element significantly increased the numbers of towels reused.

Publication Bias

There is some evidence for publication bias. The Egger's test for small study effects has a significant negative coefficient ($-1.57, p = .007$), which demonstrates that smaller studies ($N < 100$) with lower precision (i.e., higher standard errors) are reporting higher effect sizes compared with the larger studies. This suggests that studies with small samples are more likely to be published if reporting positive significant effects, which in turn may produce overestimated effects. The Egger's test is visually supported by Figure 3 presenting a scatterplot showing the distribution of treatment effects against a precision measure (their standard

error). The shortage of smaller studies reporting null or negative effects (blank bottom left area of the funnel plot) suggests a form of publication bias, reflecting the tendency for studies reporting null or negative effects failing to be published unless they have a large sample size—which makes a more compelling case for null effects.

Discussion

This study presented a systematic review and meta-analysis of the field experiments aimed at promoting sustainable hotel guest behavior. Although the strict criterion of including only studies with an experimental design performed in the field (i.e., in natural hotel settings) restricted the final sample to nine papers (13 studies), these nonetheless correspond to almost 6,000 hotel stays—a sizable number of observations.

Our results show that, primarily, efforts to improve sustainable hotel guest behavior which could be detected in the literature are targeting towel reuse. All included studies were related to towel reuse, corroborating that the most concrete actions targeting guests have been towel and linen reuse programs. This is an important contribution to the literature because there is evidence that despite placing towels in the rack, many guests have their towels replaced because housekeeping staff considers reusing towels a low-quality hospitality service (van Rheede & Dekker, 2016). It is, therefore, relevant to show that there is evidence showing how the uptake of these programs, by now established as

good practices, can be improved. Even under low uptakes, the American Hotel and Lodging Association² estimates that the requests to reuse towels reduce the number of loads of laundry washed—as well as the related water, sewer, energy, and labor costs—by 17%. The association also notes that such programs increase the life span of towels and linens, thus reducing replacement costs. Hence, the implementation of effective behavioral interventions to increase this uptake has the potential to be translated into significant environmental gains and reduced operational costs.

Second, our results show that not all messages are effective. Messages conveying descriptive social norms, that is, informing that a high prevalence of previous guests have reused their towels, are the most frequent and effective intervention to promote towel reuse. This higher prevalence is based on the analysis of the field experiments reported in the literature while keeping in mind that within industry standards, the common approach taken in hotel daily activities is to simply place environmental appeals in hotel rooms pleading for towel reuse. Our results uncover that there is a limited number of experiments that actually assess the tangible impact of these environmental appeals and showing, on average, a null effect.

Moreover, our results corroborate previous research showing the significant effects of social norms to change resource-efficient behavior but extending the analysis of their effects to several new contexts. On one hand, our results shed light on the pertinence of Carlsson et al.'s response to Scheibehenne et al. (2016). We addressed the limitations pointed by Carlsson and colleagues by using a random-effects model and showing that social norms have a significant but small effect, consistent even when allowing for between-study heterogeneity. Thus, social norms may not produce an effect as potent as previously portrayed but do seem to produce significant increases in the levels of towel reuse—although far from exhibiting effectiveness rates to be considered a game changer solution. On the other hand, our article shows that social norms also work to change the behavior of short-term, transitory customers of hospitality services as well as long-term permanent households in their daily lives (Allcott, 2011; Costa & Kahn, 2013; Ferraro et al., 2011). Finally, past research (*idem*) showed the impact of social norms to reduce energy and water consumption in customers of utilities companies but for which this reduction provides a direct gain in lower bill cost. In the service research literature, the impact of social comparison has been examined when there is a financial gain to customers (e.g., Winterich & Nenkov, 2015), but we show that social norms work to promote sustainable behavior even in the absence of direct monetary incentives—That is, towel reuse provides no financial reward to guests.

Third, there is a very limited use of choice architecture interventions to change hotel guest behavior although calls

for its use have been made (Huh & Lee, 2016). Choice architecture or nudging encompasses a number of interventions through which the characteristics or positioning of spatial stimuli are altered (Thaler & Sunstein, 2008) and has proven effective in a variety of contexts such as promoting healthy food choices (Thorndike, Riis, Sonnenberg, & Levy, 2014), retirement savings (Benartzi & Thaler, 2013), or organ donation (Whyte, Selinger, Caplan, & Sadowski, 2012). Only one field experiment was included in our meta-analysis employing such a strategy (Bapuji et al., 2012) with significant effect. Yet, two other papers excluded at later stages of screening due to their nonexperimental design, implemented nudging strategies with positive results. Kallbekken and Sælen (2013) using a pre-post treatment design showed, in a total of 52 hotels, that reducing the plate size reduced food waste by 19.5% ($p < .001$), and that introducing a sign pointing out that guests could help themselves more than once reduces food waste by 20.5% ($p < .001$). Campbell-Arvai and Arvai (2015), working with the Starwood Hotel & Resorts Chain, showed that interventions that require a passive acceptance versus an active decision are more effective to change behavior. There were two possibilities to engage in sustainable behavior: (a) Guests could elect to decline, or opt out of certain house-keeping services, namely, the laundering of towels and bed sheets and (b) guests could take a reduced-flow shower, thereby conserving water and the energy required to heat it. By default, out of two, one showerhead was turned off, but waterproof signs were placed on the wall informing that guests could turn the second showerhead on by pressing the small button. Based on more than 1,000 hotel stays, the authors showed that about 3% of guests opted-out of house-keeping while about 60% of guest kept the default of one showerhead. These studies suggest the untapped potential of simple, nonobstructive nudging interventions in the hospitality sector to foster sustainable guest behavior.

Managerial and Policy Implications

The increasing complexity of customers' demands combined with growing market competition has posed new challenge to the management of these services organizations. Our results may help hotel managers and other tourism practitioners to become more aware of possible strategies that enable guests to play a larger role in conservation efforts. Moreover, our results contribute to ongoing policy debates. Tourism is being given a central role in sustainability efforts in the next decades. The 70th Session of the United Nations General Assembly adopted the Sustainable Development Goals (SDGs) in 2015 (United Nations, 2015), and among the 17 SDGs, tourism is explicitly featured in three Goals. Furthermore, the United Nations declared 2017 as the International Year of Sustainable Tourism for Development. However, although policy making is clear in its goals, it

remains elusive about how to achieve it, emphasizing the relevance of this line of work and the understanding of the relative effectiveness of different practical interventions.

Taken together, our results show that different messaging techniques on the reuse of towels in hotels have distinct impacts on guest behavior, ranging from no effect to a significant modest effect. Our results seem to provide support for the idea that low levels of sustainable behavior from hotel guests are not based on low awareness and attentiveness (as suggested by the null effects of appeals and commitment enhancing messages) but by an insufficient motivational pull to restrict the search for a carefree experience. It seems that only stimuli such as social comparison messages, which provide a strong social motivation for behavior change in most individuals (Gächter et al., 2013), are able to produce significant changes. Thus, messages prompting guests to protect the environment based on facts, figures, and statistics are likely to produce no or very small effects. The impact of social comparison and normative information may be stronger (albeit modest) because while holidays may be periods of escape from regular routines and responsibilities, guests retain their awareness of social skills, used to establish acceptable parameters of action (Ryan & Glendon, 1998). Therefore, while stimuli appealing to individual responsibility and moral obligations may prompt few changes, social comparison stimuli seem to be effective, even on holidays.

Limitations and Future Research

It is intrinsic to the nature of meta-analysis that its value is dependent of the range and quality of the primary studies included in its analysis. Thus, the limited number of papers included bounds, to some extent, the precision and generalizability of our conclusions.

Furthermore, the strict focus on behavior hinders the analysis of latent psychological variables such as perception of quality service and willingness to return or recommend the hotel—a customary characteristic of field experiments which tend not to collect data on variables other than observable behavior. This implies that any possible unobserved adverse effects from these interventions remain unexamined. For instance, guests may reuse their towels the most when confronted with messages about what past guests have done. It is yet to be analyzed, however, if this social comparison produces negative feelings in present guests. Some people dislike social comparison, especially when their performance is considered to be weaker than others (Allcott, 2011). Hotel managers, for instance, are seeking ways to understand the most influential factors in guest loyalty and satisfaction (Cherapanukorn & Focken, 2014; Kandampully & Suhartanto, 2000). Future research should examine whether these behavioral interventions contribute to customer approval in the longer term.

Finally, the heavy focus on towel reuse programs overlooks that the overall benefits of reusing towels tend to be negligible regarding their tangible contribution to reduce CO₂ emissions compared with actions, for instance, to decrease energy consumption like promoting less air conditioning use or taking shorter showers. The potential pitfall with this current focus on towel reuse is that it might leave untouched the analysis of strategies to engage guests in more substantial efforts, and limit how sustainable can the tourism sector ultimately be.

Appendix

Conversion to Standardized Mean Difference (*d* or Effect Size [ES])

Campbell Collaboration Tool for Effect Size Calculation (see <http://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD28.php>)

1. From *t* tests:

$$ES = t \sqrt{\frac{n_1 + n_2}{n_1 n_2}}$$

2. From one-way ANOVA:

$$ES = \sqrt{\frac{F(n_1 + n_2)}{n_1 n_2}}$$

3. From proportions (χ^2):

$$ES = 2 \sqrt{\frac{\chi^2}{N - \chi^2}}$$

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Notes

1. Inception is not specified because it refers to different dates for different databases. Nevertheless, for all databases included, the period covered ranged from between the last 30 to 40 years.
2. Source: Smithsonian News (see <http://www.smithsonianmag.com/smart-news/reusing-hotel-towels-actually-does-make-difference-180949890/#vm0BWIWefdFkgUhu.99>)

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