

## Residual Effects of Past on Later Behavior: Habituation and Reasoned Action Perspectives

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*The frequency with which a behavior has been performed in the past is found to account for variance in later behavior independent of intentions. This is often taken as evidence for habituation of behavior and as complementing the reasoned mode of operation assumed by such models as the theory of planned behavior. In this article, I question the idea that the residual effect of past on later behavior can be attributed to habituation. The habituation perspective cannot account for residual effects in the prediction of low-opportunity behaviors performed in unstable contexts, no accepted independent measure of habit is available, and empirical tests of the habituation hypothesis have so far met with little success. A review of existing evidence suggests that the residual impact of past behavior is attenuated when measures of intention and behavior are compatible and vanishes when intentions are strong and well formed, expectations are realistic, and specific plans for intention implementation have been developed.*

Past behavior, people are often told, is the best predictor of future behavior. Human beings are said to be creatures of habit; they tend to persist in doing what they have become accustomed to. It is well-known that, with repeated performance, many behaviors become routine to the point where they can be executed with minimal conscious control (Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977). For most of us, walking, driving a car, brushing our teeth, getting dressed, and the myriad of other activities we perform every day become routines that do not require much focused attention. Even complex behaviors that are initially guided by explicit intentions and self-regulation can, with sufficient repetition and practice, habituate and become more or less automatic in the sense that they are performed quickly, outside awareness, with minimal attention, and in parallel with other activities (Bargh, 1996; Ouellette & Wood, 1998; Posner & Snyder, 1975).

Faced with uneven and generally modest success in attempts to account for human social behavior, it is tempting to look with envy at the reputed ability of prior behavior to predict future action. At the very least, we might want to incorporate past behavior as one of the major predictors in our theories. This possi-

bility has often been examined in the context of the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) or its successor, the theory of planned behavior (Ajzen, 1988, 1991). Briefly, according to the theory of planned behavior, human action is guided by three kinds of considerations: beliefs about the likely consequences of the behavior (*behavioral beliefs*), beliefs about the normative expectations of others (*normative beliefs*), and beliefs about the presence of factors that may facilitate or impede performance of the behavior (*control beliefs*). In their respective aggregates, behavioral beliefs produce a favorable or unfavorable attitude toward the behavior, normative beliefs result in perceived social pressure or subjective norm, and control beliefs give rise to perceived behavioral control. In combination, attitude toward the behavior, subjective norm, and perception of behavioral control lead to the formation of a behavioral intention. As a general rule, the more favorable the attitude and subjective norm and the greater the perceived control, the stronger should be the person's intention to perform the behavior in question. Finally, given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions when the opportunity arises. Intention is thus assumed to be the immediate antecedent of behavior. However, because many behaviors pose difficulties of execution that may limit volitional control, it is useful to consider perceived behavioral control in addition to intention. To the extent that perceived behavioral control is veridical, it can serve as a proxy for actual control and contribute to the prediction of the behavior in question.

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It is an undisputed fact that the frequency with which a behavior has been performed in the past can be a good predictor of later action. Of greater importance for my purposes, however, is the finding that the relation between prior and later behavior is not fully mediated by the constructs that serve as predictors in the theories of reasoned action or planned behavior (Ajzen, 1991; Albarracín, Johnson, Fishbein, & Meullerleile, 2001; Bagozzi, 1981; Bentler & Speckart, 1979; Fredricks & Dossett, 1983; see Conner & Armitage, 1998, and Ouellette & Wood, 1998, for reviews). A study of exercise behavior (Norman & Smith, 1995) can serve as an illustration. Undergraduate college students completed a theory of planned behavior questionnaire on two occasions, 6 months apart. Frequency of exercise reported on the second occasion (later behavior) was regressed on the variables contained in the theory of planned behavior and on exercise frequency reported on the first survey (prior behavior). The results of a hierarchical regression analysis revealed a significant ( $\beta = .32, p < .01$ ) residual effect of prior exercise on later exercise. Without the consideration of past exercise, the theory of planned behavior variables accounted for 41% of the variance in exercise behavior, with both intentions and perceptions of behavioral control making significant contributions to the prediction. However, adding past exercise behavior to the prediction equation raised the proportion of explained variance to 54%, a highly significant increase.

Findings of this kind have been reported in a variety of behavioral domains (see Conner & Armitage, 1998; Ouellette & Wood, 1998), and they appear inconsistent with the theory of planned behavior. According to the theory, measures of intention and perceived behavioral control should fully mediate the effects of earlier experiences on later action. The finding that past behavior has a significant residual impact on later behavior contradicts this expectation. In this article, I consider several alternative explanations for the residual effect of prior on later behavior and examine these explanations in light of published research.

### **Routinization of Social Behavior**

#### **Habituation Versus Reasoned Action**

One way to look at the process of routinization is to assume that repeated performance of a behavior produces habituation. When a habit develops, behavior is said to come under the control of stimulus cues (Aarts, Verplanken, & van Knippenberg, 1998; Ouellette & Wood, 1998; Ronis, Yates, & Kirscht, 1989). On future occasions, presence in a similar situation is sufficient to trigger the automatic response sequence. A stable stimulus context is therefore crucial for habitual be-

havior to occur, and *habit* has indeed been defined as the tendency to repeat past behavior in a stable context (Ouellette & Wood, 1998).

Routinization of behavior, however, is also consistent with a reasoned action perspective. The theory of planned behavior does not propose that individuals review their behavioral, normative, and control beliefs prior to every enactment of a frequently performed behavior. Instead, attitudes and intentions—once formed and well-established—are assumed to be activated automatically and to guide behavior without the necessity of conscious supervision (Ajzen & Fishbein, 2000).<sup>1</sup> However, whereas the habituation perspective asserts that routinized behavior is under the control of stimulus cues, the reasoned action perspective postulates that such behavior is guided by automatically activated or spontaneous attitudes and intentions. The distinction between routinization as reflecting habit formation versus formation of spontaneous attitudes and intentions is reminiscent of the exchanges between behaviorists who adhered to Hull's (1943) reinforcement theory of learning and those who supported Tolman's (1938) purposive behaviorism. Like the modern habituation perspective, Hull and his disciples thought of learning in terms of automatic habits established through reinforcement. In contrast, and similar to the reasoned action perspective of routinized behavior I advocate here, Tolman and his followers preferred to think of learning in terms of mental processes, cognitive events, and the formation of tacit hypotheses and expectations. The implications of the two perspectives, however, are quite similar: So long as the context remains relatively unchanged, routinized behavior is performed in a largely automatic fashion with minimal conscious control.

#### **Deliberate Versus Spontaneous Modes of Operation**

Currently popular dual-mode processing models of human judgment, attitude change, and the attitude-behavior relation (Fazio, 1990; Petty & Cacioppo, 1986; see Chaiken & Trope, 1999; Smith & DeCoster, 2000) imply that behavior can be generated in one of two ways: It can be guided by conscious deliberation or by automatic reliance on well-established routines (cf. Bargh, 1989, 1994; Eagly & Chaiken, 1993; Ouellette

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<sup>1</sup>Unlike implicit cognitive responses (Greenwald & Banaji, 1995), which are said to be unavailable to self-report or introspection and that can be unrelated to explicit responses (Greenwald, McGhee, & Schwartz, 1998; Kawakami & Dovidio, 2001), the spontaneous attitudes and intentions in the reasoned action perspective are assumed to be accessible in memory and equivalent to explicitly expressed attitudes and intentions. This is not to deny the importance of implicit attitudes and intentions. However, the reasoned action approach I advocate here deals only with attitudes and intentions that are available to introspection, whether effortfully brought to mind or invoked in a more automatic or spontaneous manner.

& Wood, 1998).<sup>2</sup> The theory of planned behavior is consistent with this approach. Novel behaviors and unfamiliar situations are said to evoke careful deliberation and controlled production of beliefs, attitudes, and intentions that direct subsequent behavior. In contrast, routine behaviors are assumed to be performed spontaneously and to be guided by automatically activated attitudes and intentions (see Ajzen & Fishbein, 2000; Ajzen & Sexton, 1999).

There is abundant evidence to show that attitudes, intentions, and simple acts can indeed be activated automatically (Bargh & Chartrand, 1999; Bargh, Chen, & Burrows, 1996; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Gollwitzer, 1999). However, most routines in everyday life, whether going to the movies or to a restaurant, are best described as *semiautomatic response patterns* that involve controlled as well as autonomous phases (Abelson, 1981; Bargh, 1989; Logan & Cowan, 1984; Wegner & Bargh, 1998). Moreover, even in the case of controlled activities, the amount of deliberation varies depending on motivation and cognitive capacity. At one end of the information processing continuum are novel or rarely performed behaviors that require deliberation, formation of an explicit intention, and conscious monitoring for their execution. At the other extreme are familiar behaviors that have become automatic as a result of frequent performance and are now guided by spontaneous attitudes and intentions. From a reasoned action perspective, at both ends of the continuum behavior is controlled by such cognitive factors as beliefs, attitudes, and intentions—effortfully at the controlled end and automatically at the spontaneous end. This view contrasts with the habituation perspective that assumes that routinized behavior is under the direct control of stimulus cues.

### Is Frequency of Past Behavior a Valid Indicator of Habit Strength?

According to the habituation perspective, the more frequently a behavior has been performed in the past, the more it has come under stimulus control, that is, the stronger the habit. The tendency for social psychologists to identify past behavior frequency with habit strength can perhaps be traced to Triandis's (1977) model of interpersonal behavior. According to this model, the probability that an act will be performed is a function of intentions and habits (moderated by facilitating conditions), and habit strength "is measured by the number of times the act has already been performed by the person" (Triandis, 1977, p. 10). Thus,

<sup>2</sup>Most dual-mode processing models assume that motivation and cognitive capacity determine whether the deliberative or spontaneous mode dominates. In contrast, the habituation perspective seems to assume that the mode of operation employed is a function of the frequency with which the behavior has been performed in the past (in a stable context).

the strength of a habit is assumed to grow with repeated performance of the behavior, and its effect on later behavior increases accordingly.

In contrast, the reasoned action perspective sees no necessary link between frequency of past behavior and its routinization. Just because a behavior has been performed many times does not, by itself, prove habituation. 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. Whether a frequently performed behavior has or has not habituated is an empirical question, and to answer it we need an independent and validated measure of habit.

**Automaticity in motor behaviors versus automatic decisions.** Another problem of equating habit strength with frequency of past behavior is that this practice fails to distinguish between automaticity in the execution of a behavior and automaticity in the decision to take the action in question. A behavioral intention is the cognitive representation of a decision to perform a given behavior. When the same decision is made repeatedly, the intention becomes spontaneous; it is readily accessible in memory and is activated automatically without conscious intervention. However, even when an intention is constructed mindfully and with careful deliberation, the subsequent behavior may be performed in largely an automatic fashion. Thus, a person may deliberate at length before settling on a choice in a restaurant, but once the decision is made, consumption of the meal may proceed automatically, without much conscious effort.

The habit construct, as developed in psychology by learning theorists (e.g., Hull, 1943), was originally applied to relatively simple behaviors by lower animals, such as a rat running through a T-maze. The rat's tendency to make a left turn at the junction can be strengthened by placing food at the end of the maze's left arm, thus reinforcing the left-turn response. It is the decision to turn left that is reinforced in the T-maze, not the mechanics involved in running along the pathway to the goal because these mechanics are the same whether the rat turns left or right. A large number of reinforced trials produces a strong habit to turn left, as indicated by a high probability (relative frequency) of the left-turn response. However, it should be clear that this learning process also produces at the same time a low probability of a turn to the right. That is, the rat develops not only a strong habit to turn left but also a strong habit not to turn right. If we recorded the frequency with which the rat turns right, a low frequency would not indicate a weak habit. Instead, a weak habit would be indicated by a pattern of behavior that shows no clear preference between the left and right options.

This discussion shows that frequency of past behavior may not provide a valid indication of habit strength. First, the fact that a behavior has been performed many times is no guarantee that it has habituated. Second, even if habituation occurred, researchers cannot be sure how habit strength is related to performance frequency. We would expect skill level to increase with performance, but if we want to predict the course of action people will take, that is, which of several alternatives they will pursue, then frequency of past behavior may not be a useful indicator of the relevant habit. Drivers who always get in their cars, start their engines, and begin to drive may develop a strong habit to perform this sequence of events. The fact that they exhibit a low frequency of wearing a seat belt does not indicate a weak habit (cf. Mittal, 1988). In a decision-making context, therefore, habit strength may not be directly proportional to frequency of past behavior. Instead, it may exhibit a U-shaped function such that habit strength rises when the frequency of a chosen alternative increases as well as when the frequency of the chosen alternative decreases.

### **Can Habit Explain the Correlation Between Prior and Later Behavior?**

Past behavior, even when it has been frequently performed, does not directly control performance of the behavior on future occasions. Instead, investigators have proposed that the strong and consistent relation between past and later behavior is due to the process of habituation (e.g., Aarts et al., 1998; Bagozzi, 1981; Bentler & Speckart, 1979; Ouellette & Wood, 1998). With repeated performance, a habit is assumed to develop, and the habitual behavior is triggered automatically in the presence of controlling stimulus events.

Strictly speaking, the observed correlation between frequency of prior and later behavior is no more (or less) than an indication that the behavior in question is stable over time. In the absence of an independent measure of the habit construct, using habit to explain the relation between prior and later behavior involves circular reasoning: One infers the existence of a habit from the behavior's temporal stability and then uses the inferred construct to explain the observed phenomenon. Moreover, reasoned as well as automatic processes can account for temporal stability of behavior. Thus, behavioral stability may be attributable not to habituation but to the influence of cognitive and motivational factors that remain unchanged and are present every time the behavior is observed (Ajzen, 1991; Eagly & Chaiken, 1993).<sup>3</sup> In the theory of planned behavior, the crucial factors of interest are intentions and perceptions of

behavioral control. So long as these factors remain unchanged, the behavior should also remain the same.

### **Can Habit Explain the Residual Impact of Prior on Later Behavior?**

Like the behavior's temporal stability, the residual impact of past behavior on later behavior has also been attributed to the process of habituation or routinization. When the behavior habituates, it presumably comes under the direct control of stimulus cues and, more important, intentions and other cognitive factors are said to lose some of their predictive validity (Aarts et al., 1998; Ouellette & Wood, 1998). As a result, past behavior frequency acquires a residual relation to later behavior. However, the proposition that habit, as indicated by frequency of past behavior in a stable context, can explain the residual effect of prior on later behavior faces a number of difficulties.

1. *Residual effects of past on later behavior are not evidence of habit.* The observed residual impact of prior behavior on later behavior has often been taken as prima facie evidence for the operation of habit (e.g., Bentler & Speckart, 1979; see Conner & Armitage, 1998). However, just as behavioral stability does not provide evidence for habituation, the residual effect of past behavior on later behavior, unmediated by intention, is also not sufficient to prove the operation of habit. Any factor that influenced behavior in the past and that continues to exert an effect at present could explain the residual effect. Indeed, there is no shortage of candidates. Questioning the sufficiency of the theory of planned behavior, investigators have suggested a variety of additional determinants of intentions and behavior, including personal or moral norms (e.g., Gorsuch & Ortberg, 1983), anticipated regret (e.g., Richard, van der Pligt, & de Vries, 1995), desire to attain a behavioral goal (Perugini & Bagozzi, 2001), self-identity (e.g., Sparks & Guthrie, 1998), and affect (Manstead & Parker, 1995). If added to the model, these factors—and many others—could, in theory, mediate the effect of prior behavior on later behavior. For example, it is possible that repeated contributions to the American Cancer Society produce in an actor a sense of commitment to the cause of fighting cancer. This commitment may then be responsible for continued contributions on future occasions, over and above intentions. To show that habit is the crucial mediating factor, it is not sufficient to point to the residual link between frequency of prior behavior and later behavior. Instead, evidence needs to be provided that is independent of the behavior that habit is meant to explain.

2. *Low-opportunity behaviors have residual effects.* Because habituation requires repeated enactment of a behavior, it applies only to high-opportunity activities

<sup>3</sup>Temporal stability of behavior may also be in part a function of self-perception processes whereby people infer their attitudes from their past behavior and these attitudes then influence their present intentions and actions (Albarracín & Wyer, 2000; Zanna, Olson, & Fazio, 1981).

that can be performed repeatedly. However, the residual effect of past on later behavior has been reported not only with respect to behaviors of this kind but also with respect to low-opportunity behaviors. In a study of extra-relationship involvement, for example, the residual effect of past on later infidelities was found to be strong and significant (Drake & McCabe, 2000). Intentions and perceptions of behavioral control together accounted for 22% of the variance in frequency of extra-relationship involvements over a 6-month period. By comparison, past frequency of such involvements by itself explained 56% of the variance, and it significantly improved the prediction when added to the theory of planned behavior. Participants reported engaging in extra-relationship affairs with relatively low frequency, and it would therefore be difficult to argue that the residual effect was due to habituation. Residual effects have also been reported for other low-opportunity behaviors such as searching for employment (Van Ryn & Vinokur, 1992) and attending medical checkups (Norman & Conner, 1996).

In conclusion, attempts to attribute residual effects of past behavior to habituation face serious difficulties. Because no independent indicators of habit strength are readily available, investigators have had to rely on measures of past behavior frequency. However, it is not clear that past behavior is necessarily a measure of habit. It may reflect the operation of other factors that could account equally well for its residual effect on later behavior. In addition, the hypothesized process of habituation cannot account for residual effects in the prediction of low-opportunity behaviors.

### **A Reasoned Action Approach to the Residual Effect of Prior on Later Behavior**

As long as the stimulus situation remains stable and intentions remain unchanged, there is no reason for behavior to change, and past behavior should be a good predictor of later behavior. What requires explanation, however, is why and how past behavior acquires a direct, residual impact on later behavior, independent of intentions and perceptions of behavioral control. In a stable context, one would expect intentions as well as past behavior to be good predictors of later behavior, and there is no reason to anticipate that past behavior will account for variance not explained by intentions. The habituation perspective attributes the residual effect to a process of habituation in which control over the behavior shifts from cognitive factors to environmental cues, but this view fails to describe the changes in intentions or behavior that would be required to produce the observed residual effects. Why—if the situation remains stable—should intentions lose their predictive validity?

The most likely explanation from a reasoned action perspective is that intentions have changed and that the newly formed intentions are relatively poor predictors of later behavior. There is general agreement that even performance of a high-opportunity behavior is at least initially controlled by deliberate intentions. If the stimulus situation, as well as the cognitive determinants of a repeated behavior, remained stable over time, there would be no reason for intentions or behavior to change. Under such conditions, current intentions would be perfectly consistent with past behavior, and they would be sufficient to predict later action. The presence of a residual impact of past on later behavior implies that something must have changed: Later behavior is still consistent with past behavior, but it is no longer completely in line with intentions. Assuming that the context has remained the same, the only possible explanation is that intentions have changed and that the new intentions are less than perfect predictors of later behavior.

Several reasons can be suggested as to why people may fail to carry out newly formed intentions (see Ajzen, 1985). Of limited theoretical interest is the possibility that they simply forget to enact the new intention. Thus, people who form the intention to put on a seat belt after driving without one for many years may sometimes, “by force of habit,” forget to enact their intentions until they have become accustomed to the new behavior. There is evidence to show that difficulties of this kind can be overcome by forming an implementation intention, that is, an explicit plan as to exactly when and how the behavior is to be enacted (cf. Gollwitzer, 1999). I return to the question of implementation intentions later in this article.

A conceptually more interesting possibility is that the failure to act in accordance with a newly formed intention is due to factors related to the predictors in the theory of planned behavior. Among the possible reasons are early indications of detrimental unanticipated consequences, negative reactions from important referents, underestimation of the behavior’s difficulty, and lack of resolve or willpower. “Bad habits” are often attributed to task difficulty or lack of resolve. Thus, many smokers intend to quit but fail to carry out their intentions, and people who intend to maintain a diet to lose weight often have great difficulty doing so. It should be noted, however, that these failures do not escape the person’s attention. In fact, they are generally accompanied by a good deal of anguish and regret. It would be difficult to argue that, in these instances, the residual impact of past on later behavior represents the operation of an automatic habit. People are conscious of their routine response tendencies—that is, their bad habits—and their behavior exhibits none of the hallmarks of automaticity: It is not performed quickly, outside awareness, with minimal attention, and in parallel with other activities.

In sum, forgetting, lack of resolve, unanticipated detrimental consequences, and other difficulties may account for people's failure to carry out their intentions and may thus help explain the residual impact of prior on later behavior. However, this does not provide evidence for habituation of behavior because the failure to carry out an intention is often a conscious process that, far from proceeding automatically, can greatly interfere with other activities.

### **Empirical Tests of the Habituation Perspective**

As noted, direct tests of the hypothesis that habit mediates the relation between prior and later behavior frequency require an independent measure of habit strength. However, lacking such a measure, it is still possible to derive certain implications from the habituation hypothesis that can be submitted to empirical test. Thus, it has been suggested that if habit is an active influence it should moderate the effect of intentions on behavior. When behavior has come under the direct control of stimulus cues, intentions and other cognitive factors should be relatively unimportant. Under these conditions, frequency of past behavior should be a good predictor of later behavior, but cognitive and motivational factors such as intentions should lose their predictive validity (Aarts et al., 1998; Ouellette & Wood, 1998). This hypothesis has been tested in different ways.

#### **Moderating Effect of Past Behavior Frequency**

One approach was adopted by Verplanken, Aarts, van Knippenberg, and Moonen (1998). In this study, car use during a 7-day period—a high-opportunity behavior—was predicted from intentions to use the car and from frequency of past car use (considered a measure of habit). Using simple slope analysis (Aiken & West, 1991), Verplanken et al. (1998) found a significant interaction between intentions and frequency of past behavior. The relation between intention and later car use was, as predicted, weakest for individuals who had used the car frequently in the past and strongest for individuals at the lower end of past car use. Individuals who reported using the car at an intermediate rate fell in between the other two groups.

The results of Verplanken et al. (1998), however, run counter to a great deal of other available evidence. Whatever else it may signify, the frequency with which a behavior has been performed in the past is a good indication of the amount of direct experience with the behavior, and it is well established that the ability of attitudes and intentions to predict later be-

havior increases with amount of direct past experience (see Fazio & Zanna, 1981). In one of their studies, Fazio & Zanna (1978) used attitudes toward volunteering to participate in psychological research to predict actual volunteering behavior, and the attitude-behavior correlation was found to be strongest for individuals who had participated in a large number of experiments in the past (top third). The attitude-behavior correlation in this group was .42 compared with a correlation of  $-.03$  for individuals who had participated in relatively few experiments in the past (bottom third).

Similar results emerged in a reanalysis of data from a study of class attendance (Ajzen & Madden, 1986). College students' class attendance was recorded over a period of 16 class sessions. After the first 8 sessions, a questionnaire was administered that contained measures of the constructs in the theory of planned behavior. The first 8 sessions thus served as a measure of past behavior and the final 8 sessions as the criterion. Participants were divided into thirds on the basis of their past attendance frequency and correlations were computed between intentions and the frequency of later class attendance separately for each subgroup. Contrary to the findings of Verplanken et al. (1998), the intention-behavior correlation increased with frequency of past attendance, from  $-.21$  in the low-frequency group to  $.14$  in the intermediate frequency group to  $.31$  in the high-frequency group.

The implications of these moderating effects of past behavior frequency are far from clear, however. When dealing with a high-opportunity behavior, such as car use or class attendance, all participants can potentially develop a strong habit. I noted earlier, however, that just as high frequency of past behavior may indicate a strong habit to perform the behavior, low frequency of performance may indicate a strong habit not to perform the behavior or to perform an alternative behavior. It could be argued, therefore, that to examine the effect of habit in terms of the moderating effect of prior behavior it may be necessary to compare high and low performance frequency with moderate frequency. In contrast to high and low frequency, moderate frequency indicates an irregular pattern of behavioral performance and thus, arguably, low habit strength.

This possibility was examined in another reanalysis of the data from the class attendance study described previously (Ajzen & Madden, 1986). Students who revealed patterns of high or low past attendance were compared with those who came to class on an irregular basis (intermediate level of past attendance). Contrary to the revised habit hypothesis, prediction of later behavior from intentions was greater for students who had exhibited consistently high or low attendance in the past ( $r = .44, p < .01$ ) than for students who had attended inconsistently ( $r = .14, ns$ ).

### **Moderating Effects of Behavior Opportunity**

Perhaps a better approach would consider the opportunities people have to perform a given behavior. Frequent opportunities to engage in a behavior in a stable context should produce a strong habit to perform or not to perform the behavior in question. If taken as a measure of habit, past behavior frequency should therefore be a better predictor of high-opportunity as opposed to low-opportunity behaviors. Conversely, intentions should be better predictors of low- as compared to high-opportunity behaviors because the former are presumably not as much under the control of stimulus cues as are the latter.

In a test of these ideas, Ouellette and Wood (1998) performed a meta-analysis of 15 data sets that they classified as dealing with behaviors that can be performed frequently (e.g., seat belt use, coffee drinking, class attendance) or infrequently (e.g., flu shots, blood donation, nuclear protest). To test the relative predictive power of intentions and habits, the investigators regressed behavior on intentions and past behavior simultaneously. The problem with this approach is that it relies on the unproven equation of past behavior frequency with habit strength. Whether we assume that frequently performed behaviors have come under the control of stimulus cues or remain under the control of deliberate processes, we would expect that high-opportunity behaviors will exhibit greater stability over time than low-opportunity behaviors. This expectation follows from well-established principles of psychological measurement. An index of behavioral frequency based on many observations is more reliable than one based on relatively few observations. There is extensive empirical evidence to show that a measure of behavior aggregated over many occasions is more stable over time than one that aggregated over fewer occasions (Epstein, 1979, 1980). The habituation and reasoned action perspectives differ only in their expectations regarding the effect of intentions on later behavior. According to the habituation perspective, intentions should be less accurate predictors of high-opportunity as opposed to low-opportunity behaviors. The reasoned action perspective, in either its deliberate or spontaneous mode, would anticipate little difference.

The results provided no clear support for habituation. As expected on the basis of both perspectives, past behavior frequency was a more accurate predictor for high-opportunity ( $r = .64$ ) than for low-opportunity ( $r = .37$ ) behaviors. However, consistent with the reasoned action perspective, prediction of later behavior from intentions was found to be quite accurate for both types of behavior ( $r = .59$  and  $r = .67$  for high- and low-opportunity behaviors, respectively). Moreover, as the investigators acknowledged (Ouellette & Wood, 1998), it is

impossible to derive definite conclusions from this meta-analysis because the high-opportunity behaviors differed in substance from the low-opportunity behaviors. The two types of behavior may have differed not only in performance opportunities but also in degree of importance, familiarity, or other properties that could account for any observed effects.

### **Moderating Effect of Context Stability**

To address this problem, Ouellette and Wood (1998) reported the results of primary research that was designed to demonstrate the moderating effect of contextual stability on the prediction of a target behavior from intentions and prior behavior. The target behaviors selected were two high-opportunity activities: watching TV and recycling. To estimate stability of the supporting context, participants were asked to list the activities (if any) they always performed prior to engaging in each of these behaviors. On the basis of their responses, they were divided into groups of high and low context stability.

As expected, the results of this investigation revealed a moderating effect of past behavior frequency, but the pattern of findings again did not conform to predictions that would be derived from the habituation perspective. For such high-opportunity behaviors as watching TV and recycling, a stable context should allow strong habits to be formed, whereas an unstable context should not. Consequently, one would expect a high correlation between prior and later behavior for individuals with a stable supporting context and a lower correlation for individuals with an unstable context. The results only partly confirmed these expectations. The correlations between prior recycling and recycling assessed 3 weeks later were .96 in the stable context and .12 in the unstable context. With respect to TV watching, however, there was no appreciable difference ( $r = .59$  and  $r = .56$ , respectively). This latter finding implies either that watching TV does not require a stable context or that the measure of context stability developed in this study lacked construct validity.

Of greater importance, however, were the correlations between intentions and later behavior. The habituation perspective suggests that intentions should be relatively good predictors of later behavior in an unstable context, but in a stable context where the behavior is presumably under direct control of stimulus cues, their predictive validity should decline. The reasoned action perspective would not lead us to expect appreciable differences between stable and unstable contexts. The results of the study were inconclusive. With respect to watching TV, the intention-behavior correlation was higher in the unstable context ( $r = .63$ ) than in the stable context ( $r = .46$ ), although a reanalysis showed that the difference between these two correla-

tions was not significant ( $z = .96$ ). Moreover, there was little difference with respect to recycling. Here, the prediction of later behavior from intentions was actually slightly better in the stable context ( $r = .48$ ) than in the unstable context ( $r = .43$ ). Thus, neither the meta-analysis performed by Ouellette and Wood (1998) nor their primary research provides clear support for habituation as an explanation of the residual impact of prior on later behavior.

### Independent Measures of Habit

The research reviewed thus far offers no convincing evidence to suggest that the residual effect of past on later behavior is due to the operation of habit. The problem, in part, is due to the fact that most efforts to examine this issue have made the arbitrary assumption that habit can be equated with frequency of past behavior. A more appropriate approach would rely on an operationalization of habit that is independent of the behavior it is supposed to explain and predict. Like measures of such constructs as moral obligation or self-identity, an independent measure of habit could be added to the theory of planned behavior, and its role as a mediator between past and later behavior could then be tested.

One attempt to develop an independent measure of habit (Verplanken, Aarts, van Knippenberg, & van Knippenberg, 1994) is based on the idea that the accessibility of a behavioral alternative increases with habit strength, and some research based on this approach has been summarized in a recent review (Aarts et al., 1998).<sup>4</sup> The approach adopted is rooted in the assumption that habits are akin to behavioral scripts (Abelson, 1981), that is, to schemas that embody knowledge of stereotyped event sequences. The measure, developed by Verplanken et al. (1994), confronts respondents with a set of alternative behavioral choices (e.g., different travel modes, such as car, bus, train, bicycle) and asks them to indicate, as quickly as possible, which option they would select in a number of hypothetical situations (e.g., when going to the beach, visiting friends, etc.). Frequency of choice across situations is assumed to indicate habit strength.

The scripted behavior index results in highly reliable scores that tend to correlate well with frequency of past behavior and to act in other ways similar to measures of past behavior (Aarts et al., 1998). However, in his discussion of behavioral scripts, Abelson (1981)

warned against the equation of scripts with habits. He noted that “the difference between a script and a habit is that a script is a knowledge structure, not just a response program” (Abelson, 1981, p. 722). More important, the procedure developed by Arts et al. may have little to do with scripts or habits. Respondents were asked to indicate their intentions or tendencies to perform a particular behavior in different hypothetical situations. Depending on the exact phrasing, the resulting measure is best interpreted as a generalized intention to perform the behavior or as a report of past behavior generalized across situations. The justification for assuming that it may represent something other than a generalized intention or past behavior is the instruction to participants to respond as quickly as possible. It is an empirical question whether time pressure has any effect on responses and, if so, whether the measure obtained under time pressure is in fact an indicator of habit strength.

If researchers disregard the measure’s low face validity, they can use it to examine whether habit, as assessed, can help to account for the residual effect of prior on later behavior. This was done in a study of travel mode choice (Bamberg, Ajzen, & Schmidt, in press) that examined bus use among college students. In support of the theory of planned behavior, students’ use of the bus was predicted quite accurately from intentions and perceptions of behavioral control. However, consistent with past research, addition of prior behavior resulted in a significant increase in explained variance. A structural equation analysis was used to examine the mediating effect of the scripted habit measure. Prior behavior was found to have strong and significant impacts on habit ( $\beta = 0.64$ ), as well as on perceived behavioral control ( $\beta = 0.58$ ), on intention ( $\beta = 0.55$ ), and on later behavior ( $\beta = 0.28$ ). The direct path from habit to later behavior, however, was weak and not significant ( $\beta = 0.07$ ), indicating that inclusion of the scripted behavior index failed to support the assumed mediating role of habit.

### Empirical Tests of the Deliberate Reasoned Action Perspective

The previous review of the literature indicates that attempts to explain the residual effect of prior on later behavior in terms of habituation have, so far, not been very productive. Reliance on frequency of past behavior as an indicator of habit strength is of questionable validity, and neither the stability of behavior over time nor the residual impact of prior on later behavior can be taken as *prima facie* evidence for habituation. More direct tests of the habituation perspective, examining whether past behavior frequency moderates the effect of intentions on later behavior, have also yielded inconclusive results. In the remainder of this article, I

<sup>4</sup>Other attempts to assess habit directly have asked respondents to indicate whether they perform the behavior in question by force of habit (Wittenbraker, Gibbs, & Kahle, 1983), as a matter of habit or automatically (Orbell, Blair, Sherlock, & Conner, 2001), or without awareness (Mittal, 1988). However, these investigations did not try to test whether habit, as assessed, mediated the effect of prior on later behavior.



consider alternative explanations for the residual impact of prior on later behavior, explanations involving the deliberate mode of the reasoned action perspective.

### Scale Compatibility

Studies that have dealt with repeated behavior have usually tried to predict reported performance frequency (e. g., Norman & Smith, 1995; Verplanken, Aarts, van Knippenberg, & Moonen, 1998). In a comparable fashion, such studies have also tended to assess past behavior in terms of the number of times it has been performed. In contrast, measures of attitudes, intentions, and perceptions of behavioral control usually ask about performing (or not performing) the behavior, without reference to frequency. Thus, participants in a study on exercising may be asked to indicate how often they exercised in the past 2 weeks and, 2 weeks hence, they may be asked the same question again to assess their subsequent behavior. The other variables in the theory of planned behavior, however, might be assessed by means of 7-point graphic scales asking participants to rate regular exercise in the next 2 weeks on an evaluative continuum, to indicate whether other people expected them to exercise regularly, to judge the difficulty of engaging in regular exercise, and to express their intentions to exercise regularly in the next 2 weeks. The measure of past behavior is therefore likely to share method variance with the measure of later behavior, variance not shared by the measures of attitude, subjective norm, perceived behavioral control, or intention (see Ajzen, 1991). Thus, the superior compatibility between the scales used to measure past and later behavior may lend greater validity to the measure of past behavior as compared to measures of the other constructs (Courneya & McAuley, 1993).

A reanalysis of published data (Courneya & McAuley, 1994) confirms the importance of scale compatibility. In this study, participants reported the number of times they had engaged in physical activity in the past 4 weeks and did so again 4 weeks later. At the first interview, they also indicated their intentions to engage in physical activity during the next 4 weeks. These intentions were assessed on a 7-point likelihood scale ranging from 1 (*extremely unlikely*) to 7 (*extremely likely*) and on a numerical scale (the number of times respondents intended to exercise in the next 4 weeks). Clearly, the numerical scale was more compatible with the measure of behavior than the likelihood scale.

The data obtained by Courneya and McAuley (1994) revealed a strong correlation ( $r = .62, p < .01$ ) between past and later behavior. To test the residual effect of past on later behavior, each measure of intention was held constant in a reanalysis of the data. The correlation between prior and later behavior was reduced to .55 when the likelihood measure was held constant, but to .34 when the numerical measure was held constant. The difference between these two partial correlations is statisti-

cally significant ( $z = 2.42, p < .01$ ), indicating that a behavior-compatible measure of intention can indeed weaken the residual effect of past on later behavior. However, the remaining partial correlation of .34 was still statistically significant ( $p < .01$ ), suggesting that the residual effect of past behavior could not be explained completely by lack of scale compatibility.<sup>5</sup>

### Strength of Attitudes and Intentions

Strong attitudes and intentions have a number of interesting qualities (see Petty & Krosnick, 1995, for reviews). Of greatest interest for my purposes here, strong attitudes and intentions are expected to be relatively stable over time and to predict manifest behavior better than weak attitudes and intentions. Weak attitudes and intentions with respect to a behavior most likely reflect some degree of ambivalence, indifference, or uncertainty. Clearly, such uncertain dispositions fail to provide clear guides to action. In the case of respondents with weak dispositions, past behavior may be a better indicator of likely future action than are intentions. These considerations imply that the residual effect of past behavior on later behavior should emerge when people hold relatively weak attitudes and intentions but not when their attitudes and intentions are strong.

Some support for this hypothesis can be found in a study (Conner, Sheeran, Norman, & Armitage, 2000) that tried to predict attendance at a health screening from variables in the theory of planned behavior with the addition of past attendance. Theory of planned behavior data were collected by mail survey at two points in time, separated by 1 year. About 4 weeks after completion of each survey, participants received an invitation to attend a health screening at their local general practice in the course of the subsequent month. Patient records were used to establish actual behavior at each time point. The first observation of attendance served as a measure of past behavior. It was taken prior to administration of the second survey, which was then used to predict attendance at the second screening—the measure of later behavior. Stability of intentions over the 1-year period, a measure of intention strength, was obtained by computing the absolute difference between intentions assessed in the two surveys.

The results showed that past attendance at the health screening had a significant direct effect on later behavior even after the variables of the theory of planned behavior had been entered into the regression equation ( $\beta = 0.93, p < .05$ ). However, the effect of prior on later behavior was found to be moderated by the stability of intentions ( $\beta = -1.08, p < .05$ ). Simple slope analysis

<sup>5</sup>In the theory of planned behavior, the predictors of later behavior are intentions and perceptions of behavioral control. It is possible that adding a measure of perceived behavioral control as a mediator would further reduce the relation between prior and later behavior.

showed that, when intention stability was low (1 *SD* below the mean) or moderate (at the mean), past behavior strongly predicted later action ( $\beta = 1.96, p < .01$  and  $\beta = 0.93, p < .01$ , respectively). However, when the stability of intentions was high (1 *SD* above the mean), past attendance at the health screening failed to predict later attendance ( $\beta = -0.10, ns$ ).

Very similar results were reported in an investigation (Sheeran, Orbell, & Trafimow, 1999) that predicted the amount of time students spent studying during their winter vacation. Theory of planned behavior questionnaires were administered approximately 6 weeks prior to the vacation and again in the last week prior to the vacation. Stability of intentions was measured by computing within-subjects correlations between the two waves across the five items used to assess intentions. Past behavior was the amount of time participants reported studying prior to the vacation, and subsequent behavior during the vacation was reported after students returned for the second semester. Past studying behavior had a significant residual effect on later behavior ( $\beta = 0.36, p < .01$ ), but this effect was again moderated by intention stability ( $\beta = -0.36, p < .05$ ). A simple slope analysis revealed the expected pattern. When intentions were stable, it made little difference how much students had studied in the past; their studying behavior was very well predicted from intentions. However, when intentions were unstable, they were relatively poor predictors of later studying behavior that was instead consistent with prior behavior.<sup>6</sup> Strong, stable intentions thus appear to be a prerequisite for accurate prediction. When intentions are strong, a measure of past behavior fails to account for additional variance in later behavior. However, when intentions are weak, as indicated by relatively low stability, past behavior can serve as a useful predictor over and above intentions.

### Belief Veridicality

Another possible explanation for the residual effect of prior on later behavior is suggested by the stipulation in the theory of planned behavior that perceived behavioral control can contribute to the prediction of behavior only to the extent that it accurately reflects a person's actual control. Clearly, however, people are not always accurate in their appraisals. Lack of rele-

vant information can produce inaccurate beliefs, and there is plenty of evidence in the psychological literature to indicate that people's beliefs can also be biased by a variety of cognitive and motivational processes (for reviews, see Ajzen & Sexton, 1999; Nisbett & Ross, 1980). For example, related to the veridicality of perceived control, people are found to be overly optimistic in estimating the amount of time it will take them to complete a task (Buehler, Griffin, & Ross, 1994). In a series of studies, Buehler et al. showed that people are inclined to underestimate task completion times because they tend to focus on possible completion scenarios rather than on prior experience with task completion. Estimates were found to become more realistic when participants were instructed to relate their predictions to past experiences.

Questions of veridicality can be raised not only with respect to control beliefs but also with respect to behavioral and normative beliefs. Just as people may underestimate or overestimate the difficulty of performing a behavior, they may also have unrealistic expectations regarding the likely consequences of a behavior, and they may misperceive what important others expect of them. To the extent that people overestimate the ease of performing a behavior and the favorability of its outcomes, they are likely to form unrealistic intentions to perform the behavior in question. When confronted with the actual behavior, two processes may be set in motion. First, people may reconsider their decisions, become more realistic in their expectations, and modify their intentions. Support for this process can be found in a variety of domains. For example, research on contingent valuation of public goods has documented that people consistently overestimate the amount of money they would be willing to pay for a worthwhile purpose (e. g., Brown, Champ, Bishop, & McCollum, 1996). When they know that they will actually have to make a payment, indications of willingness to pay tend to be much lower—a tendency known as *hypothetical bias* (cf. Cummings & Taylor, 1999). A similar tendency was observed in the study on exercising discussed previously (Courneya & McAuley, 1994) in which participants' intentions were found to overstate the frequency with which they would engage in physical activity in the next 4 weeks. The actual frequency was, on average, 13.65, but the intended frequency,  $M = 15.33$ , was significantly higher. Respondents appeared to realize that their intentions were overly optimistic, however. When asked to indicate how often they expected to actually exercise in the next 4 weeks, the average estimate was 13.51, very close to the reported behavior.

Such findings are also common in other research on the intention-behavior relation. For instance, in a study (Linn, 1965) of racial attitudes and behavior, White female college students were asked to indicate their willingness to pose for a photograph with a Black male that was to be used for a variety of pur-

<sup>6</sup>Sheeran et al. (1999) reported figures showing the results of simple slope analyses but did not provide the regression coefficients at different levels of intention stability. They did, however, report the results of subgroup analyses in which the sample was split at the median level of intention stability. This analysis confirmed the conclusions reached earlier: Past behavior was a significant predictor only when intentions were unstable ( $\beta = 0.37, p < .01$ ), not when they were stable ( $\beta = 0.09, ns$ ). Conversely, intentions predicted later behavior when they were stable ( $\beta = 0.58, p < .01$ ) but not when they were unstable ( $\beta = 0.08, ns$ ).

poses. On a later occasion, they were asked to sign releases of the photograph for these same purposes. The results revealed inconsistencies between intentions and behaviors because a large proportion of participants failed to carry out their favorable intentions. Postexperimental interviews traced these inconsistencies to the fact that, when expressing their intentions, many participants had disregarded the likely negative reactions of family and friends, but such considerations became prominent when they were asked to actually release the photographs.

These examples suggest that confrontation with the actual behavioral situation can be sufficient to change people's intentions prior to engaging in the behavior. In other instances, the changes may occur gradually as people begin to engage in the behavior and receive feedback contradictory to their unrealistic expectations. Evidence in support of this process comes from a study (Doll & Ajzen, 1992) on the effects of direct experience on the predictive validity of attitudes and intentions. Participants were either given direct experience playing several video games or they received secondhand information about the games by watching recorded sessions. It stands to reason that beliefs about the games based on personal experience (how enjoyable, challenging, or difficult the games are) will tend to be more realistic than beliefs based on indirect information. When they were later given an opportunity to play the different games, participants in the direct experience condition displayed less change in their attitudes, perceptions of control, and intentions than did participants in the indirect experience condition. As would therefore be expected, attitudes and intentions were better predictors of game-playing behavior in the direct as opposed to the indirect experience condition.

In sum, people often bring unrealistic expectations to a behavioral situation with the result that intentions are less predictive of actual behavior than they would be if beliefs were veridical. This is especially likely when individuals have had little direct experience with the behavior, but it also seems to occur when past experience could have produced veridical beliefs. People seem to find ways to convince themselves that they will be able to do what they did not manage to accomplish in the past or that they will do what they know they should be doing. Thus, smokers intend to quit soon even though past attempts have failed, weight-conscious individuals intend to adhere to a strict diet despite past failures, students expect higher grades than they have received in previous courses, parents intend to spend more time with their children even though they have not kept past resolutions of this kind, and so forth.

In comparison to beliefs, attitudes, and intentions, which may be unrealistically optimistic (or pessimistic), the frequency with which people have performed a behavior in the past can provide a relatively realistic

estimate of a person's actual abilities and dispositions. In other words, past performance or nonperformance of a behavior may provide information about a person's likely future behavior that is, at least for some people, more accurate than are expressed intentions and perceptions of behavioral control. Therefore, to the extent that beliefs are in fact unrealistic, a measure of past behavior can account for systematic variance in later behavior that is not accounted for by the predictors in the theory of planned behavior.

Several lines of research provide indirect evidence for the importance of veridicality in beliefs for the prediction of behavior. As noted previously, belief veridicality is likely to increase as a result of direct experience and, indeed, it has been found consistently that attitudes formed on the basis of direct experience are better predictors of later behavior than are attitudes formed on the basis of secondhand information (Doll & Ajzen, 1992; Fazio & Zanna, 1978; Fazio & Zanna, 1981). In a similar fashion, the predictive validity of attitudes and intentions has been reported to increase with amount of knowledge about the attitude object (Davidson, Yantis, Norwood, & Montano, 1985) and with reflection about it (Snyder & Swann, 1976). A greater amount of information and increased reflection are likely to be associated with more realistic expectations, resulting in better prediction of later behavior.

More direct evidence for the mediating role of belief veridicality comes from a reanalysis of data obtained in a study of academic achievement (Ajzen & Madden, 1986). At the beginning of the semester and again toward the end of the semester, college students enrolled in several different classes completed a questionnaire that assessed the constructs in the theory of planned behavior with respect to attaining an "A" in the course. In addition, the students also estimated the grade they thought they would get. Accuracy of grade expectations could be assessed by computing the discrepancy between this expected grade and the actual grade attained at the end of the semester. To examine the effect of veridicality, participants were divided at the median discrepancy score into high- and low-accuracy groups. Results of the reanalysis are displayed in Table 1. It can be seen that intentions were much better predictors of current grades when participants were relatively accurate in their expectations ( $r = .61, p < .01$ ) than when they were inaccurate ( $r = -.01, ns$ ). Past academic performance, indexed by grade point average, correlated somewhat better with present grade attainment in the low-accuracy group ( $r = .35, p < .05$ ) than in the high-accuracy group ( $r = .23, p < .05$ ). Thus, when students were unrealistic in their grade expectations, their intentions failed to predict the grades they actually attained, but their past accomplishments provided a relatively good indication of their prospects. When they were more realistic, their intentions predicted grade attainment very well and past grades had a

**Table 1.** Predicting of Grade Attainment From Past Performance and Intentions in Low- and High-Accuracy Subgroups

Variable	<i>r</i>	$\beta$	<i>R</i>
Grade Expectations			
Low Accuracy			
Past Performance	.35*	.43*	
Intentions	-.01	-.01	.39*
High Accuracy			
Past Performance	.23*	0.13	
Intentions	.61**	.61**	.61**
Perceived Behavioral Control			
Low Accuracy			
Past Performance	.28*	.26*	
Intentions	.17	.17	.29*
High Accuracy			
Past Performance	.19	.14	
Intentions	.50**	.50**	.52**

Note: Secondary analysis of data published in Ajzen & Madden (1986).

\* $p < .05$ . \*\* $p < .01$ .

lower, albeit still significant, correlation with grades attained in the present course.

Most important for my purposes were the results of a hierarchical regression analysis in which current grade attainment was predicted from intentions on the first step and past grades on the second step. As can be seen in Table 1, past performance had a significant regression coefficient ( $\beta = 0.43$ ,  $p < .05$ ) in the low-accuracy subgroup even after intentions had been entered into the equation; the regression coefficient for intentions ( $\beta = -0.01$ ) was not significant. By contrast, in the high-accuracy subgroup, the regression coefficient for past behavior was low and not significant ( $\beta = 0.13$ ), but for intentions it was high and significant ( $\beta = 0.61$ ,  $p < .01$ ). The residual effect of past on later behavior was thus significant only for individuals who held relatively unrealistic expectations regarding the grade they could expect in the course. When expectations were realistic, past behavior lost its predictive validity.

Very similar results were obtained in another reanalysis of the data from Ajzen and Madden (1986), an analysis that looked at the veridicality of control beliefs. Because inaccurate expectations of control over attaining an "A" are likely to be revised in the course of the semester, changes in control beliefs can be taken as an indication of low veridicality of initial beliefs. In the reanalysis, amount of change in control beliefs from the beginning to the end of the semester was computed, and participants were divided at the median score into high and low belief accuracy subgroups. Past performance predicted grade attainment at  $r = .28$  ( $p < .05$ ) in the low-accuracy subgroup and  $r = .19$  (*ns*) in the high-accuracy group, whereas intentions predicted grade attainment much better for students with high belief accuracy ( $r = .50$ ,  $p < .01$ ) than for students with low accuracy ( $r = .17$ , *ns*). As can be seen in Table 1, a

multiple regression analysis revealed the expected pattern. In the low-veridicality subgroup, the regression coefficients were 0.26 ( $p < .05$ ) for past performance and 0.06 (*ns*) for intentions. In the high-veridicality subgroup, the regression coefficients were reversed:  $\beta = 0.14$  (*ns*) for past performance and  $\beta = 0.50$  ( $p < .01$ ) for intentions. Clearly, the residual effect of past on later behavior depended on low veridicality of control over attaining a good grade in the course.

### Behaving in Accordance With One's Intentions

The theory of planned behavior assumes that for relatively novel behaviors, people engage in deliberation before they form an intention to perform or not perform the behavior in question. After repeated opportunities for performance, deliberation is no longer required because the intention is activated spontaneously in a behavior-relevant situation (see Ajzen & Fishbein, 2000). This view would imply that once a positive intention is formed, it is carried out when the appropriate opportunity arises. However, Gollwitzer (1993; Gollwitzer & Bayer, 1999) has shown that considerable work is often required to carry out an intention. It may be necessary to collect information in preparation for the behavior, to obtain needed cooperation by other people, or simply to remember to enact it. These tasks are facilitated when people have formed an implementation intention, that is, a specific plan that determines when, where, and how to carry out their intended actions. Such plans are particularly important for intentions that can be acted on in different ways or intentions that are poorly specified (Bargh, 1990). Formation of an implementation intention is said to bring the behavior under the control of stimulus cues such that it is activated automatically at the designated time and place (Gollwitzer & Brandstätter, 1997; Sheeran & Orbell, 1999).<sup>7</sup>

Clearly then, the formation of an intention to engage in a particular behavior may not be sufficient for the behavior to occur and intentions may turn out to be poor predictors of behavior, especially for people who have not formed an implementation intention. These individuals may fall back on their common responses to the situation; that is, their behavior may be more consistent with prior behavior than with current intentions. However, individuals who have formed not only an intention to engage in a behavior but also a specific plan for its implementation should exhibit a different pattern. These individuals should carry out their inten-

<sup>7</sup>In contrast to the habituation hypothesis, which requires repeated performance in a stable context for the establishment of a habit, Gollwitzer's (1993) theory stipulates that one-time institution of an implementation intention is sufficient to produce automatic elicitation of the intended behavior under the designated circumstances.

tions; their past behavior should make little if any additional contribution to the prediction of later behavior.

This hypothesis was confirmed in a study of breast self-examination among female students and administrative staff (Orbell, Hodgkins, & Sheeran, 1997). A theory of planned behavior questionnaire was administered and participants also reported on breast self-examination during the preceding month as a measure of prior behavior. About 1 month later, the participants reported their behavior during the preceding month. This second self-report constituted a measure of later behavior. Immediately following the theory of planned behavior questionnaire, a subgroup of women in the intervention condition was asked to write down where and when they would perform breast self-examinations, that is, to develop implementation intentions. This intervention was found to be highly effective. At the end of the 1-month follow-up, 64% of women who had established implementation intentions reported that they had performed the self-examinations as opposed to only 14% in the no intervention control group. All women in the implementation intention group who had indicated clear intentions to perform the examination reported actually doing so, whereas in the control group, of the women who intended to perform the examination, only 53% actually did. Most important for my purposes, however, is the effect of forming an implementation intention on the correlation between prior and later behavior. After the constructs of the theory of planned behavior had been entered into the regression equation, the addition of past behavior improved prediction of later behavior in the no intervention control group ( $\beta = 1.00, p < .01$ ) but not in the implementation intention group ( $\beta = 0.18, ns$ ). Thus, forming an implementation intention improved prediction of behavior from intentions and reduced the residual effect of past behavior to nonsignificant. When intentions were not accompanied by specific action plans they were less accurate predictors of later behavior and the measure of past behavior retained a residual impact.

### Summary and Conclusions

Human behavior is often remarkably stable over time to the point of overshadowing the effects of attitudes and intentions. Although intentions are generally good predictors of behavior, some people fail to carry out their intentions and instead revert to past patterns of behavior. The usual explanation for this phenomenon is that the behavior in question has become habitual, has come under the control of stimulus cues, and no longer conforms to intentions. Evidence commonly cited in support of this idea is the finding that the frequency with which a behavior was performed in the past tends to account for variance in later behavior, over and above the influence of attitudes, intentions,

and other variables included in the theory of planned behavior.

Whether we adopt the habituation or reasoned action perspective, we would expect that, so long as the situation remains stable, a behavior that has been performed frequently in the past is likely to be performed again. There is also general agreement that frequently performed behaviors can become habitual or routine and be enacted without much conscious attention. This is not to say, however, that the residual impact of prior on later behavior must necessarily be attributed to habituation. In fact, "the role of habit per se remains indeterminate in this research because of the difficulty of designing adequate measures of habit" (Eagly & Chaiken, 1993, p. 181). It would be erroneous to simply assume that past performance frequency is a valid measure of habit. Just because a behavior has been performed many times, it does not follow that it is now automatically activated or that it occurs below conscious awareness and with little effort—the usually accepted criteria of automaticity (Bargh, 1994). Whether or not a behavior has become routine to the point of being an automatic habitual response is an empirical question, and it requires an independent measure of habit for confirmation. Although some attempts have been made to develop such a measure, the evidence thus far provides little support for the proposition that the residual effect of prior on later behavior is indeed mediated by habit.

In fact, it is not at all clear how the concept of habit could account for the residual effect of prior on later behavior. Generally speaking, when a behavior habituates, it turns from being cognitively controlled and guided by deliberate intentions to routine and requiring little cognitive effort for its initiation and execution. However, if people's behavior is initially guided by explicit intentions and remains consistent over time, then why should intentions, even if they become spontaneous, lose their predictive validity? Once a behavior has become routine or habitual, the frequency of past behavior should be a good predictor of later behavior, but it should not eclipse the impact of intentions.

Strictly speaking, the association between past behavior frequency and frequency of later behavior, by itself, merely demonstrates that the behavior in question is stable over time. The reason for this stability may simply be that whatever factors determined the behavior in the past continue to exert their influence in the present (see Ajzen, 1991; Eagly & Chaiken, 1993). In the context of the theory of planned behavior, these factors are said to be intention and perceived control over the behavior. To have a residual effect on later behavior, frequency of past behavior must reflect the influence of factors not adequately captured in measures of these determinants. In this article, I examined several possibilities that, individually or in combination, may be able to account for the residual effect of prior

on later behavior. At least in part, the residual effect may be due to issues of measurement. In most empirical investigations, measures of prior and later behavior have common method variance not shared by measures of intentions and other dispositions. The only relevant data set available shows that scale incompatibility can account for some, but not all, of the residual association between prior and later behavior.

Other possible explanations attribute the residual effect of past behavior to factors of a more substantive nature. First, when attitudes and intentions are held with a degree of ambivalence, indifference, or uncertainty, they are unstable and fail to provide clear guides to action. Empirical evidence shows that, under these conditions, past behavior is a good predictor of later behavior. The residual effect of prior on later behavior disappears when attitudes and intentions are strong and well formed. Second, the expectations embodied in behavioral, normative, and control beliefs may not be particularly accurate. In the theory of planned behavior, these beliefs provide the cognitive foundation for attitudes, intentions, and behavior, but if they are inaccurate they will fail the test of reality. As a result, the predictive validity of intentions and perceived behavioral control will suffer. Past performance frequency reflects people's preexisting response dispositions. That is, it reflects the operation of all factors that exerted an influence on the behavior in the past. To the extent that people are insufficiently cognizant of these factors—that is, to the extent that their beliefs lack veridicality—a measure of past behavior can provide the information needed to improve prediction of later behavior. Empirical evidence supports this proposition by showing that the residual effect of prior on later behavior is eliminated for respondents with relatively accurate control beliefs and realistic intentions. Finally, carrying out an intention often requires development of a detailed plan that specifies when, where, and how the behavior is to be enacted. The available evidence suggests that when such implementation intentions are induced, the residual effect of prior on later behavior is no longer significant.

In conclusion, empirical evidence for a residual effect of prior on later behavior, controlling for intentions, has raised a number of important practical and conceptual issues. From a practical perspective, it implies that we as researchers may want to include a measure of prior behavior in our models to improve prediction of later action. My review suggests that this will be particularly valuable when intentions are relatively weak and unstable, when underlying expectations are inaccurate, or when people have not developed a clear plan of action. From a theoretical perspective, however, past behavior frequency adds little to our understanding of a behavior's determinants. Its correlation with later behavior merely provides a measure of the behavior's temporal stability. The attempt to imbue

past behavior frequency with theoretical significance by considering it a measure of habit strength has, so far, been unsuccessful. Rather than treating the residual effect of prior on later behavior as evidence for habituation, it may be more useful to take it as an opportunity to explore the factors involved in going from beliefs to actions. In this review, I suggest that the limits of reasoned action are not the habituation of behavior with repeated performance but may instead be related to inaccurate or unrealistic behavioral, normative, and control beliefs; weak or unstable attitudes and intentions; and inadequate planning required for successful implementation of an intended behavior.

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