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# Habitual behaviors or patterns of practice? Explaining and changing repetitive climate-relevant actions

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Understanding human behavior lies at the heart of responses to climate change. Many environmentally relevant behavior patterns are frequent, stable, and persistent. There is an increasing focus on understanding these patterns less in terms of deliberative processes and more in terms of habits and routines embedded in everyday life. Examinations of the 'habitual' nature of environmentally consequential activities have been approached from two theoretically distinct perspectives. From a social psychological perspective, 'habit' is studied as an intra-individual psychological construct that sustains ingrained behavior patterns in stable settings and obstructs adoption of more environmentally friendly alternatives. Sociologists from the social practice tradition, in contrast, have sought to highlight the ways in which resource-intensive 'habitual practices' become established and maintained in society through a commingling of material, procedural, and socio-discursive elements. We reflect critically upon key theoretical differences underpinning these two approaches to repetitive behaviors and review empirical work from both traditions that speaks to the relevance of 'habitual behavior patterns' central to addressing climate change. Finally, we examine how changes in habits are theorized and operationalized within both social psychological and social practice approaches, and practical implications for promoting environmentally sustainable societies.

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## INTRODUCTION

Global environmental challenges, such as climate change, can ultimately be attributed to unsustainable human behavior.<sup>1</sup> Technological advances in 'clean' energy and increased efficiency may help to reduce the environmental impact of human consumption, but their long-term benefit depends on curtailing consumption. Behavior change can potentially have considerable environmental impact. For example, up

to 38% of US CO<sub>2</sub> emissions are thought to be generated by household energy use.<sup>1,2</sup> Gardner and Stern<sup>1</sup> describe 17 everyday behaviors—such as car-sharing, cutting driving speed, and lowering the thermostat on central and water heating—which they estimate could realistically reduce household carbon emissions by 30%. Understanding behavior and how it may be changed lies at the heart of both mitigation and adaptation responses to climate change. Many environmentally consequential behaviors occur frequently and recurrently in unvarying settings (e.g., showering each morning, disposing of garbage, or driving to work). Such behaviors tend to be ingrained and difficult to change.<sup>3</sup> It has been suggested that frequently repeated behaviors have unique qualities that demand different explanations to infrequent behaviors.<sup>4</sup> Economic models, which focus on the maximization of the expected utility of behavior and its outcomes, offer limited insight into such behaviors: the strongest predictor of stable and ongoing behavior tends to be past performance frequency, rather than the expected costs and benefits of action.<sup>5,6</sup> People tend to deliberate less over frequent behaviors, paying less attention to the options available to them, instead continuing to do what they usually do.<sup>7</sup> There is increasing interest in portraying repeated actions less as the outcome of rational deliberation processes, and more as part of the ingrained and ‘unthinking’ habits and routines of everyday life.<sup>8</sup>

This review focuses on two, theoretically distinct, disciplinary explanations for recurrent, environmentally relevant behavior patterns. Within social psychology, ‘habit’ is used to refer to an individual psychological construct, conceptually distinct from behavior, that generates impulses to repeat familiar behaviors in particular settings. This perspective focuses on cognitive processes within the actor and commonly portrays ‘habit’ as a driver of behaviors and a barrier to adoption of environmentally friendly alternatives. Sociologists from the social practice tradition examine how routinized ‘ways of doing’ emerge, persist, or disappear in society. They focus less on the individuals who enact such practices and more on the practices themselves, and how practices secure ‘carriers’ or ‘hosts’ so as to persist and reproduce themselves. This review has three aims. First, we seek to reflect upon the key theoretical differences underpinning these two approaches to ‘the habitual’. Second, we seek to review empirical work from both traditions around the relevance of ‘habit’ to climate-change-related behaviors. Third, we consider the implications of these perspectives for understanding and modifying climate-relevant actions.

## HABITUAL BEHAVIOR OR PATTERNS OF PRACTICE?

### A Psychological Perspective on Habits

The lay definition of ‘habit’ as a synonym for stable, persistent behavior is unsatisfactory from a psychological perspective because it offers no explanatory mechanism for the persistence of behavior. Social psychologists use the term ‘habit’ to refer to a phenomenon whereby behavior persists because it has become an automatic response to particular, regularly encountered, contexts<sup>9,10</sup> that is acquired through associative learning.<sup>11–13</sup> Repeatedly and satisfactorily performing a behavior (e.g., cycling to work) in a given context (e.g., on work mornings) reinforces a mental context–behavioral–response association. With sufficient context–behavior pairings, the context is thought to automatically activate the behavior, with minimal awareness or cognitive effort.<sup>9,14</sup> Successful habitual performance strengthens context–behavior associations, such that habitual behavior patterns self-perpetuate in stable environments.<sup>15</sup> As a habit forms, control over initiation of behavior passes from conscious deliberation to automatic activation of routines by external cues, thus reducing demand on attention and memory and freeing mental resources for other tasks (e.g., thinking about the day ahead while cycling to work<sup>16</sup>). The downside to this cognitive efficiency is that, once habitual, environmentally detrimental behaviors become ‘automatic’ and are difficult to change.

From the social psychological perspective, habitual behaviors are built on three ‘pillars’.<sup>8</sup> First, their formation requires *repetition*. Second, once formed, habit directs behavior *automatically*, i.e., habitual behaviors can proceed with minimal conscious monitoring.<sup>17</sup> Third, habitual behaviors are *context-dependent*; only the situational cues with which the behavior is associated can activate the habit impulse. Although rarely defined, the implicit definition of ‘context’ refers to a cue or cluster of cues to action, potentially internal or external to the individual.<sup>18</sup> It is thought that any context can support habit development and maintenance.<sup>18</sup> Importantly, the psychological definition of ‘habitual behavior’ is not synonymous with repeated behavior.<sup>8</sup> Habitual behaviors are repetitive, but not all repetitive behaviors are habitual, e.g., sorting household waste into kerbside recycling bins each week may involve repeated deliberation rather than habit. In addition, behaviors that are habitual in one context may be deliberative in another; a habitual car commuter, for example, may consciously choose to drive for a weekend shopping trip. Nonetheless,

many environmentally consequential behaviors are frequently performed in unchanging settings and so become habitual.

Social psychology contrasts habitual behaviors with deliberative actions. 'Dual process' models portray behavior as arising through two parallel processing systems: deliberative action arises from the 'reflective system', which regulates action using conscious weighing of the perceived pros and cons of action, whereas habitual action arises via an 'impulsive system' whereby cues activate associative links that generate action with little conscious monitoring.<sup>19</sup> Psychological models hypothesize that, in stable contexts, habit will usually override contrasting intentions in directing action.<sup>20</sup> These predictions have important implications for behavior change: if habitual behavior is disconnected from conscious motivation, then it will be resistant to modification via changing attitudes, beliefs, and values.<sup>21</sup>

Although the everyday vernacular typically implies a dichotomous view of habit (habit vs no habit), habit is more realistically conceived of on a continuum<sup>22</sup> whereby behaviors may be more or less habitual. Early attempts to estimate 'habit strength'—the propensity to act habitually, a proxy for the strength of stored context–behavior associations<sup>23</sup>—based on prior performance frequency were unsatisfactory,<sup>24,25</sup> and led to the development of more sophisticated measures. Applications of the most popular measure, the 'Self-Report Habit Index' (SRHI<sup>26</sup>), which comprises 12 statements reflecting on habitual action with which participants rate their agreement, have supported theoretical predictions. For example, SRHI scores have been shown to be stronger predictors of recycling rates than intentions.<sup>27</sup>

## A Social Practice Perspective

Sociologists working within a social practice framework have developed an alternative theoretical account of what psychologists term 'habitual behavior'. Such approaches have their theoretical roots in the writings of Bourdieu,<sup>28</sup> and in Giddens's<sup>29</sup> theorizing of structure and agency (which psychologists might, respectively, term 'social context' and 'individual choice/action') as mutually constitutive. Social practice theorists discard the separation of an individual actor and the context affecting action. While the idea of 'the social' appears in social psychological theorizing, it does so in the form of intrapersonal constructs such as perceived social norms.<sup>30</sup>

By contrast, social practice accounts view practices as the site of the social, in that the nature of

the social world is shaped by shared and co-ordinated performances of practice. For example, practices performed as part of driving (e.g., stopping at traffic lights and giving way) may be conceptualized as a product of a complex dynamic of constantly unfolding actions that individuals perform in concert with other motorists, drawing upon historically evolving understandings of how one should behave. From this perspective, understanding 'behavior' requires an understanding of the ways in which routinized practices are reproduced through dynamic social processes that involve evolution of both 'habits' and practitioners. Social practice theorists also point to the dynamic interplay of interrelated *sets* of practices. 'Habitual' driving, cycling, or walking, for example, can only be fully understood through an examination of the interconnected 'careers' of all three practices.<sup>31</sup> The focus and unit of analysis for practice theory is less the individuals who enact practices (or their cognitive states), but rather the practices themselves, through emphasis on the ways in which practices secure 'carriers' or 'hosts' whose co-ordinated and shared performance allows the practice to persist and reproduce. Social practice researchers are therefore not concerned with whether *an* individual 'possesses' a habit that 'drives behavior', or how individuals can be led to break habits. Rather, they seek to map the sociohistorical trajectories of sets of practices and the ways in which their co-ordinated habitual performance can become established (or derailed) as a normalized aspect of the everyday social world.<sup>31,32</sup>

Different theoretical delineations of the specific combinative elements of a practice have been offered.<sup>33</sup> The model that has gained most traction, especially in policy circles, focuses on the dynamic relations between three different elements suggested to combine to constitute a practice.<sup>34</sup> The first relates to the *material* elements that afford enactment of a practice, such as hard infrastructure and technologies (systems of hot water provision, for example, in the case of showering). The second concerns the *procedural* elements that render a practice personally and relationally functional (e.g., increased 'time squeeze'<sup>35</sup> and a requirement for bodily cleansing to be wedged between other activities within daily sequences). The third element is the shared contemporary socio-discursive *meanings* that construct outcomes of a practice as desirable or required (e.g., notions of 'freshness' associated with bodily states<sup>36</sup>). Central to this theoretical position is the notion that these elements are dynamically related to each other, and that their commingling at a particular historical moment allows particular activities to take hold as habitual practices. Showering daily, for example,

has become a common practice for many people in the UK, in contrast with earlier historical periods when personal hygiene routines typically involved a weekly bath. While daily showering might often be explained as a ‘convenient’ and ‘necessity’ habit, it is only through provision of requisite material infrastructure and technology that showering becomes experienced *as* convenient.<sup>37</sup> The notion of a 5-min shower between rising, eating breakfast, and leaving for work being ‘convenient’ is only understandable through contemporary procedural systems of time management and the temporal organization of daily life. That it is a ‘necessity’ to *have* showered before departing the private sphere of the home for the public world of work is only rendered sensible by notions of bodily ‘freshness’ that have emerged in recent decades.<sup>36</sup>

The social psychological and social practice approaches offer distinct analyses of environmentally (un)sustainable practices and implications for bringing about change. A psychological analysis of showering would focus on articulation of the extent to which repetition of a daily morning shower routine leads to it becoming an automated behavioral response to a particular spatiotemporal context (i.e., waking on a weekday morning at home). Such automaticity would be expected to render showering behavior resistant to interventions targeting deliberative processing systems (e.g., alerting individuals to the importance of water conservation). Assuming that the context of enactment remained unchanged, social psychologists would recommend changing habitual showering patterns by promoting techniques for mindfully breaking automatic engagement in showering.<sup>21,38</sup> While for social psychologists, once habitual associations are established, the context serves only to cue the behavior, the social practice perspective views what the psychologist terms ‘context’ and the practice as inextricably bound; social practices are understood to both shape and be shaped by the elements that constitute the social world at any particular historical juncture. Thus, a social practice analysis would focus on the socio-historical processes that have led to the practice of high-frequency showering (as a social ‘entity’) becoming able to capture so many devoted recruits.<sup>37</sup> Such behaviors may be cognitively ‘habitual,’ but exponents of social practice theory<sup>33,34,36,39</sup> argue that we should seek to understand the *dynamics* of the habitual practice (showering), and the ways in which it has come to be produced and maintained through the social and material organization of daily life. The focus of both analysis and intervention design from the social practice perspective is therefore a mapping of the elements that comprise and promulgate a specific practice in a

particular sociohistorical moment, and the relations between these elements and other practices.<sup>34</sup>

## EMPIRICAL EVIDENCE FOR CLIMATE-RELEVANT BEHAVIOR AS ‘HABITUAL’

Below we review evidence, drawn from both perspectives, that speaks to the potential utility of conceptualizing various climate-relevant behaviors in term of ‘the habitual’, to illustrate how the two perspectives approach similar topics differently. Our review is illustrative rather than comprehensive in so much as our selection of behavioral domains is not exhaustive.

### Habitual Water and Energy Use *Psychological Approaches*

Psychologists have emphasized the repetitive nature of many household consumption behaviors, including use of water (e.g., laundering) and energy (e.g., switching off lights and appliances). Evidence suggests that most of these behavioral patterns are characterized by low conscious monitoring (i.e., automaticity) and performed in unvarying contexts. An examination of the formation of ecologically friendly washing habits among a cross section of the Swedish population<sup>40</sup> found that although conscious attitudes favoring sustainable behaviors (e.g., pro-environmental values and a sense of stewardship) were most strongly associated with behavior at the early stages, people were more likely to maintain environmentally friendly washing and form habits when experiences of the new behavior were rewarding.

Stronger perceived consumption habits are associated with consumption patterns. An extensive study of Australian households<sup>41</sup> showed that household water meter readings were predicted by water-consumption habits, such as washing clothes, though ‘habit’ was measured via subjective ratings of behavioral frequency rather than automaticity. Households with relatively low water consumption tended to have habits consistent with lower consumption, and deemed water conservation as personally important. This study suggested that both deliberate and habitual modes of processing shape sustainable pro-environment behavior patterns.

Household energy consumption can be increased not only by doing environmentally detrimental behaviors but also by *not* doing environmentally friendly behaviors (e.g., not switching the tap off when brushing teeth). In situations where there is a choice between environmentally friendly and environmentally unfriendly behavioral options, the

failure to enact the 'green' option may be due to habitual performance of the environmentally detrimental alternative. Commentators have argued that, in these situations (e.g., when leaving a lit room), consideration should be given to both habitual pro-environmental responses (turning off the light) and conflicting habitual non-responses (exiting the room); these have been termed 'acting' habits and 'non-acting' habits, respectively.<sup>42</sup> One experiment<sup>42</sup> showed that both 'acting' and 'non-acting' habits could be automatically and situationally triggered. The authors suggested that both acting habits and non-acting habits can become embedded in larger routines or practices, though the latter may be harder to detect and target.

### *Social Practice Approaches*

The habitual reproduction of water- and energy-consuming practices within the home has also captured the attention of social practice researchers. Applying a social practice approach to such domestic use highlights the ordinary, mundane dimensions of daily life in a way that scrutinizes the rituals of water use that have taken on a largely routine and inconspicuous status as practices of consumption.<sup>43</sup>

Hand et al.<sup>37</sup> analyzed the evolution in Britain of daily showering into a commonly and habitually reproduced practice, highlighting the elements that combine to 'constitute and re-constitute the business of showering' (p. 3). At the material level, it is argued that technological developments in water provision and heating in the 1950s (e.g., piped water into homes, electric point-of-use heating, and power showers) provided a domestic infrastructure that afforded the possibility of showering practices. However, as Hand et al.<sup>37</sup> point out, showers only become popular ('standard') items in UK homes from about the mid-1970s. This delayed adoption may be explained in relation to shifts in the social expectations and meanings around cleanliness, self-care, and bodily maintenance. In addition, Hand et al.<sup>37</sup> argue that the capacity of showering to capture willing (habitual) carriers can be linked to its ability to help people 'cope with, and manage, the temporal challenges of (late-) modern life' (p. 12); while showering has afforded the material possibility of a speedy bodily cleansing habit since the 1950s, this has only come to be socially understandable as a practical benefit by virtue of more recent procedural concerns relating to 'time squeeze'.<sup>44</sup>

In addition to understanding the constitutive elements of habitual water or energy-use practices, social practice researchers also stress that habits are maintained by 'communities of practice'. These 'communities' are not defined by shared geographic

proximity, but rather by shared participation in identified practices.<sup>45</sup> Hitching's<sup>45</sup> work on practices related to thermal comfort in the workplace shows how the existence of shared communities of practice can work to produce, and reproduce, particular habits that have implications for levels of consumption of resources (e.g., energy). Hitching<sup>45</sup> uses the example of the clothing habits of lawyers working in the City of London to show how *non*-seasonal habitual practices around choices of 'professional' clothing (e.g., suit and tie by men) in the workplace are intrinsically tied to the material provision of energy-intensive cooling of office spaces in summer months.

### *Habitual Waste Management and Recycling Psychological Approaches*

Most psychological evidence around the habitual nature of waste disposal and recycling behavior stems from prediction studies seeking to quantify the contribution of habit to behavior patterns.<sup>6,46,47</sup> Most studies have used past behavior as a measure of habit,<sup>6,46</sup> but from a psychological perspective, behavioral frequency fails to discern habitual from non-habitual repetition.<sup>21</sup> These studies have, however, illustrated the consistency of waste management behavior over time. For example, Terry et al.<sup>6</sup> found that the self-reported proportion of household waste recycled over the previous 3 months correlated strongly with the proportion recycled over the following fortnight, suggesting highly stable and repetitive recycling patterns.

Psychologists have argued that because waste disposal decisions are made in unchanging situations—e.g., at home, the day before the kerbside recycling bin is collected—repetition is likely to lead to habit formation, and so behavioral frequency will provide an adequate index of recycling habit.<sup>25,27,47,48</sup> Correlational studies suggest that where recycling is habitual it is less determined by deliberation and more by unconscious activation.<sup>20</sup> This is supported by an intervention study in which cameras were placed in the lid of household refuse bins and footage shared with household members.<sup>49</sup> Participants reported that they disposed of less waste and recycled more because they became aware of their waste disposal decisions, rather than because their attitudes or intentions changed. This suggests that the intervention changed behavior by disrupting habitual waste disposal patterns. One study found that *not* having a habit for recycling was negatively correlated with recycling behavior.<sup>48</sup> The authors interpreted this as evidence of a waste disposal habit, and suggested that habitual waste disposal may preclude recycling and formation of recycling habits.

### *Social Practice Approaches*

Although there are surprisingly few social practice analyses of domestic waste management, a growing literature has examined social practices surrounding paper use and disposal within the workplace.<sup>50,51</sup> One ethnographic study examined the practices associated with the use of paper within a university administration office environment.<sup>51</sup> Paper-related practices that participants were in the ‘habit’ of enacting were found to be vastly more nuanced and creative than the general categories of ‘printing’, ‘copying’, ‘writing’ or ‘reading’ that one might expect to emerge from such an analysis. Rather, paper was shown to both support and bridge a myriad of particular working practices in a way not easily replaced by a (less resource intensive) shift toward digitization. Examples included ‘social coordination practices’ performed by hand-outs in meetings, ‘remembering practices’ performed by post-it notes or hardcopy ‘to do’ lists, ‘sketching practices’ used to facilitate creation of new ideas, and ‘verifying practices’ enabled by carrying original documents to meetings. This work highlights the importance of understanding the dynamics of habitually reproduced practices and the ways in which specific practices are entwined with other circulating elements. To say that workers in this study were simply in possession of ‘a habit’ for using paper to print, copy, write, and read would miss important aspects of the practices involved that may be crucial for understanding future attempts to encourage a workplace shift from paper to digitization.<sup>51</sup>

Similar conclusions were drawn from a 9-month participant observation of an attempt by a team of Environmental Champions within a construction company to change waste disposal practices by removing under-desk bins in offices.<sup>50</sup> Despite the Champions being highly committed and operating in an ostensibly (‘attitudinally’) supportive organizational context, the program was eventually abandoned. Hargreaves<sup>50</sup> shows how these attempts to directly manipulate practice brought into sharp focus the relationships between under-desk waste disposal and other practices (e.g., waste removal by contracted cleaners), professional and normative standards (e.g., privacy), local regulations (e.g., health and safety), and even social interactions (with one employee questioning whether it was appropriate for a high-profile client to be asked to walk down the corridor to dispose of a dirty tissue).

### **Habitual Food Consumption**

#### *Psychological Approaches*

Most studies of ‘habitual’ food choices have been conducted by health psychologists seeking to understand

how to replace ‘habitually’ consumed unhealthy foods with healthier alternatives.<sup>52</sup> This work provides compelling evidence also relevant to efforts to reduce food wastage, limit resource-intensive food consumption, and promote environmentally friendly alternatives. Studies have suggested that, in line with habit theory, eating a (type of) food daily in response to stable contextual cues leads to subsequent consumption of the food being experienced as automatic and effortless.<sup>11,53</sup> One study found that, among volunteers eating a healthy food daily for 12 weeks, repetition strengthened self-reported habit such that rapid early gains in habit strength reduced until a peak was reached at an average of 65 days after initiation.<sup>12</sup> However, considerable variation was observed in time required for habit to peak (35–106 days).

Behavior prediction studies have mostly supported theoretical predictions regarding the relationship between habit and food choices: a meta-analysis of 13 studies found that SRHI scores for eating specific foods were moderately-to-strongly correlated with the consumed volume of those foods.<sup>15</sup> A review showed that, in seven of eight tests of the hypothesized interaction between habit and intention, the relationship between intentions and dietary choices was weaker where habit scores were higher.<sup>14</sup> Such work has prompted calls for dietary interventions to identify and break the context–behavior associations that may sustain food consumption patterns.<sup>52</sup> For example, helping dieters plan if-then responses to predictable future contexts can double weight loss over 2-month period,<sup>54</sup> presumably by reducing food intake.

#### *Social Practice Approaches*

Social practice approaches to habitual food consumption focus on the practical, routinized, conventional, and collective aspects of food consumption activities.<sup>55–57</sup> Halkier<sup>57</sup> suggests two ways that relationships between food consumption habits and environmental challenges might be potentially conceptualized from a social practice perspective. On the one hand, environmentally friendly consumption can be seen *as part of* various habitual food practices. Food practices vary in relation to their implications for energy used in transportation, sustainability of packaging, or the level of pesticides used in production. For instance, the common UK practice of eating a roast dinner on a Sunday can be enacted in both more and less resource-intensive ways—British versus New Zealand Lamb, loose local organic beans versus plastic-wrapped pesticide-sprayed Peruvian beans, and so on. Alternatively, ‘environmentalized’ food practices can be seen as distinct practices in their own right. For instance, given that practitioners themselves

may speak of ‘turning vegetarian’ (even ‘*being* vegetarian’), it may make more sense in some instances to think of activities like ‘vegetarian cooking’ as a habitual social practice in their own right. In other instances, however, cooking might be viewed as a social practice, the habitual performance of which can vary in relation to the amounts of vegetable versus plant matter involved.

Halkier<sup>57</sup> provides examples of possibilities for change created by adopting either of these two approaches. In the case of ‘environmental impact as part of food practice’, Halkier argues for a delineation of food practices into four types—improvization to achieve pleasure, pursuit of health, pursuit of organization and order, and achievement of a necessary chore. She suggests that food practices of the first three types could all incorporate various elements of environmentally friendly consumption (such as local, seasonal produce) into existing habitual routines. However, the understandings, procedures, or modes of engagement that sustain habitual food practices centered on the necessity to ‘have something to eat’ do not easily invite the incorporation of more sustainable forms of consumption. An analysis of environmentalized food practices as entities in their own right argues that the success of local vegetable box schemes has been underpinned by a reframing of ‘personal choice’ as time-consuming and burdensome.<sup>58</sup> The meaning of ‘convenience’ is reframed within the new practices through a redefinition of local seasonal availability as ‘convenient’, in that the consumer no longer has to expend so much time and effort deciding what to purchase or cook in a given week or month.

## Habits of Transportation

### *Psychological Approaches*

Most psychological research on environmentally relevant habits has focused on car use. A particular focus has been commuting, which is likely to become habitual due to being undertaken at the same time each work day with little prior planning.<sup>59</sup> Studies have shown habit to be strongly predictive of car, bicycle, and public transport commuting.<sup>60,61</sup> Experimental tests have also demonstrated characteristics of habit in travel mode decisions. One study reported a series of experiments exploring travel mode decisions in hypothetical journey scenarios.<sup>7</sup> Bicycle and car users with stronger travel mode habits paid less attention to information on the utility of available options (e.g., travel time), and situational requirements (e.g., weather conditions), before choosing their usual mode. The authors concluded that, among those with strong travel habits, the need to make a

journey automatically activates the habitually chosen option, bypassing conscious deliberation. A study of household car use found that intentions to drive only predicted car-use patterns over an ensuing 7-day period where habit was weak, but among drivers with strong habits, conscious intentions had no relationship with car use.<sup>62</sup> This confirms theoretical predictions that habits may dominate over intentions in regulating transport choices.<sup>20,59</sup> Consequently, while cognitive antecedents of planned behavior can predict car and public transport commuting they may not be optimal car-use-reduction intervention targets.<sup>61,63</sup> Increasing knowledge by providing information, or changing attitudes by highlighting the advantages of public transport,<sup>64</sup> may not result in behavior change because habitual car commuting may outlive motivational shifts.<sup>20</sup>

A psychological analysis of commuting mode choice as environmentally cued recommends interventions that disrupt contexts that activate car-use habits, or make alternative transport modes more salient and attractive. Studies exploring externally induced breaks in daily routines testify to the context-dependent nature of travel mode choices, as well as the potential for context change for disrupting such behavior patterns.<sup>65</sup> For example, Bamberg<sup>66</sup> found that residential relocation provided a good opportunity to change travel-mode choices, suggesting that those moving into new homes may be a prime target for car-reduction interventions. This supports the assumption that the individual will be more receptive to information on alternatives when ingrained habitual responses are broken. However, a review of the effectiveness of interventions to reduce car use found surprisingly few rigorously evaluated, effective interventions.<sup>67</sup>

### *Social Practice Approaches*

A social practice approach to promoting environmentally sustainable transport focuses not on how individuals make daily travel decisions or how they might be influenced by ingrained behavioral habits, but rather, on the practices in which people participate that result in or implicate various forms of travel. As Hui<sup>68</sup> argues, journeys and destinations are not arbitrary—they must be understood as ‘outcomes of the specific ordering and organisation of practices’ (p. 90). Consequently, bringing about less carbon-intensive patterns of mobility requires an understanding of both the elements of a transportation practice itself (e.g., cycling and driving), and also other practices with which these transportation acts are intrinsically linked. Such other practices are not always obvious. For example, Hui<sup>68</sup> demonstrates the



ways in which the global proliferation of the practice of Ashtanga Yoga from the 1970s has led to a burgeoning market for long-distance travel for its many recruits to visit various yoga gurus in India. Thus, one habitually practiced activity with minimal environmental impact (yoga) has become bound to an ostensibly unrelated practice (greater air travel), incurring high levels of transport-related energy use.

Different transportation practices, such as driving and cycling, can also be thought of as being in competition with one another in that they compete for practitioners' time, space on roads, and money. As Watson<sup>69</sup> points out, the major investment in a (rapidly depreciating) car is likely to facilitate its habitual use even when cycling might be an obvious and viable alternative. Driving and cycling also compete in relation to discursive and symbolic status, such as in relation to notions of 'safety', 'health', and 'convenience'.

## TWO MODELS FOR BRINGING ABOUT CHANGE

The theoretical distinctions between the social psychological and social practice approaches generate different suggestions for the sites for potential intervention. In this section, we explore the implications for models of intervention that each approach entails, to highlight what environmental policy makers and practitioners might derive from these theoretical discussions.

### Psychological Approaches to Change

From a psychological perspective, changing environmentally relevant habitual behavior involves modifying the responses of the individual. Social psychologists argue that interventions highlighting the pros and cons of the desired behaviors may be ineffective in changing habitual behavior, for two reasons. Strong habits typically lead to a narrowing of attention toward the habitual option, and so people who habitually choose an environmentally detrimental option will fail to notice or show interest in information about environmentally friendly alternatives.<sup>7</sup> In addition, if individuals are not acting deliberately, changing perceptions and attitudes will be unlikely to change behavior.<sup>62,70</sup> The psychologist's three 'pillars' of habit—repetition, automaticity, and context stability—generate recommendations and techniques for behavior change beyond attitudinal change.

*Repetition.* Habit theory in psychology is rooted in the behaviorist school<sup>23</sup> and its notion that repetition of behavior is contingent on the reward and punishment schemes surrounding the behavior. This

perspective proposes that imposing penalties on habitual resource-intensive behaviors, and offering rewards for less intensive alternatives, should modify the attractiveness of the behaviors to the individual, so changing habitual behavior patterns. For example, provision of free public transport passes for drivers has had mixed results but may provide a useful incentive for some habitual drivers.<sup>71</sup> Moreover, the experience of using alternatives can undermine erroneous negative beliefs about public transport alternatives. Providing incentives or disincentives may disrupt habitual behaviors with tangible consequences, but not all environmentally relevant habits can be financially rewarded or punished. In addition, financial instruments may be of limited effectiveness or political feasibility. They may also have adverse consequences, such as direct and indirect 'rebound' effects, whereby energy savings in one area are offset by increased consumption of alternative energy-intensive options.<sup>72</sup>

*Automaticity.* For the psychologist, overriding learned automatic cue-response contingencies is required to change habits. This draws on finite cognitive resources—e.g., attention and planning—so that, when faced with multiple everyday decisions, individuals often lapse into old habits. Psychologists recommend making if-then plans (or 'implementation intentions'), specifying where, when, and how exactly a particular action or set of actions needs to be enacted in order to change habitual responses to particular contexts.<sup>73</sup> These plans create a mental connection between the behavioral context and the action, so preparing the individual for appropriate action at the chosen time and place. Furnishing a goal intention (e.g., 'I intend to use the recycling bin') with an implementation intention (e.g., 'If I finish reading my newspaper, then I will put it in the recycling bin') has been found to be effective in various domains.<sup>74</sup> Implementation intentions are particularly relevant for changing habits because the cues and responses that define a particular habitual behavior pattern may become the very cues and responses of an implementation intention.<sup>18</sup> In this way, alternative behavioral options (using the recycling bin) may be programmed into memory so that conflicting habits (using the regular waste disposal bin) are overridden. Studies have supported the effectiveness of implementation intentions in increasing recycling<sup>73</sup> and purchasing sustainable food products.<sup>75</sup>

Implementation intentions illustrate an approach that seeks to frustrate habitual responses by making alternative actions more salient in relevant contexts. Other forms of intervention have the potential to break habits by disrupting unconscious cognitive processes, and instead prompting

deliberative behavior. For example, car clubs that provide cars parked at various locations for members' use when needed offer a promising approach to reducing car-use habits because, as well as saving costs of city driving, the need to book ahead ensures that car use becomes a planned and evaluated contingent city travel solution.<sup>76</sup> The difficulty lies in making car clubs sufficiently appealing to shift habitual drivers' motivations. The cognitive foundations of drivers' motivations, for example, are likely to extend beyond utilitarian concerns about travel cost and journey time and include anticipated affective responses to journey experience, personal space and feelings of autonomy and identity consequences.<sup>77</sup> Breaking habits requires not only that the automatic response is blocked but also that the individual is willing to choose alternative options.<sup>11</sup>

*Context stability.* Psychological approaches regard habits as context-dependent, such that, when an individual no longer encounters a given context, enactment of the habitual behavior associated with these contexts will be discontinued.<sup>65</sup> This 'habit discontinuity hypothesis'<sup>65</sup> suggests that existing 'bad' habits will be undermined by disrupting the stable contexts that prompt them, thus forcing the individual to think about and adopt alternative actions. For instance, in the domain of traffic safety, the concept of 'controlled chaos' involves removing road signs and mixing motorists, cyclists, and pedestrians in a way that forces people to abandon speeding habits and to pay increased attention to the upcoming feature of the road environment.<sup>78</sup>

Intervention developers, or individuals themselves, can modify everyday environments to disrupt habitual actions or facilitate alternatives.<sup>38</sup> For example, making locally sourced produce easier to reach in the supermarket may increase the likelihood that it will be chosen from an array of alternative options,<sup>79</sup> and using a smaller plate can reduce the quantity of food self-served, so limiting food waste.<sup>80</sup> Situations that elicit habitual resource-intensive behaviors may be anticipated and avoided, e.g., working at home removes opportunities for habitual car commuting and can yield energy savings.<sup>81</sup> However, opportunities to (re-)design the more macro-level contexts that prompt environmentally relevant behaviors are often scarce. In such instances, interventions may instead capitalize on naturally occurring context disruptions.<sup>65,82–84</sup> Verplanken and Roy<sup>83</sup> found that an intervention to promote a range of sustainable behaviors was more effective when delivered to people who recently moved house compared with a matched group who had not moved house and a no-intervention control group,

while controlling for known determinants of sustainable behavior. Context disruptions are thought to break habits and instead prompt action in line with conscious and deliberative intentions. Interventions designed to change attitudes, values, and norms may therefore have impact during the 'window of opportunity' afforded by a habit-disrupting context change.<sup>66</sup> Context disruption may also change beliefs; natural road closures, for example, have been shown to undermine overestimation of public transport journey times among habitual car commuters,<sup>85</sup> suggesting it may have potential as a structural policy instrument to change commuting habits.<sup>86</sup>

### *Upstream Interventions*

Moving individuals away from existing unsustainable habits can be considered as 'fixing problems downstream', i.e., tackling the symptoms of a broader problem, rather than its root causes. Somewhat in line with the social practice perspective, psychologists recognize that habits and the contexts that elicit them are embedded in larger structures of social practices as well as wider regulatory and cultural frameworks. Downstream interventions may be costly and cumbersome, and may be rendered ineffective where larger structures are not conducive to the new behaviors. In such instances, 'upstream' interventions that address these structures should be considered, such as legislation, large-scale infrastructural changes, or technological innovations.<sup>21</sup> Population-level behavior change has been accomplished by upstream interventions such as mandatory seat belt usage, congestion taxes, and smoking bans. Some researchers from the social practice tradition<sup>34</sup> have been critical of psychologists' assumption that lessons might transfer from other such contexts to environmental behavior, on the grounds that the processes that produce and sustain specific practices are historically and culturally specific and reflect particular combinations of meaning, materiality, and competence. However, psychologists would argue that although the particular elements ('content') that make up seat-belt-wearing practice differ from those that combine in the domain of sustainable transportation, lessons relating to the *process* of intervention may nonetheless be transferable between domains.

While there may at first be resistance to many upstream measures, they have, surprisingly, usually enjoyed wide acceptance by the population following their implementation, often even among those directly affected. The plastic bag levy in Ireland, for example, has proved popular among shoppers.<sup>87</sup> Whereas the classical psychological model portrays behavior change as the result of changing attitudes, values, or

norms, upstream interventions start with behavior change, and attitude, norm, and value changes follow.

### Social Practice Approaches to Change

From a social practice perspective, the social and institutional ‘content’ of the enactments of practices (i.e., material, procedural, and social elements) is crucial in the formation and maintenance of routine practices. *Practices*, rather than the behavior of individuals, are the entry point for intervention and policy making.<sup>55</sup> Shove<sup>31</sup> argues that when thinking of practices as performances, habits break when groups of devoted practitioners who were previously committed to carrying a practice persistently fail to collectively re-enact it. From a practices-as-entities perspective, the loss of its habit-demanding status does not necessarily end a practice, but rather implies a repositioning of it in the temporal ordering of daily life or its relation to other practices. For example, Shove<sup>36</sup> has documented shifts away from clothes laundering (washing, drying, ironing, folding) as activities that traditionally involved a focused effort on a dedicated day each week, toward contemporary incarnations of laundering practice that are spread throughout the week and now involve different material and procedural elements (e.g., use of automated washing machines, squeezed between other domestic duties and recreational activities), yet may remain ‘habitual’.

Consequently, the first step toward intervention from a social practice perspective becomes a mapping of the elements that currently circulate to allow particular practices to successfully recruit their carriers. As Shove<sup>88</sup> suggests, the aim is to understand the ‘trajectories and careers’ (p. 5) of practices that vary in their level of resource intensity. The role of policy becomes an attempt to bring about lasting transformation (or transitions) in relation to normative understandings of what constitutes a normal or appropriate way of life. Such a task is seen as achievable by way of reconfiguring the elements of practice, relationships between practices, and the patterns of recruitment and defection.

Shove and colleagues<sup>31,34,88</sup> suggest three primary routes that might be considered to achieve such an aim. Firstly, for habit-demanding practices to retain this status, their composite elements must be readily available. Thus, policy makers could strive to reconfigure practice elements such that less sustainable elements (meat, Westernization, convenience, competence in long-distance travel) become systematically less prominent and alternative, more sustainable, elements are promoted.

Secondly, social practice theorists highlight the importance of understanding how a practice exists

in dynamic relation to other practices. For example, it is suggested that promoting cycling requires an understanding of the ways in which the relationships between cycling and driving have evolved over time in a particular society, and the extent to which links between cycling and other aspects of mobility have been severed, or lie dormant. Thus, a practice orientation encourages policy makers to consider whether one might seek to influence one practice by targeting adjacent practices. For example, as we have noted, psychologists view car clubs as a means to break habits by disrupting unconscious cognitive processes surrounding travel choice, and suggest that encouraging car club use requires shifting drivers’ motivations toward using a car club vehicle. Social practice theorists, however, would argue that promoting participation in a car club requires an understanding of the elements that determine car club membership’s ability to recruit willing practitioners, as well as understanding how car club membership might be intrinsically connected to other practices (e.g., doing a large, weekly grocery shop). Psychologists might counter-argue that this is adequately explained by the psychological notion of ‘spill-over’, whereby participation in one form of pro-environmental behavior spills over into another, due to common underlying cognitions.<sup>89</sup> However, the ‘spill-over’ concept fails to fully recognize the social practice argument that environmentally (un)sustainable practices (e.g., car use) are often interwoven with and co-dependent on ostensibly unrelated practices (e.g., food consumption). Adjacent practices might feasibly be targeted in attempts to bring about shifts in the practice in question.

Finally, policy makers might seek to reconfigure social connections and networks through which practices circulate and develop. As Shove et al.<sup>34</sup> argue, these connections should be thought of not simply in terms of pre-existing sets of geographic or social networks that might be ‘used’ to foster more sustainable practices through linear processes of social diffusion. Rather, they must be understood in terms of the development of communities of practice that might ‘emerge from and enable the recurrent enactment of lower impact ways of life’ (p. 160). Examples of such ‘communities of practice’ might include groups of cyclists in a workplace sharing tips to make their commutes safer, more efficient and enjoyable, or participants in a local organic vegetable box scheme exchanging recipes according to which produce is plentiful each month.

This tripartite call to action may appear to involve ‘heavy-handed’ governance, but this is not necessarily the case. For example, the Japanese government’s Cool Biz initiative, designed in partnership with the fashion industry, achieved drastic reductions in

office air conditioning use via the systematic creation of markets for cooler business clothing (especially for men) through a reconfiguration of shared understandings of the social meanings attached to particular forms of dress. Resulting changes in collective habitual clothing practice in summer months saved an estimated 1.4 million tonnes of carbon emissions across Japan (Team-6 Committee and Ministry of the Environment (Japan), cited by Shove et al.<sup>34</sup>). Other intervention programs interpreted by social practice theorists in terms of elements of practice include massive investments in the Bus Rapid Transit system and cyclepath networks in Bogota (Columbia), the targeting of newly arrived community members with free bus passes by the Centre Area Transportation Authority (CATA) in Pennsylvania (USA), the Barclays Cycle Hire scheme in London (UK), and the New Nordic Diet program in Denmark (see Evans et al.<sup>55</sup> for details of each).

Although such examples provide some support for the social practice perspective on change, none of these programs drew explicitly upon social practice theory in their formulation. The direct translation of social practice theory into actual interventions remains somewhat a work-in-progress. Initial attempts have been made to develop 'element mapping' tools for policy makers, a work-shopped example of which is reported by Darnton and colleagues<sup>90</sup> in relation to the practice of line-drying versus tumble drying clothes. However, this approach still lacks a set of directly applicable models for *intervention*. Social practice theorists might argue that this stems from a theoretical orientation to change as one of 'emergence' rather than direct causality. While psychological approaches position the intervention developer as an agent of change that exerts influence *upon* a system from which they are personally disconnected, for social practice theorists, any attempt to 'intervene' in the social system must necessarily be done by actors who are themselves a part of that system. It might be suggested, for example, that the Japanese government effected change as part of the Cool Biz initiative only through establishing connections between the state and crucial actors in the fashion industry and celebrity culture.

## SHOULD POLICY TARGET HABITUAL BEHAVIORS OR ELEMENTS OF PRACTICE?

Social practice theorists have tended to portray the theoretical and empirical focus of the social psychological approach to behavior change as *solely* concerned with the individual cognitions of autonomous

agents, either in terms of deliberative processes or automated processes of habit formation.<sup>91</sup> Such a caricatured depiction of social psychology ignores that many of the steps taken in designing several successful intervention programs lauded by social practice theorists are arguably rooted in social psychological theory and evidence. We would argue that the precise *mechanisms* of change involved in interventions concordant with the social practice approach largely concur with the social psychological perspective.

For example, the use of celebrities to 'model' new practices in ways that reconfigure their social meaning (such as in the Japanese Cool Biz program) can be seen as emerging from a long theoretical and empirical tradition of social learning in psychology.<sup>92</sup> Many elements of the Cool Biz program also concur with social psychological theories of social influence, predicated on the importance of descriptive and injunctive social norms.<sup>93,94</sup> Similarly, targeting newly arrived community members with free bus passes to increase ridership has been cited as an example of social practice theory in action,<sup>55</sup> but also concurs with interventions based on the habit discontinuity hypothesis.<sup>83</sup> The practical intervention implications of both perspectives likely appear similar to policymakers.

This is not to argue that the theoretical and epistemological tensions and distinctions between psychological and social practice analyses of habitually (re)produced actions are unimportant. Indeed, the focus of the social practice approach on the co-dependence of ostensibly unrelated practices opens up some real, and different, possible alternatives for intervention. It is, however, perhaps at the intersections between theoretical approaches that the most novel and important policy intervention implications are likely to be found. The traditionally more individualistic approaches of social psychology can benefit from engagement with the more social models of social practice theory in which individual practices are inseparable from the material, procedural, and social structures that constitute them and the other practices to which they connect. This can helpfully focus attention on the role of policy and legislation in changing context rather than the role of persuasive communication in changing beliefs and attitudes. Notably, some strands of social psychological theorizing have emerged that emphasize the importance of understanding environmentally relevant activities and policies in terms of socially (particularly discursively) constructed meanings.<sup>95–99</sup> In addition, in line with social practice theorists' emphasis on the interlinked nature of behaviors, some social psychological research has recognized that habitual

behaviors that might at first glance seem unrelated can cluster together.<sup>100</sup>

Social practice theory provides an appealing theoretical model of how practices evolve, are maintained, and might potentially change. However, its operationalization into policy remains not yet material. Lessons can be learned from social psychology without requiring abandonment of the specific theoretical commitments that social practice theory entails. Social practice theorists have borrowed ideas from science and technology studies in theorizing around the role of material elements in the formation and circulation of social practice.<sup>101–103</sup> A deeper and more wide-ranging engagement with the diverse theoretical, empirical, and epistemological approaches that constitute contemporary social psychological theory might offer similarly useful ‘borrowings’ for both the theorizing and changing of the social meanings of practices. It should be noted, however, that it might well be the more discourse analytic traditions in social psychology that social practice theorists feel more comfortable with, due to them having more epistemological common ground relative to more cognitivist traditions (Box 1 and Table 1).

### BOX 1

#### CHANGING BEHAVIOR OR CHANGING PRACTICE?

Shove, Pantzar and Watson<sup>34</sup> have suggested that approaches to change focussed on behavior and practice, respectively, can be distinguished in terms of their basis for action, their theorizing of change, their positioning of policy in that process, and the ways in which transferrable lessons can be gleaned from past performance.

## CONCLUSION

There is compelling evidence for the utility of theorizing climate mitigation behaviors in terms of the

**TABLE 1** | Behavior and Practice (Reprinted with Permission from Ref 34, p. 143. Copyright 2012 Sage)

	Theories of Behavior	Theories of Practice
Basis of action	Individual choice	Shared, social convention
Processes of change	Causal	Emergent
Positioning of policy	External influence on the factors and drivers of behavior	Embedded in the systems of practice it seeks to influence
Transferable lessons	Clear: based on universal laws	Limited by historical, cultural specificity

habitual and routine aspects of daily life, rather than as the outcome of deliberative thought. Both the social psychological literature around ‘habits’ as impulsive, cue-driven behaviors, and the sociological literature around established social practices offer useful intervention design insights. Growing empirical literatures across both theoretical traditions speak to the importance of understanding habitual aspects of a range of behavioral practices such as water and energy use, food consumption, waste management, and modes of transportation.

Our review generates research directions for development of each side of the theoretical divide. Firstly, while psychological research emphasizes the importance of context in driving (un)sustainable habitual behavior,<sup>9,12</sup> the definition of ‘context’ has been under-theorized, and is less well-specified within the psychological literature than the social practice tradition. Psychological research into habitual behavior might benefit from more nuanced theorizing around the role of physical and social contexts, and examining the role of context empirically in a way that goes beyond the proposition that a stable ‘context’ leads to the formation of particular cognitive associations within individuals. Secondly, while the social practice tradition has provided highly rich and nuanced theorizing of the material, procedural, and socio-discursive elements that combine to constitute ‘the habitual’, future research should focus on translating such understandings into the development of new public policy programs. This will likely require basic empirical research to produce data of a form that can be successfully translated to policy. Such work is underway,<sup>88,91</sup> but this task arguably remains far from complete. In fairness, however, although the models and terminology from the psychological literature have thus far been more able to infiltrate policy discussions, it also remains to be seen whether the ‘downstream’ household-level intervention prescriptions that most often emerge from psychology are able to effect change at a societal level, rather than only within relatively small-scale controlled trials. Psychological research may be better served by a greater focus on ‘upstream’ interventions.

Although the social psychology and social practice perspectives have been constructed in recent debates as oppositional,<sup>91,104</sup> theorists of both traditions have called for integration of the two approaches.<sup>105,106</sup> We have highlighted key points of tension and reconciliation between the two traditions, and our treatment of the issue offers progress toward productively bridging the two perspectives. We have shown that the theoretical and epistemological tensions between the two fall into

less sharp relief when designing interventions and making policy recommendations. Interventions that incorporate elements of both theoretical perspectives

may perhaps be most effective for breaking the mundane habitual actions that threaten the global climate.

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