Chapter 6

By Force of Habit

Bas Verplanken

1 By Force of Habit

Many behaviors of interest in behavioral medicine are highly repetitive. This holds of course for addictive behaviors, such as smoking and drinking alcohol, but also for many other behaviors that may have health consequences, such as eating, exercising, and hygiene-related behaviors. A number of popular socio-cognitive models in health psychology describe determinants of health behavior, such as the Health Belief Model (Janz and Becker, 1984), Protection Motivation Theory (e.g., Rogers and Mewborn, 1976), and the Theory of Planned Behavior (Ajzen, 1991). However, none of these models include constructs that represent the repetitive nature of behavior, such as an assessment of past behavior. The models implicitly suggest that past behavior influences future behavior through the model components. Yet, when past behavior is taken into the equation, it appears a powerful predictor of later behavior over and above the model variables (e.g., Albarracín et al, 2001).

Repetitive behaviors not only outperform the predictive power of socio-cognitive models, they also seem to pose limits on the validity of the models. In a meta-analysis of studies that included assessments of behavioral intentions, past behavior, and later behavior, Ouellette and Wood (1998) found that intentions, which are the most proximal predictors of behavior in the prevalent socio-cognitive models, predict behaviors fairly well when these are infrequently performed. However, when behaviors occur frequently, the predictive power of intentions attenuates, and past behavior becomes the strongest predictor (Triandis, 1980). A number of recent primary studies confirmed this notion (de Bruijn et al, 2007; Ferguson and Bibby, 2002; Ji and Wood, 2007; Verplanken et al, 1998). It thus seems that habitual behavior is no longer guided by conscious considerations or motivation, but is governed by other processes. This would of course have major implications for strategies to change habitual behaviors.

Why would such effects occur? As frequency of behavior in itself has no explanatory value (Ajzen, 2002), we need to focus in more detail on the concept of habit. In this chapter, I will thus first address the question what habits are and how they operate, and discuss variants of habits. I then address implications for interventions aimed at changing health behaviors. I will end the chapter by discussing the measurement of habit.

2 The Three Pillars of Habit

Three aspects are central to the nature of habits: a habit is behavior that is frequently performed, has acquired a high degree of automaticity, and is cued in stable contexts. These three pillars of habit will be elaborated in the following.

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2.1 Frequency

Psychologists have traditionally defined habit as frequency of past behavior. This conception stems from the behaviorist school, which focused primarily on overt behavior as the scientific object of interest (e.g., Hull, 1943). The behaviorist notion of what habits are (the number of repetitions of a behavior) and how they are formed (the impact of reinforcers) have remained relatively unchanged throughout the history of psychology, in spite of what has been known as the "cognitive revolution," which followed the decline of behaviorism. However, defining habit as frequency of past behavior is problematic for at least three reasons (Verplanken, 2006). The first is the question at which frequency we would designate a behavior as a habit. Ronis et al (1989) suggested that a behavior acquires habitual quality ". . .only if the behavior has been repeated both frequently (at least twice a month) and extensively (at least 10 times)" (p. 213). However, no rationale was given for this notion. A more serious concern is that frequent behavior does not necessarily imply a habit (Ajzen, 2002): "No matter how often we may have climbed the same mountain, it is difficult to believe that this behavior has become routine in the sense of constituting an automatic response sequence. Behaviors of this kind require conscious control, even after they have been performed many times" (p. 109). Frequency of behavior is thus a necessary but not sufficient feature to qualify a behavior as habitual. Indeed, a number of studies in which independent measures of habit were included in addition to measures of past behavior, demonstrated that the two constructs are not equivalent, and independently contribute to the prediction of intentions (Knussen and Yule, 2008), later behavior (Verplanken, 2006, Study 1), or habit strength measured at a later point in time (Verplanken and Melkevik, 2008).

2.2 Automaticity

Habits are characterized by automaticity (Aarts and Dijksterhuis, 2000; Aarts et al, 1998; Sheeran et al, 2005; Verplanken and Aarts, 1999). The automaticity component, and not frequency per se, is likely to be responsible for why habits are experienced as natural elements of everyday life. We do not experience "making a travel mode decision" when commuting to work. Rather, we experience a sense of fluency and smoothness when taking the car.

Automaticity is not an all-or-none phenomenon. Bargh (1994) suggested to break down the concept into four features: lack of awareness, lack of conscious intent, the difficulty to control, and mental efficiency. A particular automatic process may thus include all or a combination of these features. For instance, lack of awareness and conscious intent may characterize habitual hand washing, while the difficulty to resist (lack of control) is a defining aspect of habitual snacking.

Habit automaticity is evident in minimal awareness, in the sense that people engage in shallow information processing when they perform a habit. Aarts et al (1997) demonstrated that habits were associated with using heuristic-based decision rules in making travel mode choices. Such decisions are based on using few attributes and thus require minimal mental effort. In another experiment, participants who had strong habits in one particular travel mode tended to ignore information about alternative options (Verplanken et al, 1997, Study 1), and needed less information about the nature of unknown travel mode choice situations before making choices (Verplanken et al, 1997, Study 2). Repeated exposure to stimuli also renders people insensitive to perceiving changes in the stimulus environment (Fazio et al, 2000). Taken together, strong habit individuals have a "tunnel vision" in that they are less interested in and attentive to information about available options and the context in which their habits are executed.

2.3 Context Cuing

The third pillar of habit relates to the context in which habits are performed and the process of

eliciting a habitual response. Habits are intrinsically tied to the performance context. Behaviors such as snacking, exercising, hand washing, or purchasing food are typically performed at the same place and at the same time (Wood et al, 2002, 2005). In the behaviorist tradition a large body of knowledge has been built on how habits form. Paramount to habit formation is the systematic pairing of a cue, a response, and reinforcement. Operant conditioning forges the propensity to respond automatically to specific cues in a behavioral context. Habit formation and maintenance can thus only be expected to occur if performance contexts are stable, i.e., if the same cues reappear in the same fashion every time an individual is engaged in that context.

Wood and Neal (2007) suggested that habit cuing may occur in different fashions. A habitual response may be elicited by direct cuing. According to these authors, repeated coactivation of responses and contexts create associative links in memory. Context cues may activate those links and thus initiate the habitual response. Wood and Neal (2007) suggest a second, "hot," form of cuing in which the reward value of the response is conditioned into context cues. This was labeled motivated cuing. In this case the habitual response to a cue has a history of incentive conditioning, which empowers context cues with signaling reward.

It is important to note that cues may involve a wide spectrum of variants, including location, time, the presence of particular people, or internal states such as hunger or mood (e.g., Ji and Wood, 2007). Likewise, a wide range of reinforcers may be present, including physiological reinforcers such as satiation, social reinforcers such as approval, or efficiency such as time, money, or the absence of the need to deliberate. In order to understand particular habits it is extremely important to have insight into which contexts, cues, responses and reinforcers are at work.

Thisthird pillar of habit provides a bridge to a sociological analysis of habit as behavior that is part of wider socially and culturally defined social practices. For instance, Reckwitz (2002) describes a "practice" as unit of analysis. Practices are interconnected complexes of bodily and mental activities, objects, spaces as well as specific forms of knowledge (including emotions and desires), discourses, and language. For instance, "going out" may be defined as such a practice. In being socially or culturally defined, practices are routinized phenomena. Individuals are the agents that carry them out. Habits may be part of practices, which thus incorporate the context and cues that trigger habitual responses. The habit of binge drinking or eating junk food may thus be part of the practice of going out. Habits may thus be considered a wider and socially meaningful perspective.

3 Varieties of Habit

Although all habits share the features that were discussed as the three pillars of habit, i.e., frequent occurrence, automaticity, and context cuing, a wide variety of habits exist across the spectrum of health behaviors. In this section, I address the question where habits are located, levels of construal, and introduce mental habits.

3.1 The Location of a Habit

When we move away from simple habits such as nail biting or whistling to the behaviors that are of interest in behavioral medicine, we deal with complex, multi-layered, and multi-faceted behaviors. For instance, exercising includes decision-making and planning, preparation, and a sequence of behaviors when exercising is executed. Unhealthy snacking may start with purchasing unhealthy food items, may be embedded in other activities such as travelling or work, and may involve a mental component in the form of negative self-thinking or low self-esteem (Verplanken et al, 2005). It may thus often be difficult to locate where exactly the habit resides. In the case of exercising, the key habitual moment might be the moment of

decision-making, whereas the exercising behaviors may be conducted and enjoyed mindfully (Verplanken and Melkevik, 2008). In the unhealthy snacking example it may be the impulsive purchasing of snacks which is crucial. In order to investigate a particular habit, it is thus necessary to analyze which part of the chain of events is the critical habitual part.

3.2 General Versus Specific Habits

Vallacher and Wegner (1987) contended that behaviors can be identified at various levels, ranging from a concrete and mechanistic level (e.g., eating a chocolate bar) to a more abstract and comprehensive level (e.g., high-calorie snacking). We thus may identify habits at different levels of construal. A particular habit may be innocent when it operates at a specific lower level, but harmful when it operates at higher levels. For example, suppose person A likes chocolate, frequently eats a chocolate bar, but has a perfectly healthy diet otherwise. Person B also frequently eats chocolate bars, but has a habit of eating sweet and fatty foods whenever he can. Person A simply likes chocolate. Person B's chocolate eating is thus part of a higher order habit, which designates an unhealthy and perhaps dangerous lifestyle. The level of construal is also important from a public health perspective, as higher order unhealthy habits add up to unhealthy populations.

3.3 Mental Habits

The habit concept may not have to be confined to overt behaviors, but is applicable to mental processes as well, in particular frequent recurrent thinking (Watkins, 2008). Thoughts that occur frequently and are elicited automatically in response to specific cues may thus qualify as a mental habit. In a comprehensive research program, Verplanken et al (2007) investigated negative self-thinking as mental habit. In these studies, the habitual quality of negative self-thinking was pitted against the content of such thinking. Having negative self-thoughts every now and then is part of a healthy mental life, e.g., being self-critical at times, learning from past mistakes, or being aware of one's weaknesses. However, when negative self-thoughts occur frequently and automatically they may become dysfunctional. Verplanken et al (2007) indeed found that the mental habit component of negative self-thinking accounted for unique variance in explicit and implicit measures of self-esteem. Similar results were found in a longitudinal study over 9 months on anxiety and depression, even after controlling for traditional vulnerability measures such as previous symptoms, dysfunctional attitudes, and negative life events. Habitual negative thinking has also been found important in the more specific area of body image. Dissatisfied body image thinking is an increasing problem and is particularly associated with eating disturbances among young people in Western cultures (e.g., Thompson and Smolak, 2001). In a sample of 12–15 years old adolescents it was found that habitual negative thinking about appearance accounted for variance in self-esteem and eating disturbance propensity over and above the contributions of gender, age, and body dissatisfaction (Verplanken and Velsvik, 2008; see also Verplanken and Tangelder, 2010). In all, a mental habit seems a viable concept, which shows satisfactory construct and discriminant validity.

4 Breaking and Creating Habit

An important reason to study habit is the importance of the concept for behavior change. It is almost tautological to say that habits are difficult to change. However, this requires some more detailed scrutiny. I will briefly follow two strands of thought, on breaking old habits and creating new ones, respectively (see Verplanken and Wood, 2006, for a more detailed account), and bring these together by discussing the concept of habit discontinuity.

4.1 Breaking Habit

Frequency per se needs not be a barrier for behavioral change. What makes habits difficult to change is above all related to the other two pillars: automaticity and context cuing. This is particularly problematic when information-based interventions such as mass media campaigns are employed as a vehicle for change. As I explained in the beginning of this chapter, habit fosters conditions of minimal awareness and tunnel vision. Clearly, this does not bode well for the effectiveness of information campaigns. Even if campaigns change attitudes and intentions, the finding that habits attenuate the link between intentions and behavior suggests that investing in interventions that aim for attitude and motivation change is not an effective strategy. Another reason why informational campaigns may not easily affect habits is that these do not change the context cuing effect. The power of contextual cuing suggests that habituation shifts some control over behavior from an internal locus (e.g., an individual's willpower) to the external environment, and thus beyond the reach of information campaigns. Behavior change strategies that include modifications of the performance context, such as infrastructural changes, are thus deemed more effective.

4.2 Creating Habit

The features that make unhealthy habits resistant to change are the very features we would like healthy behaviors to acquire. Intervention planning often designates behavior change as the principle objective. However, although behavior change is of course an important milestone, habituation of the new behavior might be adopted as an intervention goal as well. Principles that govern habituation, such as reinforcement schedules, have been extensively investigated in the behaviorist tradition (e.g., Hull, 1943). These principles may thus be taken into account when designing behavior change interventions. Lally et al (2010) demonstrated how habituation might be monitored. She asked participants to adopt a new, healthy, daily behavior, and obtained measures of habit strength every day over a period of 12 weeks. The habituation curves that resulted for each participant provided information on features such as the speed of habituation and degree of automaticity of the behavior.

4.3 Habit Discontinuities

Opportunities to break existing habits and build new ones may come together when people undergo naturally occurring changes that may, at least temporarily, disrupt existing routines (Verplanken and Wood, 2006). Such discontinuities may occur, for instance, because of moving house, starting a family, changing jobs, or retirement. Discontinuities may also arise from external changes, such as a period of economic downturn or new laws and regulations such as the smoking ban or congestion tax. In terms of our habit model, such discontinuities imply that habitual cue-response links are broken and the individual has to re-negotiate new solutions. During such windows of opportunity, individuals may be more open to information that assists or persuades them to find new solutions. Although this may seem an obvious suggestion, there has been little systematic empirical work to test this *habit discontinuity hypothesis* (Verplanken and Wood, 2006; Verplanken et al, 2008). Some studies provided circumstantial evidence in line with this hypothesis. Bamberg (2006) successfully delivered an intervention to promote the use of public transport after participants had moved residence. Verplanken et al (2008) found that university employees who had recently moved *and* were environmentally concerned commuted less frequently by car compared to those who were also environmentally concerned but had not recently moved. However, the habit discontinuity hypothesis awaits more rigorous testing.

5 The Measurement of Habit

In their seminal book *The Psychology of Attitudes*, Eagly and Chaiken (1993) wrote: "... the role of habit *per se* remains indeterminate (...) because of the difficulty of designing adequate measures of habit" (p. 181). The domain of habit seemed indeed to have stalled for a very long time. A major reason may be that habit has always been equated with behavioral frequency. As the measurement of a construct is intrinsically linked to the theory one has about the construct, the lack of progress in measuring habit strength can be traced back to the theoretical and conceptual problems that were inherited from the behaviorist school. However, to date a variety of measures are available, each of which has its strengths and weaknesses.

5.1 Frequency of Past Behavior

The most prevalent operationalization of habit is measures of self-reported frequency of past behavior. These may take the form of asking respondents how often they performed a particular behavior during some specified time frame. Responses are usually given on a bipolar response scale, for instance, a five-point scale ranging from *never* to *always*. The most obvious problem of this measure is that one-item measures are notoriously unreliable. There is of course an accuracy problem if one wants to assess objective frequency, rather than the experience of frequency. This particularly holds if such judgments rely on individuals' episodic memory, which is not likely to store traces of frequently occurring behavioral episodes. The most serious concern, however, is the conceptual problem that frequent behavior is not necessarily habitual. In other words, the measure only captures one of the three pillars of habit.

5.2 Past Behavioral Frequency and Habit Combined

Some authors assessed habit by adding statements such as "by force of habit" or "without awareness" (e.g., Mittal, 1988; Wittenbraker et al, 1983) to a self-reported frequency of past behavioral item (e.g. How often did you use your seatbelt during the past month by force of habit?). However, this measure should be disqualified due to its double-barreled nature: respondents are asked to provide one response to two different questions, i.e., on frequency and the degree to which they performed the behavior by force of habit.

5.3 Response Frequency Measure

The response frequency measure of habit was developed to assess habit strength in multiple choice contexts (e.g. Verplanken et al, 1994). Participants are presented with a series of situations and are asked to make a choice from multiple alternatives in each of these situations. For instance, in the context of travel mode choices participants were presented with situations such as going to the supermarket or visiting a friend in town, and a range of travel mode options as choice alternatives. The task is to be conducted under time pressure. The invariance of choices across situations (e.g., the number of times the car is chosen in a travel mode context) was then taken as an assessment of habit strength. The measure thus capitalizes on the automaticity component of habit, i.e., the assumption that under time pressure schematic or script-based responses will be elicited. Although the response frequency measure shows good test–retest reliability (Aarts, 1996) as well as construct and discriminant validity (e.g., Verplanken et al, 1998), it has some practical and conceptual limitations. For instance, new sets of situations need to be developed and tested in each new research context. The required time pressure prevents the measure to be used in self-paced questionnaires. Finally, the measure may be confounded with intentions or preferences.

5.4 Habit as a Reason for Behavior

Knussen and colleagues presented participants with lists of pre-tested reasons why one would recycle household waste (Knussen et al, 2004).

One of the alternatives was "because it is a habit." This measure rests on the assumption that people have insight into the reasons behind their behavior. Although this is not an unreasonable assumption in itself, it is questionable whether habit can qualify as a *reason* for behavior. In addition, the one-item format of the measure renders it potentially unreliable, and one may question whether people have unanimous interpretations of the concept of habit. For instance, habit may indeed be interpreted as repetitive and automatic behavior, but it is also used to refer to "bad" behaviors. This measure thus requires further testing and validation.

5.5 A Context-Focused Habit Measure

Wood and colleagues introduced a measure of habit strength that combines two pillars of habit: the frequency of past behavior and the stability of the context in which the habit occurs (e.g., Wood et al, 2005). The frequency aspect is measured as has traditionally been done by a one-item measure asking participants how often they performed the behavior. As an assessment of context stability participants are asked to indicate the extent to which they perform the behavior under similar circumstances. This may be operationalized by a single item (e.g. Danner et al, 2008) or by multiple items, such as items referring to location and time (e.g. Ji and Wood, 2007; Wood et al, 2005). The frequency item is then multiplied with the context item(s) to form (a) measure(s) of habit strength. By combining frequency with context stability, this measure is an improvement of the one-item frequency measure, although it still has potential reliability problems.

5.6 Self-Report Habit Index

Verplanken and Orbell (2003) developed the Self-Report Habit Index (SRHI). The SRHI is a generic 12-item instrument, which assesses the experience of frequency and automaticity of behavior, i.e., two of the three pillars of habit. The experience of automaticity is broken down into a number of facets, i.e., the lack of awareness and conscious intent, mental efficiency, and difficulty to control (Bargh, 1994). In addition, the SRHI includes the experience of behavior being self-descriptive. The instrument is presented in Table 6.1. Verplanken and Orbell (2003) validated the SRHI in a number of studies and domains. For instance, the SRHI discriminates between repetitive behaviors that are executed weekly versus repetitive behaviors that are executed daily. Verplanken (2006, Study 3) showed that the measure discriminates between repetitive behavior that is executed in an automatic versus deliberative fashion (e.g., when behavior is easy versus difficult).

Table 6.1 The Self-Report Habit Index (Verplanken and Orbell, 2003)

Behavior X is something .....
1. I do frequently.
2. I do automatically.
3. I do without having to consciously remember.
4. That makes me feel weird if I do not do it.
5. I do without thinking.
6. That would require effort not to do it.
7. That belongs to my (daily, weekly, monthly) routine.
8. I start doing before I realize I am doing it.
9. I would find hard not to do.
10. I have no need to think about doing.
11. That is typically "me."
12. I have been doing for a long time.

Note: Five- or seven-point response scales anchored with "strongly disagree" and "strongly agree" may be used. From Verplanken and Orbell (2003, p. 1329). Copyright 2003 by John Wiley & Sons. Permission for reproduction should be sought.

To date the SRHI has been successfully used in a large variety of domains, such as food or snack consumption (Brug et al, 2006; Conner et al, 2007; de Bruijn et al, 2007; Honkanen et al, 2005; Verplanken et al, 2005), consumption of beverages (Kremers et al, 2007), food safety practices (Hinsz et al, 2007), physical activity (Chatzisarantis and Hagger, 2007; Verplanken and Melkevik, 2008), weight loss (Lally, 2007), Internet use (Lintvedt et al, 2008), and social behavior (Verplanken, 2004). The

12 items usually show high internal reliabilities (> 0.90), and satisfactory test–retest reliabilities of 0.71 over 1 week for unhealthy snacking (e.g., Verplanken, 2006) and 0.87 over 1 month for exercising (Verplanken and Melkevik, 2008) have been obtained. Importantly, Conner et al (2007) showed that the SRHI moderated the relationships between implicit measures of attitude and behavior, while no moderation was found in the relationship between explicit measures and behavior. These results validate the relationship between the SRHI and automaticity.

5.7 Conclusions

Which is the best measure? First, the availability of a set of different habit measures should be celebrated as an important step forward (Ajzen and Fishbein, 2005). The conceptual problem of the one-item self-reported past behavioral frequency measure (i.e., the fact that frequency is a necessary but not sufficient feature of habit), and potential reliability problems, renders this as an inadequate measure of habit. The combined one-item self-reported frequency and self-reported habit measure should not be used due to being double-barrelled. The habit-as-reason measure awaits further testing and validation. As for the other measures, each seems to capture some unique aspect of habit. Selecting the best alternative measure depends on the researcher's goal and the type of behavior under study. Different measures may also be used in conjunction with each other. The context-focused habit measure captures an important situational aspect of habitual behavior, i.e., context stability, in addition to past behavioral frequency. The response frequency measure (if properly applied) focuses on habits that are executed in multiple-choice contexts. The SRHI captures the experience of both frequency and automaticity and seems the most solid measure in terms of reliability and validity. In addition, this measure is generic and thus needs no adaptations or pilot testing for each new domain and can easily be used in questionnaires.

6 General Conclusions

Since the decline of behaviorism, habit has long been a forgotten concept in the social and behavioral sciences. This is the case in spite of the fact that many unhealthy behaviors are strongly habitual and that we would like to see healthy behaviors become habitual. The focus on deliberative thinking and motivated behavior such as represented by the prevalent socio-cognitive models may now be supplemented by the notion that these factors may wear off over time and be replaced by the more automatic and context-driven powers of habit (Dawes, 1998). The habit concept has much to offer to those who want to understand why people behave unhealthily, or why it remains such a challenge to establish healthier lifestyles. Researchers have now a choice of instruments at their disposal for measuring and monitoring habit strength. In all, habit theory seems a valuable contribution to the behavioral medicine field.

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