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Nudges, Norms, or Just Contagion? A Theory on Influences on the Practice of (Non-)Sustainable Behavior

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Abstract: ‘Nudging’ symbolizes the widespread idea that if people are only provided with the ‘right’ options and contextual arrangements, they will start consuming sustainably. Opposite to this individual-centered, top-down approach stand observations highlighting the ‘contagiousness’ of thoughts, emotions, and behaviors of reference groups or persons present in a decision-context. Tying in these two lines, this paper argues that nudging may sound promising and easily applicable, yet the social dynamics occurring around it can easily distort or nullify its effects. This argument stems from empirical evidence gained in an exploratory observation study conducted in a Swedish cafeteria (N = 1073), which included a ‘nudging’ treatment. In the study, people in groups almost unanimously all chose the same options. After rearranging the choice architecture to make a potentially sustainable choice easier, people stuck to this mimicking behavior—while turning to choose more the non-intended option than before. A critical reflection of extant literature leads to the conclusion that the tendency to mimic each other (unconsciously) is so strong that attempts to nudge people towards certain choices appear overwhelmed. Actions become ‘contagious’; so, if only some people stick to their (consumption) habits, it may be hard to induce more sustainable behaviors through softly changing choice architectures.

Keywords: sustainable consumption; peer influence; mimicking; social contagion; nudging

1. Introduction

Countries worldwide are struggling with unsurmountable negative consequences of the unsustainable ways in which modern everyday lives are set up. There is little doubt that everyday behaviors need to change and become ecologically ‘sustainable’ [1]. Recent developments due to Covid-19 also show that rapid change of behaviors is actually possible. Nonetheless, discussion on the path of how to reach the change towards a society that uses its resources ‘sustainably’ remains to be decided on and is most hotly debated. While some call for more laws and regulations [2], others appeal to the responsibility of individuals [3] or the possibility of softly ‘steering’ behaviors towards sustainability by providing sustainable alternatives more readily and ‘nudging’ people towards the use of those [4].

While discussions go on and information about the *political* backgrounds of consumption expand, the amount of resources used, the garbage produced, and the ubiquitousness of environmental pollution are gaining in scope rather than decrease [5]. Commonly cited explanations attribute those developments to convenience, the difficulty of breaking established routines, and structural arrangements that continue to favor and foster non-sustainable behaviors [6–12].

However, though sounding plausible, behaviors have actually changed tremendously over the last decades. Patterns of mobility, fashion circles, and meat consumption are just a few examples of

everyday activities that have continuously expanded in the last years and reached unprecedented levels of unsustainability [13]. Communication and travel have changed in their very essence. We know that human behavior changes over time, but why were these changes in consumption behaviors able to spread so well, while many ‘sustainable’ ways of consumption commonly find it difficult to spread?

The theory of nudging or sociological practice theories see the reasons in the ‘choice architectures’, structural arrangements or broader life contexts in which those actions that are to be changed are embedded. The given circumstances, including the social setting, are crucial for the kind of decisions people take [4,10]. In this vein, a widespread thought is that if people are only provided with the ‘right’ options in the ‘right’ contextual arrangements or decision-framings that foster the choice of the ‘right’ options, they will start consuming in the ‘right’ way, for instance, sustainably.

However, whereas experimental applications of nudges and changes in ‘choice architectures’ have revealed quite positive effects [14–17], the factual and long-term effectiveness outside experimental settings appears to be more sobering [18]. Good effects seem to be restricted to very specific settings [19–21]. One explanation for those shortcomings provide for example sociologists, anthropologists, and social psychologists, who point out that actions can be imbued with social, cultural, and political meanings [1,8,22–25]. Thus, decisions may be guided more by an expressive intention than by the physical outcome of the action itself. Therefore, individuals may ‘stick’ to their patterns and circumvent the effectuated changes in the choice architectures.

Another explanation offers research related to health-related behaviors and consumer trends. As shown there, conscious imitation and *unconscious* contagion of attitudes, opinions, and behaviors happen across an extensive set of everyday decisions [26–29]. Similar dynamics are observed and highlighted more and more in the study of electoral behavior and public opinion [27,30–39]. Rather than judging choices and deliberately deciding what to do, people regularly seem to engage in more or less mindless, automated imitation of what the people next to them are doing.

This paper presents evidence from an exploratory observation study (1073 individuals nested in 395 groups) that supports the intuition that sustainable consumption is not spreading because of social imitation dynamics, which are labelled ‘social contagion’. The study set out with two research questions: To what extent do individuals replicate each other’s choices? And can a ‘nudge’ make groups of people or single members choose potentially sustainable options? Situated in a cafeteria, patterns of choice among groups of people were traced before and after implementing a change in the choice architecture. This treatment was designed to encourage one choice over another. From the results, the central argument is derived, which is that a key impediment to the spreading of sustainable (consumption) behaviors is *an unconsciously occurring mimicking, and its social contagion*.

On the following pages, the article starts with a brief presentation of the theoretical background, setup, and findings from the observation study. It started as a trial to ‘nudge’ visitors of a cafeteria to choose a ceramic cup (as a proxy for ‘sustainable’ choice) instead of a disposable cardboard cup by making it easier available than before the treatment. Contrary to what was originally hypothesized, the treatment did not increase choices of the ceramic mugs (on the contrary). Instead, what was observable was that individuals in groups tended to choose all in the same ways. In other words, they seemed to mimic each other. With this result at hand, a discussion of different theories follows, attempting to explain when and to what extent individuals’ choices replicate each other. Based on that, the paper presents a theory of mimicking and contagion in the context of consumption activities that can be carried out in more or less sustainable ways.

2. Theoretical Background

What drives and what prevents sustainable behaviors from occurring? In public and media, the commonly provided explanation follows a line of understanding inspired by traditional economics. This line describes decision-making as the outcome of a rational cognitive process. Like accountants, people are assumed to weight costs and benefits, taking into account all necessary information, having clear and stable preferences in mind, such as price-caps, requirements, and tastes. Following such “conscious,

intentional, and individually controlled” decision-making process [40], individuals eventually choose that option that provides them with the greatest (maximum) benefit with respect to their interests. In this vein, non-sustainable behaviors like buying non-ecological food or taking the flight instead of a train are assumed to be due to alleged prices premiums, which people continue to associate with sustainable options [41,42]. In other words, people are prevented from sustainable behaviors because it is the rational thing for them to do.

Cognitive psychologists turn this rationalistic view upside-down and postulate that people are in fact ‘irrational’ [43–46] or “bounded rational” [47,48]. As they acknowledge, individuals face several hundreds of decisions every day, many at the same time and in combination with other actions [49]. Carrying them all out fully aware and accounting all costs and benefits before choosing the cheapest product or the ‘best’ possible option would likely lead to a cognitive overload. Therefore, individuals use different cognitive shortcuts and strategies to make decisions simpler, faster, or simply feasible [44,50].

Much information is processed in fast, automated ways [44]. As this occurs, contextual cues can nurture certain beliefs about own preferences and with that behavioral decisions; or they can *bias* preferences [51–55]. Such cues involve what is presented in a situation and in what *way* products or information are presented, as well as other visual, auditive, and social-emotional signals in the broader surrounding. In sum, decision-making may be ‘benefit-driven’, yet in a somewhat other way than postulated by traditional economics. Some decisions follow the economic cost-benefit analysis. However, in the majority of situations, the ‘rational thing to do’ seems to be to not bother thinking too much, and instead ‘house-hold’ cognitive resources. This is done relying on manifold cognitive heuristic strategies that help abridge decision-making.

A prominent conclusion drawn from this is that by changing the “choice architecture” [4], one can ‘steer’ behavior. As Thaler and Sunstein [4] propose with their concept of “nudging”, by providing people with the ‘right’ choice architecture, they can be steered to choices that are better for themselves in the long-term and for society. This way, people can follow their days as usual and continue relying on their automated processing. Yet, by changing certain features of the arrangements in which decisions are made—the choice architecture—one can ‘conduct the conduct’ and nurture individuals in relatively unobtrusive ways to choose differently than they would without the nudge. Such nudging techniques can entail switching default options, changing physical presentation of options, giving feedback on what is (about to be) done, and/or prompting social norms [4]. A typical example of how such a choice architecture can be created is an approach in food contexts. By placing vegetables and salads before less healthy options, people have their plate too full to add large quantities of unhealthier food, and this way are nudged towards healthier choices.

The nudging approach has been particularly welcomed and embraced by politicians and business managers, as it permits them to change citizens’ behaviors and their outcomes without the need to tighten laws and regulations, or sacrifice sales turnout and economic growth for environmental sustainability. Indeed, the motivation of nudging theory is that it shall serve as an alternative to governmental enforcement, coined “libertarian paternalism” [4]. It leaves individuals their freedom of choice, while acknowledging the fact that choices are not made in a void, that is, there is always a certain kind of choice architecture present.

The power of this approach has been shown successful in a variety of settings and situations, including healthcare (e.g., donation of organs, [56]), and food consumption (e.g., [14,57–59]). In relation to sustainability, positive effects have been observed and explored especially in the spheres of energy and water conservation (e.g., [60–62]), mobility [19], and food waste [15,19]. In addition, in a metastudy, Lehner and colleagues mention the case of the Swedish fast food chain MAX, which through labelling their products with carbon footprint information is said to have witnessed a shift towards buying products with lower carbon footprint [19].

In general, however, research on the application and effectiveness of nudges in the domain of sustainable consumption is limited to a few cases [19]. Moreover, while results from experiments

have revealed quite positive effects [14–16], the factual and long-term effectiveness observed outside experimental settings appears to be more varied [18,61,62]. Good long-lasting effects are observed mainly in very specific settings [19–21] or for specific crowds [61].

On the one hand, this may be due to a limited number of studies considering longer-term effects. On the other hand, it points to potential shortcomings in the real-world application—or applicability—of the approach to re-arrange outside settings more favorably for sustainable consumption. For example, a rich strand of research, including conflict research, development economics, health care, pedagogics, consumer, and sustainability research, comes to the general conclusion that individuals tend to ‘follow the herd’ and imitate others around them [26,29,63–71]. Comparable dynamics are observed and discussed in public opinion and political behavior research [33,72–75], as well as in food contexts [76–79]. As these studies highlight, interpersonal communication, interaction, or mere co-existence can make people behave in certain ways [27,30,32–38]. People imitate each other’s choices; likewise, behavior change is regarded as depending on social dynamics favorable to it [64]. Correspondingly, effects of choice architectures on behavior may be closely entwined with social dynamics. This calls for an exploration of nudging effects over time, the accompanying social dynamics, and of explanations for shortcomings within a classic everyday setting.

3. Materials and Methods

In the ambition to address this research gap, a collaboration was established with a cafeteria located on the campus of a Swedish medium-sized university in 2019 for doing an exploratory observation study. The cafeteria is privately run by a franchise holder, open from breakfast until late afternoon. Over lunchtime, every day there are four warm options on offer. Besides this, the cafeteria offers a salad bar, several cold meals, snacks, and drinks. The cafeteria has in its main seating area 35 tables with four seats per table (Appendix A, Figure A1). Thus, it can host a good number of people and groups per day. At the same time, it remains feasible for an observer to keep track and record of guests.

The study started with preparing a codebook and a seating plan (which included assigning a number to each table). In April 2019 followed a pretest. The experience served to refine what information was reliably observable, and in what way the recording was best to be done (the codebook can be obtained upon request). The actual study embraced two steps, which were aimed at allowing for testing longer-term effects of nudging techniques and identifying possible explanations for practical shortcomings. The specific objectives were, reiterating the research questions, to (1) identify patterns of choice at individual and group level, and to (2) explore to what extent and in what ways patterns of choice change or remain stable after making a change in the choice architecture. Patterns of change refer to both the sum of individual choices of one or another variant, and to patterns of choice at the group level (inspired by Al Ramiah and colleagues [80]) before and after the implementation of the treatment.

The first stage involved collecting data about patterns of choices of individuals and the groups they were part of (if they were in a group), who visited the cafeteria. Specifically, on five days in the course of two weeks in May, a daily observation of the cafeteria visitors was conducted at lunchtime hours (11:30 am until 1 pm), i.e., when the density of groups coming in is highest. The procedure involved taking notes of the use of reusable and non-reusable alternatives of individuals by groups.

This round was followed by implementing the treatment in November. It consisted of rearranging the choice architecture for how the reusable coffee containers (ceramic mugs) are provided. The rearrangement was accompanied by a second round of observations and note-taking, again on five days in the course of two weeks. To account for potential confounders, the two rounds took place at roughly the same time periods of the semester, since timing of the year may influence as an extraneous variable.

In both rounds, records were taken by pen and paper, for everyone who took a seat at one of the tables in the observed seating area. This included those individuals who did neither ate nor drunk anything. To identify group patterns, individuals of one group were collected together on one notepad (Appendix A, Figure A2). Given this observational character, the treated and untreated populations

are non-randomly selected, and the groups self-assigned. After transcribing the notes into an excel-file, the analyses were done with the statistical program R.

In the cafeteria selected, students, academic, and non-academic personnel can have snacks, drinks, and lunch onsite or to take away (some also bring their own food from home), on any days they wish (there are several restaurants/cafeterias on the campus). Visitors can choose between various ecologically more and less sustainable options: What type of coffee cup (ceramic, cardboard, own re-use mug), non-coffee drink (glass, plastic bottle, own re-use bottle), and meal (plate, take-away/plastic, own). While the available options are not immense, they are present and well recognizable. This allowed for a feasible and reliable observation and record of choices. Correspondingly, the coding included for each individual the group number of which they were part, the type of coffee cup (ceramic, cardboard, own re-use mug, none), non-coffee drink (glass, plastic bottle, own re-use bottle, none), and meal (plate, take-away/plastic, own, none) they chose, plus their gender. At the level of the group, besides to the assigned group number, notes included the assigned table and the size of the group. Table 1 summarizes the variables that were collected as part of the observation.

Table 1. Variables collected as part of the observations.

Group Level Data	Individual Level Data
Date	Gender
Round (before/after treatment)	Cup
Table number	Glass
Size of group (no. of persons)	Meal

The setting allowed for a simple treatment with a clearly distinguishable outcome: Altering the way in which the different types of coffee cups are provided. There have been discussions about the extent to which disposable cups (e.g., of paper) are more or less eco-friendly than refillable mugs (e.g., ceramic). Independent life-cycle assessments suggest that ceramic cups fare better if using mugs frequently [81], and Swedes do so, using on average 100 paper cups per person/year [82]. This surpasses the break-even point of when refillable mugs fare better than disposable ones [81]. In addition, paper cups are typically coated with plastic as moisture barrier, since on its own paper cannot hold liquid. This coating must be separated from the cup before the paper can be recycled (if the cups reach recycling plants). Yet, as this process is expensive, the cups often are sent to landfill. Against this backdrop, paper cups can be assumed to be less sustainable than ceramic mugs. Furthermore, a poster at the cashier asks customers to “consider taking reusable mugs for the environment”, thus giving reason to believe that cafeteria visitors could see the ceramic mugs as the ecologically more sustainable option than paper cups. Nevertheless, some individuals may have had the popular discussions in mind and thought that paper cups were more or equally as sustainable as ceramic mugs. This critical point has to be taken into account when interpreting the results.

Originally, the ceramic mugs are offered first, directly at the beginning of the line and thus as a kind of default. However, they are also located in a corner and somewhat hidden. Yet, at the entry, customers face a number of impressions: It is where people meet their fellows, greet, and talk to each other, while at the same time they must decide what to eat. If one forgets to take the cup there (or is not yet decided whether to take coffee or not), once arriving at the cashier that person might be too lazy or feel too pressured (e.g., having people behind them in the queue or their fellows waiting) to go back to the entry [83,84]. As alternative, they can take a disposable paper cup, which is provided at the cashier, hard to overlook and especially convenient for those who overlook the ceramic mugs at the entry. There is no charge for taking the paper cup, nor a discount for taking the ceramic mug, and thus no financial incentive to choose one over the other.

The hypothesis was that *by providing ceramic mugs at the cashier and thus equally as convenient as the paper cups, more people would take the ceramic mug*. The treatment was set up precisely in this way and in line with a simplified adoption of nudging. Rather than forcing individuals to choose a

certain kind, their liberty of choice was preserved while improving the presentation of the desirable alternative [4,85]. Specifically, after a first number of days of observation and note-taking, the ceramic mugs were placed directly before the disposable paper cups at the cashier. Of the various aspects coded, the following discussion centers on this coffee dimension.

4. Results

To what extent do individuals take up available opportunities for potentially sustainable behaviors? Do more people choose the reusable mug or the disposable paper cup? How does it change after implementing the treatment? In total, 1073 individuals nested in 395 groups could be observed. About half of the individuals had coffee (262/283 before/after the treatment, respectively) and half did not (296/232). Men had coffee slightly more often than women (64 and 43 percent of male/female visitors, respectively). This did not change noticeably from before to after the treatment. Among those who had coffee, in total, 328 people took paper cups and 193 took ceramic mugs. Yet, while the pattern is similar for women and men, women took proportionally more paper cups than ceramic mugs (29 and 11 percent) as men did (33 and 28 percent). In general, of the total of coffees taken per observation day, the proportion of paper cups ranges between 50 and 70 percent. Only on days 3 to 5, the proportion is fairly similar (Figure 1a). With and without counting in own re-fillable mugs brought to the restaurant together with the ceramic mugs, the number of choices of disposable cups exceeds that of the reusable options ($t = -29.728$, $df = 520$, $p < 0.000$).

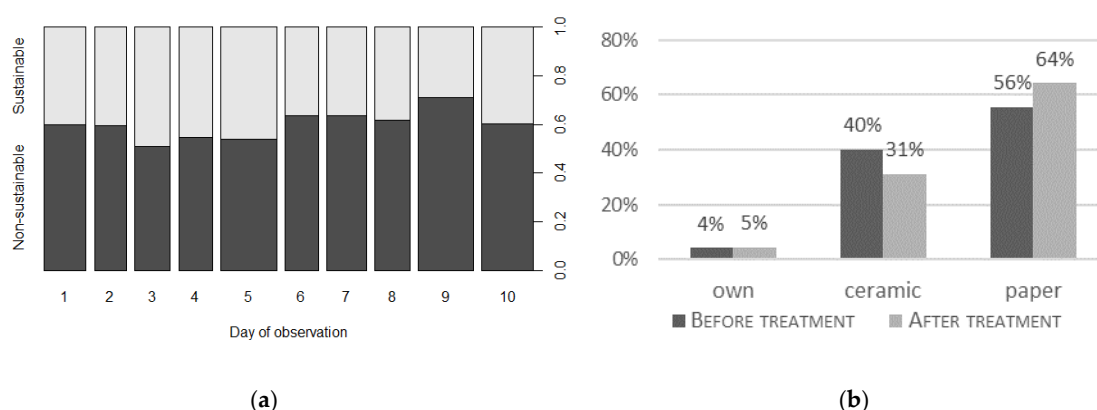


Figure 1. (a) Distribution of choices days 1 to 10 (in %); (b) Type of choice (in %) before and after treatment.

Comparing before and after the treatment (Figure 1b), the number of disposable cups increases from 146 to 182, while that of reusable mugs decreases from 105 to 88 (using own refillable mugs remained similar, with 11 before and 13 after the treatment). The pattern is the same for men and women (52/65 percent paper cups before the treatment, and 56/77 percent after). Though not statistically significant, this result is yet opposite to what was expected. After all, by making ceramic mugs better visible and accessible, and placing them next to the paper cups, the expectation was that more individuals would choose the ceramic mug. Instead, people chose the cardboard variant slightly more.

To explore how to make sense of that, a first possibility is to compare whether choices are related to the size of the group, both before and after the treatment. Some worthwhile differences become visible ($\chi^2 = 89.45$, $df = 42$, $p < 0.000$). For those visiting the cafeteria alone before the treatment, the distribution is split almost perfectly in three between choosing ceramic, paper, and no coffee. After the treatment, almost three times as many of them chose the disposable paper cup over the ceramic mug. In groups of three or four, more chose disposable cups before the treatment, in groups of two or larger than four, a relatively equal number of individuals chose reusable and disposable cups (for larger groups, this has to be interpreted carefully given the small number of groups of these sizes). While after the treatment, in groups of three and five the gaps between reusable and disposable choices

increased, leading to a similar excess of the former as among single visitors. For the others, it changed in distinct directions. The interesting take-away is that the treatment seems to have instigated changes in choice patterns, more ‘movement’. Yet, not necessarily into the intended direction, which suggests that the nudge did not work as planned.

This points to another remarkable pattern. In theory, groups can be homogeneous (groups where all coffee drinker choose the same kind of cup) or mixed (groups where individuals choose distinct variants of cups). The empirical observations show: In groups in which two or more people chose a coffee, the majority of individuals chose the same kind of cup as their peers did. Three hundred and eighty-five individuals were in groups in which all those who had coffee, chose the same; 147 individuals were in groups where there was a mix of choices (229 individuals were the only ones of the group choosing coffee). In addition, in the mixed groups, individuals chose the ceramic variant somewhat more often, while in homogeneous groups they did the opposite ($\chi^2 = 25.75$, $df = 4$, $p < 0.000$). These patterns are the same for women and men.

This pattern remains fairly unchanged when differentiating before and after the treatment ($\chi^2 = 46.95$, $df = 12$, $p < 0.000$; Figure 2). In the mixed groups, the number of ceramic mugs taken increases slightly, but that of the paper cups also does so. In homogenous groups, in turn, somewhat fewer take ceramic mugs, while the number of paper cups remains fairly the same (at the end being more than twice as many cups than mugs).

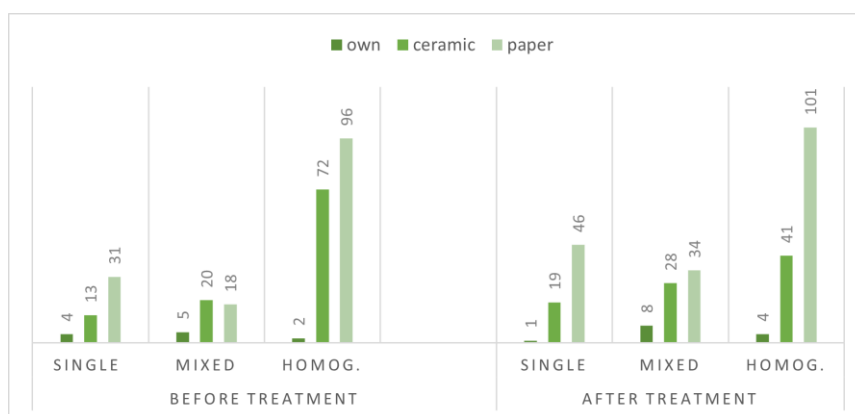


Figure 2. (Non-)sustainable choice before and after treatment in mixed versus homogenous groups. Note: “Single” refers to groups of two or more people where only one person had coffee.

Figure 3 makes a more fine-grained differentiation of groups. Before the treatment, not considering individuals who were in groups where several people took a coffee but they themselves did not, leaves 170 individuals who chose exactly as their peers did; and 21 individuals who chose as the majority of people in the group did. In contrast, not a single person belonged to a minority that chose one option compared to a majority of the group that chose differently. Fourteen people were ‘lone wolves’, choosing one thing while all others chose something else. After the treatment, the homogeneity pattern remains stable. However, the distribution of sub-types of mixed groups changes. Groups where all or a majority chose the reusable alternative decrease, whereas ‘lone wolves’ and group minorities choosing ceramic mugs become more. Groups where all or a majority chose the paper alternative increase slightly, as does the number of ‘lone wolves’ ($\chi^2 = 54.8$, $df = 17$, $p < 0.000$).

The rearrangement of the mugs seems to have seeded some deviations from the ‘one’ group choice. Slightly more individuals seem to have pursued their own decision ($t = -3.25$, $df = 398.87$, $p = 0.001$). However, the largest share of individuals continues to be part of majorities. Overall, the above-mentioned movement seems to be mainly on detriment for sustainable homogenous groups. Little altered is the homogeneity of individual choices prevailing across groups.

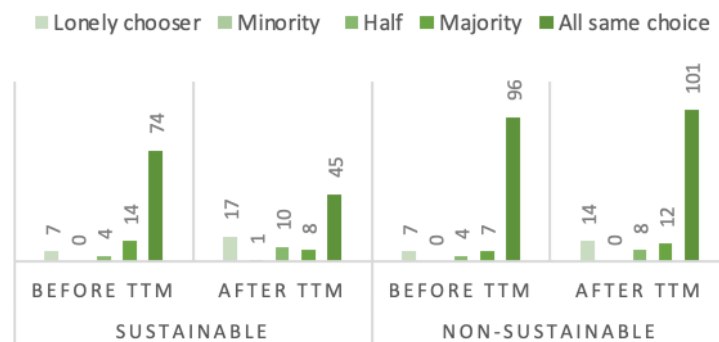


Figure 3. Individual roles of chooser in their group. Note: Groups where only one person chose a coffee are excluded from this calculation.

Finally, looking at the group level, the pattern is reiterated. On the one hand, there are 37 mixed groups (13 before and 24 after the treatment), compared to 130 homogenous groups (67 before and 63 after the treatment), plus 114 groups where a single person had coffee, and 114 groups where no one had so. On the other hand, homogeneous groups show a tendency towards unsustainable action, which becomes more marked after the choice rearrangement: 28 ceramic mugs versus 39 paper cups before the treatment; and 17 versus 40 afterwards. Nevertheless, compared to mixed groups, the proportion of reusable choices in homogeneous groups is somewhat higher.

As a last sidenote, whether consciously or unconsciously, the lunchtime visitors mirrored each other's choices also with respect to the kinds of meal they had (warm dish, cold dish, own food brought) and their non-coffee drinks. To sum up generally, the treatment changed little in the overall pattern of choice, with a tendency to take the disposable rather than the presumably more sustainable alternative. This contradicts the hypothesis. What becomes visible instead is a clear tendency of people in groups to all choose the same alternative. Potentially (non-)sustainable behavior, in other words, seems to be 'contagious'.

5. Discussion

5.1. Nudging and Social Influences

A small change in physical environment was not sufficient to nudge potentially more sustainable choices in the cafeteria setting (all else being equal). Instead, a pattern of homogeneity of choice within groups persisted. In a notable majority of groups, all individuals who drank coffee consistently chose the same kind of coffee cup. This suggests that there is something occurring at the social context level, which distorts effects from the nudge.

A possible explanation provided as part of nudging theory is that certain patterns of individual behavior can be, once established, difficult to change. This seems to be especially true if there is a certain level of uncertainty about which kind of behavior seems to be the 'right' one to engage in [4]. In such situations, people are susceptible to social influences. Hence, a person can derive intuitions of what to do from the social settings and also more or also from conscious processes of interaction with others. Specifically, Thaler and Sunstein acknowledge three types of social influences: Social cues can remind of the existence of a given behavior (*priming*); give *information* about what seems to be the 'right' thing to do; or prompt *peer pressure* with respect to what should be done in order to be thought about well by a given (group of) people [4]. These cues are in turn assumed to serve as means that can be exploited. That is, they are regarded as nudges in themselves, which can be used to shift behaviors toward the desirable ones.

Tying in with this, a social influence discussed extensively with respect to sustainable consumption and everyday behaviors are social norms, frequently also known as nudge [18,60,86–88]. Norms are implicit assumptions or beliefs about what seem to be common standards of 'good' or 'appropriate' versus 'bad' or 'inappropriate' behaviors developed as they interact in and with their social

environments. They are regularly followed unconsciously, yet not unconditionally, as people have personal norms, values, and personal backgrounds, which may put thresholds on when and what norm is followed. Still, individuals tend to follow norms, seeking to avoid/obtain social disapproval and possibly associated sanctions [89].

The most common conceptualization of norms in the study of sustainable behaviors distinguishes two types of normative beliefs: Those that relate to what others (would) do in a situation (descriptive social norms); and those relating to what others think that ‘ought to be done’ in a situation (injunctive social norms) [90]. Some recent studies further differentiate between ‘static’ and ‘dynamic’ norms, where the former describe a norm as it is, whereas the latter describe what is developing, i.e., newly evolving or changing norms [62]. The effects of norms are particularly studied in relation to water and energy use, recycling, and conservation behaviors. What can be concluded from these studies is that highlighting to individuals in more or less explicit ways what others around them are doing (descriptive norms) or what is desirable to be done (injunctive social norms) seems to generally be an effective way to trigger certain behaviors, and behavioral change [60,62,86,89,91–96]. Research concerned with food and health contexts also indicates that individuals tend to alter what they consume to the (eating) norms perceived among their peers [49,57,76–79,97,98].

Nevertheless, results point to limitations of the extent to which social norms can take effect. Contextual conditions seem to be highly influential on whether a norm becomes salient and thus impacts behavior (e.g., [99,100]). Moreover, Loschelder and colleagues recall that for a norm to make behavior change in the way aimed for, this “desired behavior needs to already be the norm adopted by many people” [18]. Otherwise, the opposite behavior might continue or increase further instead (see also [86]). In everyday life, multiple norms abound, which may potentially compete. In quite a few cases, sustainability norms are emphasized alongside non-sustainable ones, most notably economic efficiency and economic growth, which rely heavily on continuously rising consumption levels independent of whether that is sustainable or not [101–103]. With particular reference to eating contexts, Warde describes how eating, understood as a practice involving more than only ingestion, is particularly complex [104]. Respectively, a multiplicity of norms relating to different aspects of the eating context can become relevant.

Several co-existing norms can intensify uncertainty, internal conflicts, and cognitive burden with respect to what to do. It is especially in such cognitively demanding contexts, when descriptive norms seem to have an effect on behavior, whereas that of injunctive norms seems to decrease [105]. From this, Farrow et al. deduce “that compliance to descriptive norms can constitute a heuristic shortcut that reduces the effort involved in decision-making” [89]. In other words, people then tend to follow what they observe others are doing, rather than to act based on what is assumed not to be desirable at that time.

With respect to the cafeteria study, at the first glance, this suggests that the similarity of choices was the result of a common norm. The study focused on lunchtime visits, where people come in as part of a group and have their attention drawn by different things: The choice of food, talking and interacting with the peers, not forgetting trays, cutlery, etc., being fast enough to not cause congestion. Wansink and Sobal illustrate that in these complex eating contexts, people tend to overestimate tremendously their attention to the multiplicity of decisions they (must) deal with. Their awareness seems to lie typically on *what* is eaten and drunk. Less or little focus seems to be put on other aspects that only constitute a “subset of food choice”, which would also include the tableware [49]. For such, following a norm as a heuristic shortcut seems reasonable to expect [17,97].

However, the study took place in Sweden, where acting sustainably *is* a common norm. In addition, since long time before the study started, there had been posters in the cafeteria informing guests about the porcelain cup being from an environmental perspective the better choice. Thus, they pointed to normative behavior and asked them to consider taking the ceramic cups or bring an own re-fillable mug for the sake of sustainability. For another, the social setting was not different before and after the treatment. With that, underlying norms should have stayed the same.

The power of norms certainly may be great. However, considering the vast number of decisions to be taken every day, assuming norms would be applied to everything of this is probably an exaggeration. The long research tradition of the social psychology of groups provides plenty of examples showcasing that individuals who are immersed in a group are prone to conform to what is happening or said there. They give judgements and act in different ways than they would when being alone, even if these are overtly wrong and counter to general norms (e.g., Asch and Sherif experiments [4]; also [31]). Such conformity is said to be grounded in group dynamics, social identities, and more or less formal organizations of life [23,63,100,106–109]. Humans seem to have a ‘drive’ to conform and imitate what others are doing who belong to their same social groups [110,111]; in particular, those who are perceived as belonging to a same social group or who represent groups that a person wants to belong to or looks up to [63,108,112–114].

This research points to subliminal processes in the human mind, which tend to happen quite automatically, stemming on an innate strive to coordinate better with others. Such improved coordination can facilitate fulfilment of basic needs, like social acceptance and belonging, co-habitation, and collaboration for ensuring basic things like survival [110,115,116]. Furthermore, group and social identities affect perceptions of the self, of others, and of the self, vis-à-vis those others [117–119]. Thus, how someone decides in relation to the group can influence self-conceptions, self-coherence, and self-esteem. Its relevance in eating contexts has been demonstrated as one way through which social influences occur [77,120] in rather automatic rather than contemplated and deliberate ways [49,97]. For example, Spanos and colleagues [121] present evidence for individuals’ tendency to not regard social influence as ‘valid’ influence on own food intake. In addition, acknowledgement of such social influences was very low, suggesting that individuals may be ignorant about or even deny the effect which others tend to have on their food intake. This suggests that social influences on eating tend to work unconsciously.

What becomes visible from this is that social influences may not only work as nudges. They can also be factors themselves that potentially *distort or inhibit (or also permit) nudges to take effect*. Especially in situations where multiple things happen at the same time, replication of others’ doings appears to be common and it may outperform a nudge. The remainder of this paper elaborates on how this may be happening, and what implications this has for current ambitions (and needs) to advance sustainable everyday lives.

5.2. Mimicking and Behavioral Contagion

People tend to imitate surrounding people. This can apply to opinions, beliefs, and emotions, as well as to single actions and more general behavioral patterns. The ‘transmission’ processes are said to work through interpersonal communication, interaction, or mere co-existence [27,30,32–38]. Co-existence, for instance, increases people’s odds to turnout if they live together with others who turnout [27,30,36,37,75,122–125], to eat the same kinds and amounts of food [78,79,97,120], and even to commit suicide [126]. Nonetheless, as Centola [64,127,128] elaborates, behavior spread is complex, and more so than the spread of information. It depends heavily on the specific social circumstance (or network structure), the kind of behavior, and the single follower. Carrying out behavioral change requires a social context favorable for it. That is, the social context mediates between what is thinkable or intended, and what is eventually carried out.

With a look at this mediating social circumstance, sociologists and scholars of food and culinary arts, especially, are vigorously emphasizing that single behaviors and related decisions are embedded within larger compounds of social interactions and general practices. Practices are “something we perform” [129], in the sense of several acts hanging together in “a conventional way of doing things” [129]. This is similar to what Thaler and Sunstein mention when they talk about stickiness of social practices. Yet, practice theories go a bit further than Thaler and Sunstein’s lens.

Rather than looking at a single behavior, practice theories take into account that single activities, or decisions in regard to them, are not performed in isolation from each other, nor from the rest

of a person's life and contexts. They are parts of larger arrays of doings [10,11,130–133] and need to be studied accordingly [104]. Something a person performs can consist of several interrelated practices. In this way, a single doing may be bound to a certain general way of performance and therefore in itself be limited to change. Frequently cited explanations for continuing non-sustainable consumption patterns correspondingly include the difficulty to break established routines and ways of performances [6–8,10–12,134–137].

Moreover, practices do not only consist of doings, but also of sayings and understandings, of 'rules of conduct' and principles, as well as of purposes, tasks, or endeavors with respect to the practice [104]. Practices can carry meaning, be ingrained with values, and involve social routines and habits (a good example is the practice of eating). A manifold set of cues, including visual and non-visual symbols, can affect the ways in which behaviors are interpreted and which symbolic meaning is attached to them [22]. With this, multiple actions that hang together will *in their sum* be imbued with meanings emanating from a social world. This implies that a person may assume performing something in a 'sustainable' way may prevent a practice to carry the meaning it is aimed to express [22]. Single-use take-away containers, especially for coffee, are not only symbols of (un-)sustainability, but also of modern, busy life, of flexibility, mental alertness (caffeine), and healthiness (drink enough, hygiene; e.g., [138]). Thus, the full symbolic meaning strived for (e.g., healthy, flexible, etc., person) may be thought to be conveyed only if all elements are matched (yet, Schifferstein [139] also shows that ceramic is generally rated notably better suitable for hot drinks than cardboard, which allows for the thought that in the present study, the choice of the physical object was not in the center of attention).

Alternatively, in the mind of a person, a situational cue may be associated with a certain habitual behavior and thus instigate the same rather automatically. Especially consumption in itself is, as Warde observes, "not itself a practice but is, rather, a moment in almost every practice" [140]. From this perspective, an activity like coffee (cup) consumption, being embedded in the larger practice of eating-in with peers, is likely not in focus; and with this, neither is the fact that it is performable in more or less sustainable ways. In summary, one needs to think about a behavior in relation to the larger compound in which it is embedded [141]. Attention or focus may lie on decisions with respect to the practice, while a single action itself can be performed rather unconsciously, without attributing it greater relevance or attention.

In this respect, Chartrand and Bargh [142] coined 'chameleon effect' the tendency of individuals to unconsciously, passively, and unintentionally imitate gestures, mimics, and other kinds of behaviors executed by counterparts. Their participants also showed to not have been aware of their mimicking. Thus, especially basic, automatic behaviors like touching one's face or moving the leg seem to be 'contagious' in quite simple ways. Lakin and colleagues [143,144] contend that people mimic others' behaviors as a way to affiliate with them, to strengthen the bond and increase liking. This, they argue, can work as a "social glue". The interesting intuition from this is that individuals are prone to mimic the people next to them without realizing so, grounded in a desire to create or strengthen interpersonal bonds. This is similar to the notion of norms as heuristics and vehicles to avert or attain social dis/approval. Yet, mimicking works simpler, in a more rudimentary and intuitive way of dealing with everyday life.

Norms may not always be followed fully conscious, yet they are typically pondered at some point and incorporated into one's behavioral repertoire with the aim of satisfying certain social expectations. The social community considered can stretch beyond those involved in the moment of performing an action. Imitation or mimicking, in contrast, functions on a more ad-hoc basis and focused on those present at that moment.

Following this logic, mimicking occurs whenever individuals are in (1) socially exposed situations, (2) in which they move and act beside others, and (3) where the action in question is only a side-aspect and likely granted no conscious attention by the person. Instead, (4) social bonding or smoothly 'fitting-in' with the crowd is one objective, and (5) completing the action and the practice of which it is part effectively. Visiting restaurants with others is just one emblematic example of a common stage for

establishing or strengthening interpersonal bonds. Structural arrangements provide a framework in which actions originate. Yet, the social exposition and co-habitation can be cognitively demanding there, as people must deal with many things happening at once. Some of them more, and others less relevant or in the locus of attention. There, just as humans mimic gestures, mimicries, yawning, and emotional states, individuals can mimic others' doings and dealings with the physical world. This can help them manage the multiplicity and complexity of choices and influences occurring. At the same time, it helps fulfilling a fundamental ambition of social situations in everyday life, and of human existence in general: Social bonding.

This also implies an explanation for why some individuals deviate from the group pattern: For some individuals, the respective act may not be considered a minor side-aspect without relevance. Due to personal values, norms, or convictions, for instance, it may be regarded an integral decision. In the case of the coffee cup selection, for some it may be a deliberate decision to choose a reusable mug for the sake of the environment, or the take-away paper cup to keep flexibility and the possibility of leaving the restaurant with the coffee. Hence, rather than mimicking, these people probably chose on more deliberate terms, or their own established habits based on such values, beliefs, or convictions.

The central deduction one can draw from this is that people mimic each other's behaviors as this can help unload burden *and* strengthen interpersonal bonds; or, as the empirical case here might suggest, not threatening interpersonal bonds by provocation (i.e., by choosing differently to one's friends). It may occur between two and more people, subject to the individual's cognitive and emotional engagement with the situation and the human counterpart. Furthermore, mimicking may spread among a number of peers. In this way, behaviors can become contagious. One peer after another mimics another, such that at the end one can observe correlations of behaviors among the peers (in contagion literature called *assortative mixing*) at the same time (so-called *temporal clustering* [145]).

The observational character of the data allows for hypothesizing about the causal chains. Furthermore, by the nature of the behavior studied one can assume that what is occurring is contagion, i.e., a causal diffusion of behavior, rather than homophily, i.e., the tendency to mingle with people who are similar in the first place [145,146]. Yet, follow-up studies are needed to dive into these proposed dynamics occurring within groups and individuals. One question to be explored in the future is, if or when people choose one alternative over another *deliberately* (e.g., due to personal values); and if and when they are or are not mimicked by others. Moreover, there are similar examples in everyday life, as taking food and add-ons like napkins on lunch buffets, littering, or product choices when shopping with others. Just as taking a cup, these activities can be embedded in contexts in which they are performed in similarly mechanistic, automatic ways as scratching the face or moving the leg. To what extent mimicking and contagion occur there, and thus the wider applicability of the proposition, is subject for future exploration, too.

What can be concluded at this stage is that choice architectures may be designed such to enable practicing sustainable behaviors. However, their conversion into respective actions is mediated by the social context and way of people interacting in it. The exploratory study provides a good empirical example of this. In addition, while the study does not cover who of a group chose first, it leaves the notion that through mimicking, presumably non-sustainable behavior can be said to have become *contagious*.

6. Conclusions

Individuals mimic each other in everyday life, and with that in behaviors that have important consequences for the environment. What is more, as the observation study illustrates, a rearrangement in the choice architecture to make a potentially environmentally sustainable behavior easy does not necessarily change the pattern. People choose as their peers do; and if some choose the less environmentally friendly variant, they do so as well. So, it happened in the present study, where facilitating the choice of reusable vis-à-vis the disposable alternatives, measured as kind of coffee cups, led to the non-intended increase in disposable cup choices.

The relevance of this may be pervasive for current efforts to make everyday lives ‘sustainable’. One broader lesson from the study is that norms and structures may be important, but the power of the unconsciously occurring mimicking and potentially following contagion effects cannot be overstated. People stick to habits and they follow each other. This can be a vicious circle. As people mimic each other, predominant non-sustainable behavior can remain the common thing. Without doubt, structural adjustments are required to make sustainable choices easily accessible. Yet, social circumstances mediate between structural arrangements and eventual action. Respectively, this *social* dimension must be granted serious attention and be targeted more determinedly.

In this way, non-sustainable consumption can be portrayed as a contagious disease, which currently is treated through putting trust in people that they will do the ‘right’ thing. These people, however, are not even aware of them spreading the disease. Without clear actions taken by regulators, shop-owners, and others who have it in their hands what is on offer in everyday life contexts, non-sustainable behaviors are likely to continue flourishing. Putting faith in “the individuals’ sense of responsibility”, as politicians frequently state it cross-nationally (at least rhetorically), will probably not suffice. If individuals are not aware of a choice, the sense of responsibility may not ‘kick-in’. The study presented is limited in that it was conducted at only one location and in a university setting, where only a certain part of the citizenry mingles. Additionally, the observations only inform about correlations of choices, not about causal chains or underlying attitudes, norms, and beliefs of the individuals. For example, some individuals may have regarded the paper cups as more sustainable than ceramic mugs (see discussion in the methods section). Yet, with the study being located in a country that is generally viewed as a leader in sustainable action, the results provide an emblematic example of the limitations of the great faith put in individual action.

Also, this rhetoric denies the existence of structures, defaults, lack of information and transparency, norms, and social pressures, which continue favoring non-sustainable behaviors. Thus, even if individuals theoretically want to act sustainably, they may be forced or relapse to the opposite due to inertia or other pressures. It requires some change in political rhetoric and top-down policy measures to regulate and steer the kinds of structures, defaults, information, and transparency that make ‘right’ behavior currently difficult. However, the discussion above also emphasized that various tiny acts can be embedded in larger complexes of everyday actions. Implementing nudges or changing norms to steer them towards sustainability can become an endless number. Apart from the question whether this is feasible [147], it would require much time and effort. However, time is short.

The good news, however, is that it might not need carefully designed nudges that give people the impression that they are deciding freely (when, truly, are we?). A combination of three approaches can be highlighted. One is policy measures, like taxes on pollution or bans. This, to make it more attractive and acceptable to politics and citizens, could be combined with a second approach, which is the use of deliberative setups. As deliberative theory suggests, by having different kinds of citizens meet, discuss, and exchange their opinions about a political issue, they get familiar to different perspectives and, ideally, align their opinion and preferences to what is desirable for the public good. Hence, they can come up with ideas and suggestions for policymaking to promote sustainable behaviors. By getting a representative part of the citizenry engaged in a democratic process, it strengthens the legitimacy of following measures. In addition, the citizens involved may consciously and deliberately—rather than unconsciously—change their (consumption) choices and behaviors in the aftermath [147].

Tying in with this, there is excellent research undertaken recently on how a few people may be enough to motivate the spreading of new patterns of behaviors and their acceptance across social environments. Such changes may work through having the ‘right’ people change their actions. In the study of having more people get vaccinated or adopting other health behaviors, Banerjee and his colleagues illustrate that there are identifiable ‘central’ individuals who can act as “seeds” and spread new behavior more effectively than other people [148,149]. Likewise, Paluck, Shepherd, and colleagues identify “social referents” at schools [150–152], while Gladwell speaks of “connectors”, “mavens”, and “salesmen” [153]. Centola however adds that for a behavior to spread, the diffusion by opinion

leaders needs to be paired with reinforcement among the people in the network, thus constituting “wide bridges” [64]. Such social dynamics can be very strong, in particular when a community reaches social ‘tipping points’ [28,70,153,154], for which critical majorities can be already small percentages (17–20%) [28,70]. Hence, if as a third instrument such persons and network conditions can be activated for sustainable action and the diffusions of its acceptance, sustainable behavior may spread effectively and extensively through (un)conscious following and mimicking.

Many people (especially in the most polluting countries) tend to oppose environmental measures because they want everything to remain as it is and “always has been”—overlooking that the way in which they are living today is fundamentally different from how it has been only 10 years ago. This points to the great need for a fundamental change in the common rhetoric about sustainable everyday lives and actions aligned with that. Paired with a more upfront communication by ‘central persons’ and opinion leaders, and an inclusive deliberation with citizens about how to go for this change, more ambitious endeavors to ban non-sustainable behaviors and to make sustainable change happen may become societally viable.

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Appendix A

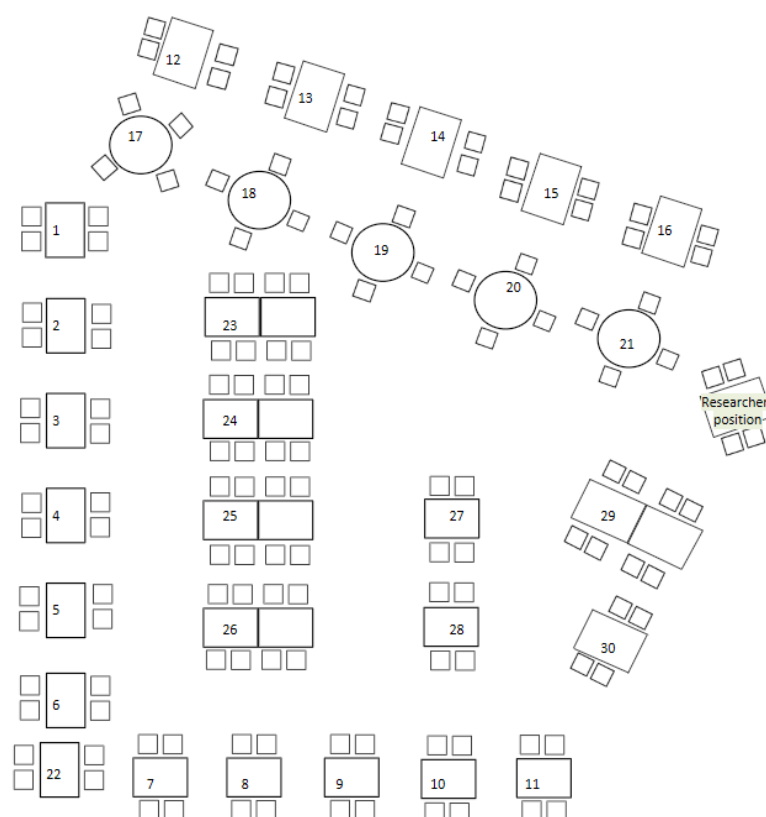


Figure A1. Seating plan in the cafeteria.

date	table:		round:	
	cup	glass	meal	gender
Pers 1				
Pers 2				
Pers 3				
Pers 4				
Pers 5				
Pers 6				
Pers 7				
Pers 8				

Figure A2. Notepad used per group.

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