

# Chapter 11

## Cracks in the Wall: Habit Discontinuities as Vehicles for Behaviour Change



Bas Verplanken, Deborah Roy, and Lorraine Whitmarsh

### Introduction

Every December millions of people make New Year's resolutions. Newspapers, Internet, and social media are full of tips and recommendations. By the sixth of January millions of New Year's resolutions have gone down the drain. The idea behind these resolutions makes sense though: January first is a new beginning, a point where we can break with the past and begin a cleaner, healthier, or more prosperous future. While we may wish to change habits at other times in the year, in everyday life it is difficult to decide when exactly we should start doing that (e.g. Gollwitzer & Brandstätter, 1997). An event such as New Year may thus serve as an anchor point to hook on a habit change. What most people underestimate is the fact that life and our daily routines continue as usual after January 1st, activated by the same situational cues which maintain the old habit. We are, however, not only unaware of the power these conditions exert on our behaviour, but also grossly overestimate the willpower needed to overcome them.

Whereas a New Year's resolution may not be a very effective vehicle for habit change, the notion that 'moments of change', events that break existing patterns or routines, provide opportunities for more long-lasting change, seems plausible. There are many examples: 'catharsis' in psychotherapy paving the way for fundamental psychological changes, 'rites of passage' marking significant transitions in people's lives, improvement of safety regimes after natural or man-made disasters,

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B. Verplanken (✉)  
Department of Psychology, University of Bath, Bath, UK  
e-mail: [B.Verplanken@bath.ac.uk](mailto:B.Verplanken@bath.ac.uk)

D. Roy  
University of Bath, Bath, UK

L. Whitmarsh  
Cardiff University, Cardiff, UK

or unexpected events turning the course of history. In this chapter we explore the idea that moments of change may be highly conducive to habit change. Although this is not a new idea, there is a growing interest for it in various fields, most notably transportation and health. Such transitions have been labeled ‘entry points’ (Axon, 2017), ‘turning points’ (Beige & Axhausen, 2012), ‘fateful moments’ (Giddens, 1991), ‘transformative moments’ (Hards, 2012), ‘teachable moments’, (Lawson & Flocke, 2009), ‘moments of change’ (e.g. Thompson et al., 2011), ‘habit discontinuities’ (Verplanken, Walker, Davis, & Jurasek, 2008), or ‘context changes’ (Verplanken & Wood, 2006). The suggestion is that these periods in people’s personal, social, or professional circumstances provide opportunities for conscious, planned behaviour change (e.g. Schwanen, Banister, & Anable, 2012; Verplanken & Wood, 2006). In other words, interventions to change behaviour might be more effective—provide more value for money, if you will—if they capitalize on moments of change. We refer to this as the *Habit Discontinuity Hypothesis* (Verplanken et al., 2008; Verplanken & Wood, 2006).

Before we focus on change and habit discontinuities, we briefly outline a few basic concepts with respect to habit. As discussed in more detail elsewhere in this book, we consider a habit as an automatic association between a contextual cue and a response, which has a history of repetition and rewards (e.g. Rebar, Gardner, Rhodes, & Verplanken, 2018; Verplanken & Aarts, 1999; Wood & R niger, 2016). Habits usually originate from deliberate goal-directed actions. Repeated and satisfactory execution of these actions creates representations of cue–response links in memory, which are automatically activated upon encountering the cue, thus triggering the habitual action. Habits thus indicate a significant role of the performance context in controlling behaviour, often greater than many of us realize. The original goal may trigger a habit (e.g. Aarts & Dijksterhuis, 2000), but goals need not necessarily be involved in habitual action, as contextual cues have assumed control. A goal may be activated if the action is thwarted or does not lead to the usual outcome, or if anything else changes in the context where the action is usually performed (e.g. Wood & Neal, 2007; Wood & R niger, 2016). And the latter is the particular focus of the present chapter.

We will begin with a brief discussion about situations where behaviour changes due to changing circumstances. We then turn to studies that experimentally investigated the Habit Discontinuity Hypothesis, that is, designed interventions to explicitly capitalize on context change. In the final section, we discuss some mechanisms that may play key roles in these discontinuity effects.

## Changing Circumstances, Changing Behaviour

Changing circumstances often imply changes in people’s behaviours and habits. Changes may simply occur as a function of natural changes in our situation. That is, people adapt to changing circumstances without necessarily being motivated to change or having consciously planned any change in the first place (e.g. Clark,

Chatterjee, & Melia, 2016; Fujii, Gärling, & Kitamura, 2001; Goodwin, 1989; Marsden & Docherty, 2013; Parkes, Jopson, & Marsden, 2016; Poortinga, Whitmarsh, & Suffolk, 2013). For instance, Parkes et al. (2016) investigated commuters' travel behaviours in the wake of the 2012 London Olympic and Paralympic Games. These games disrupted many commuters' travel habits. These researchers documented how commuters adapted to the situation by rerouting, retiming, or switching travel mode. Most of them reverted to the old patterns once the games were over. Of course, one may incidentally discover better options during such periods of disruption, which may lead to adopting new habits. That was the case for a portion of participants in a study of travel mode change during and after an eight-day freeway closure in Japan (Fujii et al., 2001). While many who commuted by car continued doing so after the closure was lifted, some who had switched to public transport during the closure discovered that they had overestimated the travel time by car and continued to use public transport after the disruption.

Behaviour change often co-occurs with important events in people's personal or professional lives (e.g. Beige & Axhausen, 2012; Marsden & Docherty, 2013; Scheiner, 2006; Scheiner & Holz-Rau, 2013; Thompson et al., 2011). While not an exhaustive list, some examples are transitions from school to work (e.g. Busch-Geertsema & Lanzendorf, 2017; Fujii & Gärling, 2003; Koehn, Gillison, Standage, & Bailey, 2016), family situation changes (e.g. Goodwin, 1989; Thomas, Fisher, Whitmarsh, Milfont, & Poortinga, 2017), residential relocation (Clark et al., 2016; Fatmi & Habib, 2017; Jones & Ogilvie, 2012; Scheiner, 2006; Thomas Poortinga, & Sautkina, 2016; Verplanken et al., 2008), changes in study, work or employment situations (e.g. Clark et al., 2016; Rogers, Vardaman, Allen, Muslin, & Brock Baskin, 2016; Walker, Thomas, & Verplanken, 2015; Wood, Tam, & Guerrero Witt, 2005), changes in retail contexts (e.g. Poortinga et al., 2013), new infrastructure (e.g. Heinen, Panter, Mackett, & Ogilvie, 2015), retirement (e.g. Barnett, van Sluijs, & Ogilvie, 2012; Burningham & Venn, 2017; Mein, Shipley, Hillsdon, Ellison, & Marmot, 2005; Midanik, Soghikian, Ransom, & Tekawa, 1995; Smeaton Barnes, & Vegeris, 2017), or surviving a life-threatening illness (Webb, Fife-Shaw, Ogden, & Foster, 2017). In such cases people adapt to the new circumstances or adopt behaviours that are typical, or believed necessary, in the new circumstances. Of course, while behaviours may thus change, this does not necessarily mean for the better. For instance, Koehn et al. (2016) documented how adolescents who transitioned from home to independence embraced new priorities, but certainly not a healthier lifestyle.

Whether people choose to change or adapt to changing circumstances, existing habits may or may no longer be useful or feasible, and if the latter, new behaviour has to be negotiated. A seminal study illustrating this process was conducted by Wood et al. (2005), who demonstrated the power of context and discontinuity effects in more detail. These researchers investigated what happened to students' habits (in this case exercising, reading the newspaper, and watching TV), when they transferred to a new university. While these are typically circumstances where a person enters a completely new environment, certain elements from the old environment may re-appear in the new one. For instance, the students in Wood et al.'s study were

again living in a student house with one or more housemates. Two of the findings in that study were particularly significant for the present discussion. The first was that for some students the transfer led to a degree of ‘defreezing’ of old habits; their old routines were disrupted, and new behaviours emerged that were under the control of conscious intentions. Secondly, there were also students who continued to do what they did at their old university. These were students for whom the critical context cues that triggered their habits in the old situation were also present in their new location, such as ‘having a roommate who reads the newspaper’, which thus continued to trigger the old habit of reading the newspaper.

The first finding—intentions controlled behaviour in the new environment—means that when the context change involves the removal or disruption of contextual cues that trigger an old habit, the automatic responses to cues can no longer occur, and more deliberate processes kick in. Individuals may then be more open and attentive to new information, which otherwise would not be the case as habituation comes with ‘tunnel vision’, that is, a mindset in which the individual is almost immune to new information or alternative options (Verplanken, Aarts, & van Knippenberg, 1997). When a habit is blocked or suspended due to a change of context, this ‘spell’ is, at least temporarily, broken. The person may thus need and search information or advice, and be open to alternative options. This forms the basis of the Habit Discontinuity Hypothesis.

Equally important was Wood et al.’s (2005) second finding: those students who found the old cues recurring in the new context picked up and continued their old habits. This suggests that going through a context change does not necessarily mean a person will adopt new behaviours. As soon as the critical cues that triggered the habit in the old performance context re-appear in the new situation, the old habit is re-instated very quickly: the ‘sixth-of-January effect’. This demonstrates the power of context cues: the rewarding properties of habit contexts are enduring (e.g. Anderson & Yantis, 2013) and can be transferred to other performance contexts. Thus, all things being equal, while a discontinuity in the performance context may disrupt habits, the default tendency of people undergoing such changes is that old habits will re-appear if the original cues are still present after the disruption when the situation has stabilized (e.g. Fatmi & Habib, 2017; Fujii et al., 2001; Parkes et al., 2016).

## Testing the Habit Discontinuity Hypothesis

While it is obvious that changing circumstances may lead to behaviour change, the key element of the Habit Discontinuity Hypothesis is that behaviour change *interventions* capitalize on those moments of change and thus be more effective compared to interventions delivered under stable conditions. We identified a number of studies that explicitly aimed at delivering a behaviour change intervention in the context of a life course change. These studies highlight several aspects that are important in understanding discontinuity effects.

Some studies focused on travel behaviours. Bamberg (2006) conducted a randomized controlled trial testing an intervention to promote the use of public transport in the German city of Stuttgart. Residents who had indicated they intended to move into the area within 6 months, were presented with a questionnaire at the start of the study and 12 weeks after they had moved house. They were randomly assigned to an intervention and control group. In the former condition an intervention was delivered 6 weeks after participants had moved house. The intervention consisted of personally tailored information about the local public transport facilities and a one-day free public transportation ticket. Compared to the control condition, participants who had received the intervention showed a stronger increase in the use of public transport. Thøgersen (2012) found similar effects in secondary data analyses studying the effect of a free travel pass on switching to public transport. Participants in that study had been randomly assigned to an experimental group, who received a one-month free travel pass, or to a control group. It was found that the intervention was only effective among participants who had moved house or workplace in the 3 months that preceded the study. Likewise, Ralph and Brown (2017) investigated the effect of a personalized transportation guide for traveling to the university, which was provided to a group of first year graduate students 2 months before the semester start. These were compared to a group of students who had not relocated. The results suggested that the transportation guide was effective for those who had moved house in the past 6 months, but not for those who had not relocated.

Two further studies focused on energy-related behaviours. Maréchal (2010) analyzed the proportion of energy subsidy applications to local authorities in the Brussels region in Belgium from residents who moved house in the previous 3 years versus incumbent residents. While there was no reason to suggest that those subsidies were more useful or available for residents who had relocated, they were more likely to apply for them than incumbent residents. In contrast to the focus of most studies on relocation as a habit-disrupting moment of change, one study considered electric vehicle purchase as a potential moment of change. Nicolson, Huebner, Shipworth, and Elam (2017) tested the Habit Discontinuity Hypothesis among a large sample of owners of electric vehicles who bought their vehicle up to 5 years ago. The owners of such cars were sent prompts to charge their vehicles during off-peak hours, which would contribute to reducing peak demand and thus the use of more polluting power plants. It was found that prompts were most effective (indicated by opening the email that was sent) if these were delivered within 3 months of the purchase of an electric car.

Verplanken and Roy (2016) conducted a randomized controlled field experiment that tested an intervention aimed at promoting a range of sustainable behaviours among households who had moved house in the previous 6 months. These participants were compared to a matched control group who had not relocated. Half of the participants in each group received an intervention while the other half served as the no-intervention control group. Self-reported behavioural frequency measures for 25 behaviours, averaged into an overall behavioural index, were taken at baseline and 8 weeks later. There were two main results. The first was that when the post-measure

index of behaviour was regressed on the baseline measure, while controlling for major determinants of behaviour taken at baseline (i.e. the baseline behaviour index, habit strength, intention, perceived behavioural control, biospheric values, personal norms, and involvement), the intervention and, most importantly, the interaction of the intervention and moving status, were statistically significant: the intervention was effective among movers, but not among non-movers. Secondly, when we broke down moving status into more detail, the discontinuity effect appeared amongst those who had relocated in the past 3 months, whereas no effects were obtained for those who had moved more than 3 months earlier or had not moved at all.

Tests of the Habit Discontinuity Hypothesis have not always provided support for the hypothesis. Schäfer et al. (2012) tested the effects of two types of interventions (information mailing and personal consultation) on sustainable consumption as a function of two types of life course discontinuities (residential relocation and having a first child). While the consultation intervention was effective, this was not more the case after relocation or childbirth. On the contrary: the campaign appeared more effective in the stable life groups. Additional qualitative research suggested that a reason for this result might have been that the campaign was launched too late (6 months after the discontinuity moment), and was thus missing the ‘window of opportunity’, as new (unsustainable) routines had already been (re)established.

We can draw at least two conclusions from the intervention studies mentioned above. The first is that, taken together, the studies begin to provide good support for the Habit Discontinuity Hypothesis. Interventions do seem to be more effective when these are delivered in the context of major discontinuities, or when these are explicitly focused on such discontinuities. The second conclusion is that if one would wish to answer the question how long a ‘window of opportunity’ lasts, the evidence so far suggests that a period of approximately 3 months would probably be the best guess. Having said that, we need to be more precise about what exactly is meant by a ‘window of opportunity’, as this term has been applied widely to diverse endogenous (biographical, e.g. leaving home, starting a family) and exogenous (societal, e.g. energy shortages; new policies) events (Thompson et al., 2011). Also, a window may ‘open’ some time before the actual discontinuity materializes, for instance when people deliberate commuting options in considering new residential areas (Stanbridge & Lyons, 2006; Walker et al., 2015).

Some caveats need to be mentioned. First, studies vary in the rigor with which they test the Habit Discontinuity Hypothesis. The above studies compared the efficacy of an intervention between life course change and non-change groups, in order to isolate the effect of discontinuity. Only some of these randomized participants to intervention versus no-intervention conditions (Bamberg, 2006; Verplanken & Roy, 2016), while only one matched the discontinuity and no-discontinuity participants on key characteristics (Verplanken & Roy, 2016). Other studies instead examined interventions targeted to moments of change (e.g. parenthood, office relocation), but did not include a control group who received the intervention but were not undergoing a moment of change (Schulz et al., 2006; Walker et al., 2015). While those studies are unable to show the rela-

tive efficacy of interventions upon habit disruption, they nevertheless tell us something about habit breaking or formation. Some studies were able to investigate the length of the ‘window of opportunity’ (e.g. Nicolson et al., 2017; Verplanken & Roy, 2016). Obviously, each design characteristic has consequences for the validity of conclusions that can be drawn from a particular study. Also, the studies reviewed were all field studies investigating real-life discontinuities. While these contexts are of primary interest from an applied perspective, they do not allow rigorous testing such as controlled laboratory work might deliver, which makes it difficult to draw conclusions on, for instance, causality.

A second caveat is that a discontinuity may in fact be a proxy for other variables and conditions. For instance, ‘moving house’ may imply changing jobs, starting a family, or other circumstances and considerations, and may be embedded in a wider social, geographic, and cultural framework. This has led some authors to criticize the very concept of ‘moments of change’. For instance, Burningham and Venn (2017) argued that ‘(...) transitions are often experienced as multiple, intersecting and in the context of relationships, and (...) always socially and materially situated’ (p. 2). While acknowledging that ‘moment of change’ and ‘windows of opportunity’ imply more than the discontinuity moment itself, this does not make the Habit Discontinuity Hypothesis less meaningful.

Finally, it can be noted that, with the exception of Schulz et al.’s (2006) study of new parents, no other habit discontinuity studies documented longer-term effects. It is therefore impossible to draw conclusions on the longevity of habit discontinuity effects. Furthermore, little is known about mechanisms that underlie habit discontinuity effects. The latter, then, is the topic of the next section.

## Unpacking the Habit Discontinuity Hypothesis

What exactly is a ‘window of opportunity’ created by a discontinuity in a person’s life, and what may be the mechanisms driving habit discontinuity effects? We contend that potentially there are at least three processes involved in discontinuity effects: (1) ‘unfreezing’ old habits; (2) information acquisition and processing; (3) activating or changing goals or values. We will elaborate each of these three elements.

### *Unfreezing Old Habits: Kurt Lewin’s Insights*

Kurt Lewin was an influential scholar in the domain of social change, who published his major works in the late 1930s and 40s. Lewin is often cited as the originator of the ‘unfreeze-change-freeze’ model, which has become popular in the management literature, although it is often represented in overly simplistic terms (Cummings, Bridgman, & Brown, 2016). Lewin provided interesting analyses of change processes in the form of his Field Theory (e.g. Lewin, 1947). It should first be noted that Lewin’s



key unit of analysis was the social group, rather than the individual. In a Gestalt tradition, and being a true social psychologist, he considered the social group as encompassing more than the sum of individuals, and individual behaviours as a function of the group context. Lewin described a social system in terms of ‘force fields’, which refer to the total of influences toward or away from an outcome or criterion. Let us take as an example the degree to which a certain population behaves sustainably, and do things like saving water and energy, buy ecological and fair-trade products, and use public transport. This may thus be described as a field consisting of bundles of specific forces that encourage or discourage sustainable behaviours. These forces may include personal, social, and situational factors. Personal factors may for instance be individuals’ expected costs and benefits of behaving sustainably or adhering to pro-environmental values. Social factors may consist of injunctive or descriptive norms encouraging or discouraging sustainable action, or activities of pressure groups. Situational factors may be physical, such as properties of the existing housing stock or poor public transport, but may also consist of events, such as an episode of flooding. All influences together, some exerting a positive and some a negative impact on aspiring sustainable lifestyles, thus form a force field, which is manifested as an overall level of sustainable living. It also exists, in Lewin’s terms, as a quasi-stationary equilibrium: the degree of performing sustainable behaviours fluctuates around an average as long as specific forces do not substantially change or disappear, or new forces appear. An intervention to promote sustainable behaviour would be such a new force, and would thus lead to a new equilibrium of the force field, in this case, hopefully, at a higher level and thus an increase in sustainable behaviours. However, a habit (a ‘historic constancy’, in Lewin’s terms) creates an additional force, which locks in behaviour and holds back change. This may occur, for instance, due to vested interests (e.g. the need to drive children to a distant school), existing infrastructure (e.g. unhelpful bus routes), or ingrained unsustainable social norms, values, or stereotypes (e.g. pro-environmental groups being seen as ‘extremists’). If strong habits are prevalent, this would ‘freeze’ the system and prevent an intervention to move the equilibrium to a higher level. It thus follows that if existing habits were to be removed, or if something happened to make them ineffective (‘unfreezing’ the force field), the equilibrium would not be held back, and an intervention would be more successful, which is thus what discontinuities can be expected to accomplish.

Why do we elaborate on Kurt Lewin’s field theory? Critics may say this is merely a description of the Habit Discontinuity Hypothesis using different terms. In addition, whereas Lewin’s unit of analysis is at the level of the social group, the Habit Discontinuity Hypothesis was formulated at an individual level. We think Lewin’s theory brings at least two important elements to the table. The first is that the concept of ‘unfreezing’ is also applicable at the individual level, i.e. (temporarily) breaking the cue–response links which we used to describe a habit (see also Chap. 10 in this volume). This has consequences such as the way individuals process information, make decisions and reorient themselves, which we will further discuss in the next section. Secondly, the Lewinian conception of habit as an element in a larger force field stresses the fact that habits are embedded and sustained by larger structures, which constitute the force field (e.g. Burningham & Venn, 2017; Guell, Panter, Jones,



& Ogilvie, 2012; Kurz, Gardner, Verplanken, & Abraham, 2015; Shove, Pantzar, & Watson, 2012). It follows that while a discontinuity in an individual's life may unfreeze a particular habit and thus make that individual more sensitive to change, an intervention that capitalizes on a *shared* discontinuity, thus including social, physical, geographical, and cultural elements, can be expected to be much more effective. Examples of such opportunities are new residential areas, major infrastructure disruptions, policies that restrict or remove choices (e.g. congestion charges; smoking ban), the restructuring or relocation of an organization, or the transitions of well-defined cohorts such as school leavers or retirees. In such cases, relatively large groups of people are undergoing a significant change in more or less the same time and space frames, which may make bespoke interventions feasible and cost-effective. In order to be effective, a 'Lewin-style' discontinuity intervention should then capitalize on a wide range of elements of that force field (e.g. expectations, attitudes, norms, interaction and communication patterns, infrastructure, financial support), or in popular management terms, adopt a 360° approach. Thus, if the larger force field is not implied in an intervention, even if it changes the behaviour of an individual, old habits are likely to be re-instated once the situation has stabilized, which is what the literature discussed earlier in this chapter suggests.

It does not only suffice to unfreeze a force field and move to a new, higher-level equilibrium; this new state should also be consolidated if the changes are to be maintained. In Lewin's (1947) words: '(...) after 'a shot in the arm', group life soon returns to the previous level' (p. 34). Hence, 'freezing' the new state and thus securing it against relapses should be a key objective if interventions are to be effective. This again concerns all relevant elements in the larger force field; the new equilibrium (in our example, a more sustainable lifestyle) must thus be supported not only by individual positive attitudes and intentions but also by social norms and standards, infrastructure, if possible socio-cultural changes, and last but not least new habits.

### ***Information Acquisition and Processing***

Discontinuities imply a 'shake-up' of one's everyday life behaviours and choices. By default, a significant proportion of those behaviours can be designated as habitual in nature (e.g. Wood, Quinn, & Kashy, 2002). A discontinuity thus creates a situation where a person has to reorient and make new choices. These new choices may be motivated by existing values or by a new set of priorities. In either case, the process of making a new choice will involve information acquisition and processing. In a research program on travel mode choices, Aarts and colleagues investigated the effects of habits on choices and decision-making in greater detail (Aarts Verplanken, & van Knippenberg, 1997, 1998; Verplanken et al., 1997). That work demonstrated that habitual and non-habitual behaviours differ markedly in terms of information acquisition and processing, and types of decision rules used to make choices. When strong habits are present individuals search or attend less to information which is relevant to their choices. This holds in particular for information about

alternatives to habitual choices, as well as for the appreciation of the context of choices (Verplanken et al., 1997). Relatedly, strong habits are also associated with the use of non-compensatory compared to compensatory decision strategies (Aarts et al., 1997). The former strategies require less attention and fewer mental operations compared to the latter, and thus mirror the experience of doing things ‘by force of habit’ (Langer, Blank, & Chanowitz, 1978; Roy, Verplanken, & Griffin, 2015). Discontinuities require a reorientation based on available options and attributes, and may put individuals in a more deliberative mindset than they normally would have (e.g. Gollwitzer, Heckhausen, & Steller, 1990). If interventions capitalize on this, they may thus be more effective.

### *Value Activation or Change*

Although many behaviours may originally have been guided by goals and values, these forces may disappear once behaviour has become habitual (e.g. Maio, 2017). For instance, in a study on the meaning of sustainability, participants who scored all high on environmental attitudes and values attributed unsustainable acts to ‘thoughtless consuming’ (Roy et al., 2015). It takes at least some form of cognitive activation, if not cognitive effort, to make people aware that an important value may be implicated in the behaviour at hand (e.g. Verplanken & Holland, 2002). A discontinuity and the associated need for a reorientation may do exactly that. Thus, a discontinuity may make individuals (re)consider long-term goals and motives in arriving at new choices and behaviours. In a study on sustainable commuting, Verplanken et al. (2008) measured university staff’s environmental concern, and asked them also how they traveled to the university and when they last moved house. Not unexpectedly, the level of environmental concern correlated significantly with the degree to which they commuted by car versus other modes of transportation. However, when this was broken down by the time of relocation, the association only appeared to exist amongst those who had moved house in the past year. While this was a correlational study and can therefore not make causal claims, it supported the thesis that the relocation activated ‘dormant’ attitudes and values, which were then considered and acted upon (see for a conceptual replication, Thomas et al., 2016). For some, this may have been due to planning their relocation around availability of low-carbon travel options (Stanbridge & Lyons, 2006).

Some other studies provided evidence for the role of attitudes and values in discontinuity effects. Clark et al. (2016) analyzed the stability of commuting behaviours over the course of a year among a large UK sample. They found that employment changes and residential relocations were the major life events that made commuters switch, which primarily was driven by changes in distance to work. However, they also found that pro-environmental attitudes predicted switches from car to public transport or active commuting but not switches toward car commuting. Similarly, Matthies, Klöckner, and Preißner (2006) provided evidence that after an intervention to ‘unfreeze’ existing car use habits, the use of public transport was driven by perceived behavioural costs and by pro-environmental personal

norms. Thomas et al. (2018) used a large longitudinal data set to analyze changes in pro-environmental behaviours as a function of having children. They found that whereas the general trend was toward behaving less sustainably, those who held pro-environmental attitudes showed a small increase in sustainable behaviours.

The process of ‘unfreezing’ habits thus not only interacts with the external social and physical context, as Lewin emphasized, but also with internal goals, priorities and values that motivate individuals. These internal motivations are more likely to manifest in consistent behaviour when external conditions are conducive (Stern, 2000). For example, environmental concern is more likely to predict recycling behaviour when one has a curbside recycling collection (Derksen & Gartrell, 1993). In relation to habit discontinuity, as the studies above suggest, contextual disruption may provide an opportunity for extant values to manifest in a new value-consistent behaviour.

New Year’s resolutions may similarly act as a window of opportunity to change habits that have become ‘misaligned’ with one’s goals or values (e.g. to be healthy). However, as discussed earlier, this desire to change is often insufficient to unfreeze old habits and freeze new ones. At this time, the use of ‘implementation intentions’ may help (e.g. Adriaanse, Gollwitzer, De Ridder, de Wit, & Kroese, 2011; see also Chap. 10 in this volume). This involves introducing a counter-response to an existing habitual act, accompanied by thoughtful consideration. Specifically, a concrete plan is formulated that aims to shift control over behaviour from contextual cues back to individual conscious deliberation (e.g. ‘on Tuesday at 5pm, I will go to the gym’). This may result in new learning that the same goal can be achieved through more adaptive and favorable means. One still, of course, has the problem that existing contextual cues may be exerting control over current behaviours. However, with sufficient motivation, these new alternative responses could eventually become habitual in nature. Here, again, values may become manifest in value-consistent behaviour change.

In contrast to habit discontinuities that *activate* existing values, some may *change* an individual’s values or result in a redefinition of the self-concept, for example when having a child (increasing nurturing and security values; Thomas et al., 2018), moving to a different culture (Bardi, Buchanan, Goodwin, Slabu, & Robinson, 2014), or overcoming addictions such as drugs, overeating, gambling, or smoking (e.g. Best et al., 2016; Epiphaniou & Ogden, 2010; Kearney & O’Sullivan, 2003; Kim, Wohl, Salmon, & Santesso, 2017; McBride, Emmons, & Lipkus, 2003). While overcoming addictions are beyond the scope of this chapter (but see Chaps. 17 and 18 in this volume), the role of the self and identity, both personal and social, is undoubtedly important in particular in making long-lasting changes in behaviours that do not have immediate personal benefits, such as in the ecological domain (e.g. Whitmarsh & O’Neill, 2010). Sociological and psychological studies both highlight that life transitions can act as moments of personal reflexivity and re-evaluation (Giddens, 1991; Williams, 1999). Interventions may capitalize on this change in values or identity by addressing multiple targets, either within the same domain (e.g. making a variety of environmentally friendly choices), or in different domains (e.g. contributing to a better environment as well as improving one’s health).

The transition from adolescence to adulthood (around age 15–25), for example, is a key period of change in which adult identities and lifetime habits are formed, autonomy increases, and ideologies are explored (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008; Solhaug & Kristensen, 2013); this period often sees radical shifts in health, social, and political behaviours, mediated by factors such as family background (Frech, 2012; von Post-Skagegård et al., 2002). Sustainability interventions targeted to emerging adulthood, for example, may have profound and enduring effects, due to links between identity and a range of pro-environmental behaviours (Gatersleben, Murtagh, Cherry, & Watkins, 2017). On the other hand, applying such interventions to other habit discontinuities when values shift may not be so effective; the stress and reduced available time associated with the transition to parenthood, for example, might mitigate intervention effectiveness (Burningham & Venn, 2017; Thompson et al., 2011). This again highlights a need to develop a more differentiated understanding of ‘moments of change’ that draws out salient dimensions for intervention planning.

## Final Thoughts

Behaviour change is difficult, and people vastly underestimate the power habits exert over our lives. However, moments of change can be capitalized upon to encourage the uptake of more adaptive, healthy, safe, pro-social or sustainable behaviours. The evidence reviewed in this chapter offers insights into what has worked and what is needed now, including a more detailed conceptual definition of ‘moments of change’; identification of relevant mediators of intervention effectiveness for different types of moment of change; and longitudinal studies to document longer-term effects of efforts to discontinue or disrupt unwanted habits.

### Habit Research in Action: Testing Habit Discontinuity Effects

What would constitute a proper test of the Habit Discontinuity Hypothesis (HDH)? If we confine this question to investigating the potential which life course changes may have to boost the effectiveness of behaviour change interventions, there are a number of problems. The gold standard is a fully randomized controlled trial, in particular one that runs sufficiently long in time in order to test the extent of the ‘window of opportunity’. Thus, the following elements make a stronger test of the HDH.

1. An intervention versus no-intervention control condition. A prerequisite of a proper HDH test is to make sure one has an intervention that works. The test, then, is whether an intervention is *more* effective in the wake of a habit discontinuity. The inclusion of a control group may occur in several ways, for instance simultaneously with the intervention condition, or in the form of a waitlist-control group.

2. A discontinuity versus no-discontinuity condition. This is not always easy to accomplish. However, the HDH is properly tested by an intervention/no-intervention  $\times$  discontinuity/no-discontinuity interaction.
3. Random allocation to conditions. This is standard if one wishes to test an intervention. However, problems may arise in implementing this in certain settings. For instance, in the Verplanken and Roy (2016) study, we did not want neighbours to be in different conditions. In such cases a ‘clustered randomization’ procedure might be the next best option, in this case designating certain areas as ‘intervention’ and others as ‘control’. Random allocation to a discontinuity versus no-discontinuity condition is in most cases impossible, or if it were possible, unethical. The next best solution might then be to match the two groups on key characteristics. However, one will most likely have to accept that the two groups differ in more respects than the discontinuity per se. These differences depend on the type of discontinuity, and may be traced back to socio-economic factors (e.g. in the case of relocation), psychological factors (e.g. divorce), or cohort effects (e.g. retirement).
4. A pre-post discontinuity longitudinal design. The HDH typically plays out over longer periods of time. A HDH design is stronger if one is able to start collecting data before the discontinuity is a fact. Also, in order to establish the size of the ‘window or opportunity’, sufficient time and measurements are needed as post-measures. One of the difficulties is to know when exactly a ‘window of opportunity’ opens. For instance, a discontinuity that is anticipated (e.g. retirement), may set things in motion long before the actual moment of retirement. Also, certain discontinuities may be instigated *in order to* change behaviour (e.g. moving house for a better commute). Thus, the timing of measurements is an important element.

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