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Reasoned Action and Social Reaction: Willingness and Intention as Independent Predictors of Health Risk

Frederick X. Gibbons, Meg Gerrard, Hart Blanton, and Daniel W. Russell
Iowa State University

Three studies are described that assess elements of a new model of adolescent health-risk behavior, the prototype/willingness (P/W) model (F. X. Gibbons & M. Gerrard, 1995, 1997). The 1st analysis examined whether a central element of the prototype model, behavioral willingness, adds significantly to behavioral expectation in predicting adolescents' smoking behavior. The 2nd set of analyses used structural-equation-modeling procedures to provide the 1st test of the complete model in predicting college students' pregnancy-risk behavior. Finally, the 3rd study used confirmatory factor analysis to assess the independence of elements of the model from similar elements in other health behavior models. Results of the 3 studies provided support for the prototype model and, in particular, for 2 of its primary contentions: (a) that much adolescent health-risk behavior is not planned and (b) that willingness and intention are related but independent constructs, each of which can be an antecedent to risk behavior.

Most models of attitude–behavior consistency are based on an assumption that the decision to engage in a particular behavior is the result of a rational process that is goal-oriented and that follows a logical sequence. That is, behavioral options are considered, consequences or outcomes of each are evaluated, and a decision to act or not act is made. That decision is generally referred to as *behavioral intention* (BI). This approach is perhaps best exemplified by Fishbein and Ajzen's (1980) theory of reasoned action and its update, Ajzen's theory of planned behavior (Ajzen, 1985, 1988, 1991), but it is typical of a number of social psychological theories (e.g., subjective expected utility theory, Ronis, 1992; protection motivation theory, Rogers, 1983). A central tenet of these rational approaches is that because all behaviors involve premeditation or planning, the only proximal antecedent of a particular action is the individual's intention to engage in that action.

These approaches have fared very well in predicting behavior. In the domain of health, for example, rational-based theories have been very effective at predicting a variety of health-promoting actions, such as dieting (Schifter & Ajzen, 1985), exercise (Godin, Valois, & Lepage, 1993), reducing dietary fat (Sparks & Shepherd, 1992), condom use (Fisher, Fisher, & Rye, 1995), and health screening (McCaul, Sandgren, O'Neill, & Hinsz, 1993; see Conner & Sparks, 1996; Sheppard, Hartwick, & Warshaw, 1988, for reviews). This success is not surprising given that these are intentional behaviors that are premeditated and logical. They are also goal-oriented and therefore fit well within a rational framework. As Ajzen (1985) has suggested, "strictly speaking, every intended behavior is a goal whose attainment is subject to some degree of uncertainty" (p. 24).

Not all behaviors are logical or rational, however. Again using health as an example, it would be hard to argue that behaviors that impair one's health or well-being, such as having sex without contraception when pregnancy is not desired or drunk driving, are either goal-oriented or rational; the question of whether they are premeditated or intended remains open. Nonetheless, these behaviors are common, especially among young persons. In fact, the prevalence of some of them seems to be increasing of late (University Of Michigan Survey Research Center, 1995). In general, predicting this type of behavior is more difficult for models that rely on an assumption of rational forethought (Boldero, Moore, & Rosenthal, 1992; L.K. Brown, DiClemente, & Reynolds, 1991; Johnson, 1988; Kilty, 1978; Stacy, Bentler, & Flay, 1994; cf. Conner & Sparks, 1996). In particular, whereas rational or deliberative theories, such as the theories of reasoned action and planned behavior, have been successful at predicting intentions to engage in some health-impairing behaviors, such as reckless driving (Parker, Manstead, Stradling, Reason, & Baxter, 1992), excess drinking (Schlegel, D'Avernas, Zanna, DeCourville, & Manske, 1992), and smoking (Godin, Valois, LePage, & Desharnais, 1992), they have been less effective at predicting health-impairing behaviors, such as substance use (Morojele & Stephenson, 1994; see Van den Putte, 1993, for a review), drunk-driving, and smoking (Stacy et al., 1994). It should be kept in mind, however, that most of the studies generated by or testing these theories have not included intention and behavior (separated temporally) in the same design, and very few have focused on health risk as opposed to health pro-

Frederick X. Gibbons, Meg Gerrard, Hart Blanton, and Daniel W. Russell, Department of Psychology, Iowa State University. Hart Blanton is now at the Department of Psychology, University at Albany, State University of New York.

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Correspondence concerning this article should be addressed to Frederick X. Gibbons, Department of Psychology, Iowa State University, Ames, Iowa 50011. Electronic mail may be sent to fgibbons@iastate.edu.

motion. The latter is consistent with these studies' emphasis on rational behavior.

Adolescent Health Risk

Elsewhere we have presented a model, called the prototype/willingness (P/W) model (Gibbons & Gerrard, 1995, 1997; Gibbons, Gerrard, Ouelette, & Burzette, 1998), that was intended to explain and predict these relatively complex behaviors within a population that has proven somewhat problematic for rational behavior theories, namely, adolescents and young adults (van den Putte, 1993; cf. L.K. Brown et al., 1991). The model is based on three related assumptions, which reflect its relative emphasis (compared with most health models) on social reactivity rather than rational planning. The first assumption is that for young persons, more so than adults, behaviors related to health risk are volitional, but they are often neither rational nor intentional. Rather, they are reactions to risk-conducive circumstances that most adolescents are likely to encounter from time to time. Second, health-risk behaviors are social events for adolescents; they seldom engage in these behaviors alone (cf. Nadler & Fisher, 1992). Third, because of their social nature, these behaviors have clear social images associated with them that are widely recognized. When adolescents consider engaging in the behaviors, the images have a significant impact on their decisions.

Support for these assumptions has come mostly from our own research (Gerrard, 1987; Gerrard, Gibbons, & Boney McCoy, 1993; Gibbons, Gerrard, & Boney McCoy, 1995), although similar opinions have been expressed by several researchers. Others have suggested, for example, that adolescent sexual activity is often spontaneous rather than planned (Brooks-Gunn & Furstenberg, 1989; L.K. Brown et al., 1991; Chilman, 1983). Consistent with this notion, surveys conducted with sexually active teens have suggested that much of their sexual activity is reactive and not premeditated (Ingham, Woodcock, & Stenner, 1991; Winter, 1988), which may be one reason why more than 80% of adolescent pregnancies are unintended (S. Brown & Eisenberg, 1995). Moreover, it does not appear to be the case that this behavior is a result of ignorance of the risks involved (Gerrard & Luus, 1995; Terry, Galligan, & Conway, 1993). On the contrary, adolescents do know, for example, which kinds of sexual behaviors are safe (or rational) and which are not. When asked, they will typically say they do not intend to engage in behaviors in the latter category. Often, however, they end up doing so anyway (Kegeles, Adler, & Irwin, 1988; Turtle et al., 1989; cf. Blanton, Gibbons, Gerrard, Conger, & Smith, 1997; Zabin, 1994). This lack of correspondence between attitude and behavior suggests two things: (a) Attitudes—especially those toward risky behaviors—change and (b) there is an additional, nonintentional component involved in the decision to engage in risky behavior. That component, called *behavioral willingness* (BW), is the focus of the P/W model. The model shares a number of constructs and assumptions with the theory of reasoned action. It also adds two new constructs, one of which is BW. The two constructs and the model itself are described below.

The P/W Model

Willingness

Although many adolescents do not intend to engage in risky behaviors, they do frequently find themselves in situations in which the opportunity to perform these actions is presented to them (e.g., a party where cigarettes are available, an enthusiastic boyfriend or girlfriend who wants to have sex). In these settings, the issue is more appropriately framed as "What are you willing to do?", which is not the same as "What do you plan to do?" BW is distinguished from BI in several ways, including a relative lack of planning or premeditation and self-focus associated with BW compared with BI. The primary distinction, however, involves the reactive rather than deliberative nature of BW (see Gibbons et al., 1998). According to the model, this reactive component is a function of four factors. Three of these factors are also related to BI, as outlined in the theory of reasoned action. First, subjective norms are operationalized in the P/W model in a manner quite similar to that in the theory of reasoned action. In particular, perceptions that important others (e.g., peers) engage in the behavior, and would not disapprove of one's own participation, are associated with greater BW to engage (Gibbons, Helweg-Larsen, & Gerrard, 1995), just as it is with greater BI. Second, positive attitudes toward the behavior are generally associated with more BI and more BW to engage. Measurement of attitudes, however, is somewhat more outcome-focused in the P/W model than in the theory of reasoned action, because of the model's focus on risk behavior. In particular, the less danger or the less likelihood of negative outcome an individual associates with a particular risk behavior, the more willing he or she is to engage in that behavior (Gibbons et al., 1998). Third, having engaged in the behavior in the past should be associated with a more favorable attitude toward the behavior (Bentler & Speckart, 1981), more positive subjective norms (Gerrard, Gibbons, Benthin, & Hessling, 1996), and greater BI (Bagozzi, 1981) and BW to engage again. The fourth antecedent to BW, which is unique to the P/W model, is the social image or prototype that the adolescent associates with the behavior, in other words, his or her perception of the type of person who does it.

Prototypes

In general, adolescents are preoccupied with social images and identities—their own and others (Erikson, 1963; Manning & Allen, 1987; Youniss & Haynie, 1992)—and that may be even more true for the images associated with risk behaviors (cf. Chassin, Tetzloff, & Hershey, 1985). In fact, previous research has indicated that adolescents are quite familiar with risk images (Chassin, Presson, Sherman, McCoughlin, & Gioia, 1985; Leventhal & Cleary, 1980) and that these images are positively associated with attitudes and subjective norms, as well as intention to engage in the associated behavior. The more favorable an adolescent's image of smokers, for example, the more likely he or she is to intend to smoke (Chassin, Presson, Sherman, Corty, & Olshavsky, 1981). According to the P/W model, the influence that images or prototypes have on behavior is mediated by BW. Briefly, the reasoning is as follows. Adoles-

cents have a clear image of the type of person who engages in different risk behaviors (e.g., the typical smoker). They also realize that if they engage in risky behaviors within a social context, which is where these behaviors are most likely to occur (Assumption 2 of the model; Gibbons & Gerrard, 1995), they will acquire the image themselves. If they smoke in public, for example, they will become a typical smoker in the eyes of their peers. In some sense, then, the images are social consequences as well as antecedents of the behavior. These images tend not to be very favorable, however, even among those who do engage in the behavior. Thus, the images themselves (or their acquisition), although influential, are usually not goals for young people. Instead, the question is how acceptable the image is to them—the more acceptable it is, the more willing they are to do the behavior. Thus, social images or prototypes relate directly to BW in the model but not directly to BI.

Empirical Support

Previous research has supported this aspect of the P/W model by demonstrating a relation between risk prototypes and willingness to engage in a related risk behavior. Specifically, maintaining a favorable image of the typical unwed teenage parent has been shown to be positively associated with adolescents' willingness to engage in unprotected sex (Gibbons, Gerrard, et al., 1995, Study 1; Gibbons, Helweg-Larsen, et al., 1995). In addition, alcohol prototypes (i.e., images of the typical drinker) have been shown to predict changes in drinking behavior among adolescents (Blanton et al., 1997) and college students (Gibbons & Gerrard, 1995). To date, however, no studies have examined the extent to which the impact of prototypes on behavior is mediated by BW and not BI, as is hypothesized in the model. That question was explored in the current research.

Measuring Intentions and Willingness

Intentions Versus Expectations

In a revision of the theory of reasoned action, Sheppard et al. (1988) recommended that a distinction be made between BI, which they defined as the extent to which plans (i.e., commitment) have been formulated to perform a behavior, and what they call *behavioral expectation* (BE), which they suggested is the individual's perceived likelihood that she or he will actually perform the behavior. The latter construct takes into account a number of additional factors besides BI that could affect performance of the behavior, such as opportunity, previous behavior or habits, and alternative behaviors available to the individual. Thus, BE appears to be more appropriate for certain types of behaviors, such as substance use (Morojele & Stephenson, 1994). Reports of BE are also less constrained by social desirability than is BI (Beck & Ajzen, 1991). Because most adolescent health-risk behaviors are not socially desirable and are largely context-dependent, we assumed that a BE measure would be a more effective predictor than would a typical BI measure (e.g., "How likely is it that you will drive drunk?" vs. "Do you intend to drive drunk?"; cf. Stacy et al., 1994; Stacy, Newcomb, & Bentler, 1991). Consequently, we used BE measures in this study.

Willingness

In assessing BW, risk-conducive circumstances are first described to respondents and then respondents are asked how willing they would be to react in several different ways if they were in such a situation. These reactions vary in terms of level of risk (e.g., say no, do something less risky). Respondents are told that no assumption is being made that they would ever be in such a situation. In this manner, the construct emphasizes social as well as situational influences on behavior, and it shifts some of the focus of responsibility for the behavior from the adolescent, which is where it rests for most BI measures, and places it on the context (Gibbons et al., 1998). Because it involves some estimation of the likelihood of a particular behavior (given an opportunity), BW does include an element of expectation. Like BE, it is also less affected by social desirability constraints. In short, willingness measures are more similar to expectation measures than they are to "traditional" intention measures. Using BE rather than BI items, then, provides a more conservative test of the difference between reasoned and reactive behavior.

Summary

Previous studies have examined various aspects of the P/W model; as of yet, however, no study has examined the entire model. In particular, the most basic assumption of the P/W model, which is that much adolescent risk behavior is not intended or planned, has not yet been assessed. Moreover, the hypothesis that BW relates to behavior independent of BI has been examined in only one study (Gibbons et al., 1998). Hence, the purpose of the first study was to test the second half of the P/W model, which links BW to risk behavior. Specifically, the study examined the relations among BW, BE, and change in adolescents' cigarette smoking over time. The following hypotheses were examined: (a) Adolescent risk behaviors have an extraintentional component, which is captured in the BW construct and (b) accordingly, this construct will add significantly to the predictive power of BE. Study 2 then presents the first test of all elements of the model in a single prospective study, using structural-equation-modeling procedures. Finally, Study 3 presents the results of a confirmatory factor analysis intended to assess the extent to which the unique elements of the P/W model (i.e., prototypes and BW) are, in fact, distinct from similar elements in other theories.

Study 1

Method

Participants and Procedure

The Time 1 (T1) sample consisted of 245 boys and 255 girls from small towns in Iowa who had been recruited along with their families to participate in a study of social psychological factors related to health behavior. Half of the sample was age 13 at T1 and half was age 15. From that group, 470 completed all of the measures at T1, 464 at Time 2 (T2), and 447 at Time 3 (T3); 430 completed all measures at all three time periods. Data collection occurred in the families' homes at intervals of approximately 1 year. Families were paid $50 at T1 and T2

and $55 at T3 (for additional description of the sample and measures, see Gerrard et al., 1996; Gibbons et al., 1995). Behavior was assessed at T1 (i.e., prior behavior), at T2, and then, as the criterion, at T3. BW and BE were both assessed at T2.

Measures

Two measures of smoking behavior were used: (a) lifetime, "What is the most you have ever smoked cigarettes?" followed by a 6-point scale with anchors *never* (1) to *I have smoked every day* (6) and (b) current, "How often do you smoke now?" followed by a 4-point scale from *not at all* (1) to *every day.* (4) For analysis, the two items were standardized and then averaged together (alphas at T1 and T3 = .83 and .89, respectively).

BE was assessed with a single global item, "Do you think that you will smoke cigarettes in the future?", followed by a 7-point scale with anchors *I definitely will not* (1) to *I definitely will* (7). We chose to keep the time frame open, assuming that a specific time period (e.g., 1 year) would produce a more conservative (lower) BE value. BW was assessed by asking participants to imagine themselves in different situations and then think about how they might respond if they were in the situation. For smoking, the situation was "Suppose you were with some friends and one of them offered you a cigarette. How likely is it that you would do *each* of the following?" This was followed by three responses: "Take it and try it," "Tell them 'no thanks,' " and "Leave the situation," each with a 7-point scale with anchors *not at all likely* (1) to *very likely* (7). The second two items were reversed, and then the three were averaged together to form a BW index (α = .80).

Results

Descriptive Statistics

The means, standard deviations, and correlations for the primary measures are presented in Table 1. As indicated in the table, BW was greater than BE, but the correlation between the two was very high (r = .69). Nonetheless, responses on the BE measure suggested that much of these adolescents' smoking behavior was not intended. For example, among those who reported smoking during the period from T2 to T3, 55% had responded with either a 1 or 2 on the prior (T2) BE question. Among those who initiated the behavior during this time period, 64% had responded with a 1 and 25% a 2 on the BE question.

Table 1
Correlations, Means, and Standard Deviations for Adolescent Smoking (Study 1)

Variable	1	2	3	4
1. T1 behavior	—			
2. T2 BE	.44	—	.69	.56
3. T2 BW	.41		—	.62
4. T3 behavior	.52			—
M	2.64	1.86	2.93	3.40
SD	1.40	1.41	1.69	2.16

Note. N = 430. Scales BE and BW = 1–7; behavior = 2–10 (i.e., sum of the behavior items). BE = behavioral expectation; BW = behavioral willingness; T = time.

Table 2
Hierarchical Regression and Commonality Analysis Predicting Adolescent Smoking (Study 1)

	Regression[a]			Commonality[b]	
Variable	β	Z	R^2	R^2 (unique)	R^2 (shared)
Step 1: T1 behavior	.26	6.53	.24		
Step 2: T2 BE	.17	3.33	.38	.01	.13
Step 3: T2 BW	.39	7.76	.45	.07	

Note. N = 430. BE = behavioral expectation; BW = behavioral willingness; T = time. For all values, $p \leq .001$.
[a] For regression, β and t are at final step; R^2 reflects increment in R^2 at time of entry. [b] For commonality analysis, R^2 = increment associated with the predictor.

Regression Analyses

A hierarchical regression analysis was conducted in which T1 behavior, then T2 BE, and finally T2 BW were entered as predictors of T3 behavior. In addition, a commonality analysis was also conducted to determine the increment in R^2 accounted for by each of the three predictors individually and then BE and BW together (i.e., their unique and also their shared explanatory ability). Results of this analysis, presented in Table 2 and Figure 1, indicated that the three variables together explained 45% of the variance in T3 smoking behavior, with previous smoking explaining the greatest amount. In addition, in spite of their high correlation, BE and BW each explained a significant percentage of the variance in behavior independently, after accounting for previous behavior. Moreover, BW was a significantly stronger predictor than was BE (R^2 increment for BE = 1.4%, for BW = 7.3%; both ps $< .001$; the difference between the BE and BW betas was significant, $p < .001$). The two constructs together, however, accounted for a larger proportion of the variance in behavior (12.9%) than did either by itself. These results remained essentially unchanged when the adolescents who were regular smokers were excluded from the analyses, when nonsmokers were excluded, and when the criterion was switched

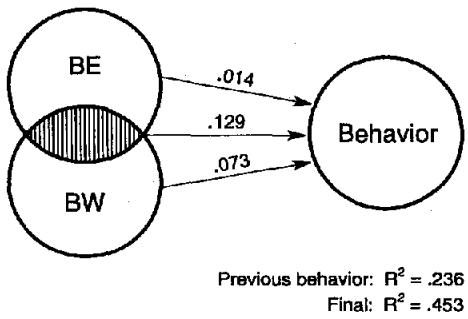

Figure 1. Shared and unique variance of behavioral expectation (BE) and behavioral willingness (BW) predicting adolescent smoking (Study 1). N = 430.

to current smoking only. Also, there were no sex differences on any measures or in the regression analyses.

Discussion

As expected, BW and BE were highly correlated. The two constructs are clearly related, and the overlap between the two, as indicated by the commonality analysis, predicted changes in smoking quite well. Consistent with the P/W model, however, there was a significant element of this adolescent risk behavior that apparently was not intended. That element, which we have called BW, related more strongly to smoking behavior than did BE. One likely reason for this is the fact that smoking is not yet habitual for most adolescents, which is probably why the BE measure was not as effective at predicting this behavior as it usually is for adults. In fact, for many adolescents, smoking is neither planned nor premeditated. Rather, it is a response to opportunity—situations that they are likely to encounter that are risk-conducive. Being at a party where cigarettes or alcohol are available would be a prime example. This combination of availability and willingness can lead to risk, even when there was little or no intention in the first place.

Regarding the distinction between BW and BE and their relation to behavior, several factors are worth noting. First, the long period of time between the measurement of BE and behavior most likely attenuated their relation somewhat (Ajzen, 1988; of course, the same was true for the relation between BW and behavior). Similarly, the fact that previous behavior was included in the regression means that this was a conservative test of the predictive ability of both BE and BW (Grube & Morgan, 1990; Huba, Wingard, & Bentler, 1981; Sutton, 1994); some expectation and some willingness are most likely subsumed by previous behavior. Third, because BE is conceptually more similar to BW than to BI, it seems likely that the statistical distinction between BW and BI would be more pronounced and that the BW index would have explained even more of the variance in behavior, if BW had been used in conjunction with a BI measure instead of the more encompassing BE measure. Finally, the fact that BE was assessed with a single item and BW with an index does raise the possibility that the reliability for BE was lower, which could have affected its predictive power. (The alpha across the three waves of data collection for this measure was .76, which suggests its reliability was reasonable, however.) This issue was addressed in Study 2.

Study 2

Although most individual components of the P/W model have been examined empirically, to date, no study has provided an assessment of the overall model. The second study provided this initial test. All components of the P/W model (see Figure 2), including those it shares with the theory of reasoned action (subjective norms, attitudes, and BE) as well as its two unique elements (BW and risk prototypes), and previous behavior were incorporated into a single analysis.

According to the model, BW is expected to relate to behavior in two ways: directly, independent of BE, and indirectly, through BE. This latter path reflects the shared variance of the two constructs identified in the commonality analysis in Study 1. It is also consistent with another tenet of the model, which is that being willing to perform a behavior will lead to an increase in the perceived likelihood or expectation of performing that behavior. This sequence is thought to be more likely than the reverse (i.e., intending to engage leads to a willingness to engage; see Gibbons & Gerrard, 1997, for further discussion). Thus, a path from BW to BE was freed in the model. In addition, one pathway depicted in the figure that has not yet been examined is the relation between previous behavior and BW. Having engaged in the behavior previously should result in greater BW and greater expectation of engaging again (cf. Gerrard et al., 1996; Gordon, 1989).

Method

Overview

This study included an older sample, college students, and a different risk behavior, sexual intercourse without contraception. Consistent with previous studies, the image that we hypothesized would be related to lack of contraception was that of the young unwed parent (Gibbons & Gerrard, 1995; Gibbons, Gerrard, et al., 1995). We used the LISREL VIII program to assess the fit of the model.

Participants and Procedure

Participants were college students who had responded to three waves of data collection in an ongoing longitudinal study of health-risk behaviors (see Gibbons & Gerrard, 1995, for further description of the sample). There were 628 students at the first wave, which was collected during spring semester of the students' freshman year.[1] From that group, 84 dropped out of school and 18 others dropped out of the study (i.e., declined or could not be scheduled for the subsequent sessions).[2] In addition, 57 individuals had enough missing data to be excluded from the analysis, leaving a total across the three waves of 469 cases. This sample had a mean age of 18 at T1 and 19 at T3 and was 44% male. Each wave of data collection was separated by 6 months. Participants'

[1] First contact with these students was actually in the fall of their freshman year (N = 679; the decline of 51 was due to school dropout). However, many indicators of interest for the current analyses were not included in that initial wave of interviews. The first wave that did include all of the measures associated with the P/W model was the third (referred to here as T2). A number of other measures collected at each wave (e.g., academic performance and health) are not discussed here.

[2] Those participants who dropped out of the study (most of whom dropped out of school) reported engaging in more pregnancy-risk behavior than did those who stayed in the study through all three waves and answered all of the items. We do not believe this alters the conclusions of the study, however, for two reasons: (a) As a result of this attrition, there was less variance in the behavior to predict, which most likely attenuated the power of our model; and (b) there were no differences between attriters and participants in terms of the relations between prototypes and BW, as measured at the initial wave (prior to T1), and between these central constructs and T1 behavior. Moreover, the model shown in Figure 2 was reestimated using various methods of missing data estimation (i.e., sensitivity analyses) for participants who dropped out of the sample. Use of these estimated measures did not substantively alter the results.

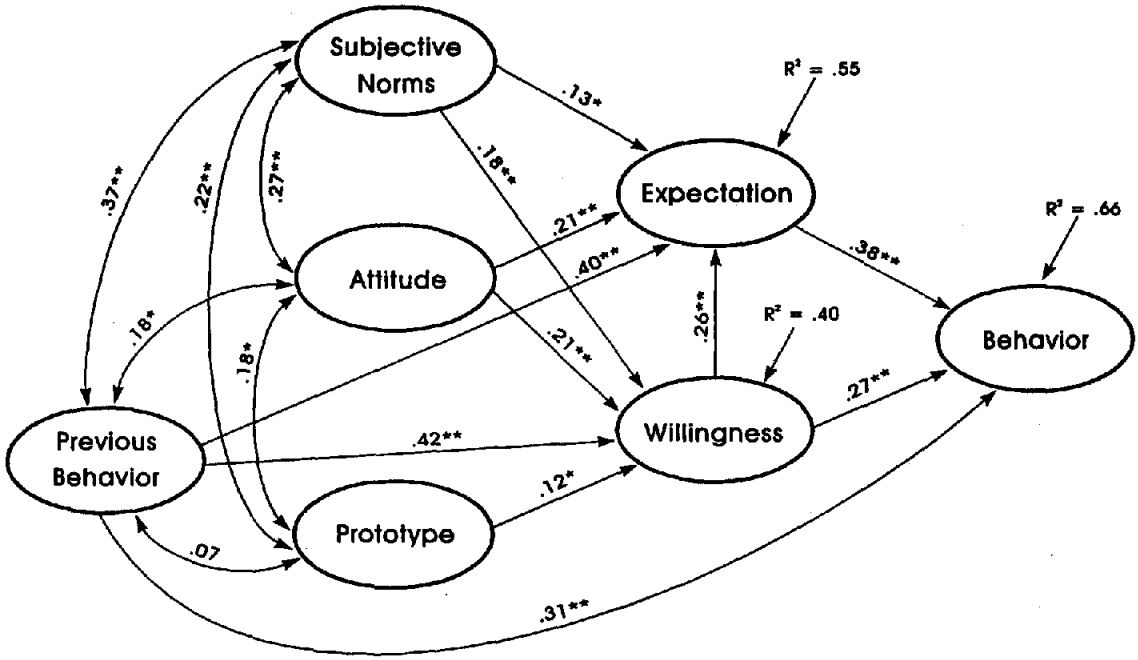

Figure 2. Structural model for pregnancy risk (Study 2). $N = 469$. Goodness-of-fit index = .95. $*p < .05$. $**p < .001$.

pregnancy-risk behavior was assessed at T1 and T3. At T2, all elements of the P/W model, plus BE, were assessed.

Measures

Behavior. Two measures of pregnancy-risk behavior were used to operationalize the behavior latent construct. The first was a direct question ("In the past 6 months, have you ever had sexual intercourse without using any kind of birth control?", followed by a scale from 1 = *never* to 5 = *all the time*). The second question asked participants what type of birth control they had used the last time they had intercourse. Their responses were then coded in the following manner: 3 = *none*, 2 = *less effective (withdrawal or rhythm)*, 1 = *effective (pill or condom)*, 0 = *virgin* (28% of the sample were virgins at T3).

Subjective norms. There were four measures of subjective norms. Two items assessed perceptions of prevalence of the behavior, one among friends and the other among peers: "How many of your friends [people your age] have had sexual intercourse without using birth control?" each followed by a scale from 1 = *none* to 7 = *almost all*. The other two questions assessed perceptions of friends' and parents' reactions to the behavior: "How do you think your friends [parents] would respond if they thought you had had sexual intercourse *without using birth control?*" each followed by a scale from 1 = *have a strong negative reaction and tell you to stop* to 5 = *encourage you to continue*. The two friend questions (reaction and prevalence) were added together, as were the peer prevalence and parent reaction questions, to form two indicators of a subjective-norms latent construct. Finally, consistent with the theory of reasoned action, we did include two measures of motivation to comply, each of which was multiplied by the corresponding perceived norm items (i.e., parents' and friends' reactions). These product scores did not load as highly on the subjective-norm latent construct as did the individual items, however, so we used the latter. Problems with this product term (see also Footnote 2) are not unprecedented in studies of the theory (Ajzen, 1991; Ajzen & Fishbein, 1970).

Attitude. There were five measures of attitudes and beliefs (referred to here simply as attitude measures). The first three pertained to the theory of reasoned action concept of behavioral belief (i.e., perceived pregnancy risk), one for the self, the second for a couple: "If you [a couple] were to have sexual intercourse *regularly* (say once a week for a year) *without using birth control,* what do you think the chances are that you [the woman] would get pregnant?" The third item replaced "regularly" in the self question with "once or twice." Each of the three items was followed by a scale ranging from 1 = *no chance* to 7 = *definitely would happen.* The last two items pertained to the reasoned action concept of outcome evaluation: "In general, how dangerous do you think unprotected sex is?", followed by a scale ranging from 1 = *not at all dangerous* to 7 = *very dangerous,* and "How would you feel if you had [caused] an unplanned pregnancy sometime in the future?", followed by a 7-point scale with anchors *very happy* (1) to *very unhappy* (7). This last item did not correlate well with the others, however, and so it was not included in the latent construct. The couple pregnancy risk over a year and the perceived danger items were combined as were the other two (self) pregnancy-risk items to form two separate indicators of a latent attitude construct.

Prototype. A definition of a prototype was provided (see Gibbons, Gerrard, et al., 1995, for the description) and then participants were asked to indicate their opinion of the "type of person (your age) who gets [a woman] pregnant" using 12 adjectives (smart, confused, popular, immature, "cool" [sophisticated], self-confident, independent, careless, unattractive, dull [boring], considerate and self-centered); items were reversed where necessary, so that a high score reflected a positive perception. Exploratory (oblique) factor analysis of these 12 items in previous studies (e.g., Blanton et al., 1997) consistently produced evidence of three correlated factors, labeled mature, self-assured, and attractive. A

mean was calculated for each of the four-item subscales defined by the three factors; these three scores constituted the prototype latent construct.[3]

Expectation. There were two BE items: "Do you think you will have sex in the next year without using birth control?" (from 1 = *I definitely will not* to 7 = *I definitely will*) and "If you were to have sexual intercourse in the next year, how likely is it that you would use the following kinds of birth control?" This second item was followed by a list of six types of birth control, each accompanied by a 7-point scale ranging from *not at all likely* (1) to *very likely* (7). The list included "no birth control," which was the second measure used in the BE construct.

Willingness. BW was assessed beginning with a description of a scenario in which participants were asked to imagine being with their boyfriend or girlfriend who wanted to have sex, but with no birth control available. They were then asked how likely it was that they would do each of the following: have sex, but use withdrawal (which was defined); not have sex; have sex without any birth control. Each statement was accompanied by a scale ranging from 1 = *not at all likely* to 7 = *very likely.* The second item was reversed, and then the three were included as indicators of the latent BW construct.

Results

Descriptive Statistics

Means, standard deviations, and correlations for all primary measures are presented in Table 3. Twenty-two percent of respondents at T1 and 17% at T3 indicated they had sex without any birth control during the previous 6 months. In addition, 5% at each time period reported using relatively ineffective birth control (rhythm or withdrawal) during their last intercourse. Correlations among the BW and BE measures were more modest than in Study 1 (mean r = .38). Once again, many of the participants who indicated at T3 that they had engaged in the risk behavior in the previous 6 months had reported little or no expectation of doing so at the previous wave: 47% of this group responded with either a 1 or 2 on the BE question at T2. Of those who had risky sex for the first time during this period, 60% responded with a 1 and 27% with a 2 on the BE question at T2.

Structural Equation Analyses

Structural equation analysis with latent variables was used to test the causal model shown in Figure 2, as operationalized by the maximum likelihood methods of LISREL VIII (Jöreskog & Sörbom, 1993). Evaluation of model fit was based on the goodness-of-fit (GFI) statistic, which represents the proportion of the variation and covariation of the measured variables that is explained by the model (Tanaka & Huba, 1985), and the Comparative Fit Index (CFI; Bentler, 1990), which is based on the noncentral chi-square value for two models, the one being tested and a null model which specifies that the variables are uncorrelated.

Correlated measurement error. Because behavior was assessed using identical items at two points in time (i.e., T1 and T3), systematic response biases due to the wording or nature of the questions may have affected self-reports. Systematic or correlated measurement error serves to increase the apparent stability of the latent variables, thereby lessening the potential causal effects of other variables (cf. Ulrich-Jakubowski, Russell, & O'Hara, 1988). In addition, the overall goodness of model fit is negatively affected by correlated error (see, e.g., Krause, Liang, & Yatomi, 1989). We therefore included the possibility of correlated measurement error between the parallel measures of behavior at T1 and T3 that were included in the model. We also constrained the factor loadings of the two indicators of behavior to be constant over time.

Testing the measurement model. To evaluate the adequacy of the measurement model, a confirmatory factor analysis was conducted using the maximum likelihood estimation algorithm from the LISREL VIII program. A seven-factor oblique model was tested, with the factors hypothesized to underlie the measured variables as described above (i.e., Behavior at T1; Prototype, Attitude, Subjective Norms, BE, and BW at T2; and behavior at T3). This model (see Table 3) was found to provide a very good fit to the data, $\chi^2(82, N = 469) = 192.4, p < .001$, GFI = .95, CFI = .96. All of the hypothesized factor loadings of the measured variables on the latent variables were highly significant (see Table 4). Table 5 presents the correlations among the latent variables derived from the confirmatory factor analysis. Several relations are worth noting. First, T1 behavior was correlated with all of the T2 cognitive variables (all $rs \geq .19$), except prototype; T1 behavior was also highly correlated with T3 behavior (r = .66). Second, as expected, subjective norms and attitude were related to BE (all $rs \geq .43$), and BW was related to the prototype construct (r = .23). Finally, BW and BE were once again related to each other (r = .60), and both were related to T3 behavior ($rs \geq .65$).

Testing the full structural model. Given that the specification of the latent variables through the measurement model appeared adequate, we then tested the overall structural equation model. The model was found to fit the data well, $\chi^2(86, N = 469) = 196.5, p < .001$, GFI = .95, CFI = .96. The standardized path coefficients from this model are presented in Figure 2. As

[3] A latent attitude construct could have been created in a manner more consistent with the theory of reasoned action by multiplying the outcome measures (i.e., likelihood of pregnancy) by the affective measure ("How would you feel if you got [someone] pregnant"). In fact, multiplying the outcome measures by this affect measure did produce a viable attitude latent construct with reasonable loadings. Product terms can inflate the loadings of the indicators on the latent construct, however, and therefore are less appropriate for structural modeling. Thus, the pregnancy-reaction (affect) measure was dropped. Similarly, in the P/W model, the prototype construct, which incorporates an element of perceived similarity to the image, is typically multiplied by a measure of similarity. This reflects the belief that a favorable (or unfavorable) image means something different to individuals who consider themselves to be similar to that image than it does to persons who believe they are more distinct (Gibbons & Gerrard, 1995, 1997; Gibbons, Gerrard, et al., 1995). We have also used a behavioral product term in previous research in which the unprotected sex items were multiplied by a measure of frequency of sexual intercourse, thereby producing a total risk score. Once again, the multiplication process can result in a misrepresentation of the latent construct, and so we did not do this in the analysis reported here (when the product terms were used, the results were similar to those reported here).

Table 3
Means, Standard Deviations, and Correlations Among the Measured Variables (Study 2)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. T1 No BC use	—	48**	33**	28**	01	−00	27**	15	06	13**	02	06	03	−01	−01	30**	37**	30**	31**	22**
2. T1 No BC use (last time)		—	27**	64**	05	02	31**	14**	04	09	−02	08	10*	09*	09*	25**	34**	37**	32**	17**
3. T3 No BC use			—	35**	06	−01	28**	17**	14**	11*	−00	10*	13*	13*	08	35**	53**	36**	40**	22**
4. T3 No BC use (last time)				—	06	02	25**	21**	−02	02	−06	10*	07	11*	10*	12**	28**	35**	32**	17**
5. No BC use: friend reaction					—	30**	13**	04	05	10*	06	27**	16**	10*	14*	08	15**	17**	23**	11*
6. No BC use: parent reaction						—	02	−02	08	05	06	14**	13*	12*	14**	06	11**	09*	15**	13**
7. No BC use: friend prevalence							—	59**	12*	14**	01	01	14**	11*	11*	23**	34**	28**	24**	22**
8. No BC use: peer prevalence								—	08	08	−00	−05	04	00	01	16**	25**	18**	14**	20**
9. Preg. risk (self): sex regularly									—	41**	46**	09*	03	06	14**	20**	25**	14**	19**	21**
10. Preg. risk (self): sex once or twice										—	25*	15*	08	10*	14**	14*	18*	15*	20**	23**
11. Preg. risk (other) sex regularly)											—	12*	03	02	06	11*	06	08	12**	15**
12. Danger of unprotected sex												—	07	11*	10*	16**	21**	19**	17**	09*
13. Prototype: "mature"													—	69**	55**	11*	06	17**	18**	16**
14. Prototype: "self-assured"														—	61**	12**	09*	12*	17**	15**
15. Prototype: "attractive"															—	13*	08	05	15**	18**
16. Likelihood of sex without BC (BE)																—	56**	27**	31**	40**
17. Likelihood of sex no BC (BE)																	—	45**	45**	40**
18. Withdrawal (BW)																		—	73**	47**
19. No sex (BW)																			—	52**
20. Sex without BC (BW)																				—
M	1.30	1.80	1.22	1.71	2.00	1.18	3.22	4.08	6.45	4.44	6.60	5.95	3.81	3.83	3.18	1.72	1.38	2.99	2.32	1.76
SD	0.67	0.74	0.55	0.63	1.08	0.49	1.40	1.11	0.82	1.31	0.64	1.13	0.82	0.75	0.82	1.31	1.05	2.07	1.74	1.36

Note. Decimal points omitted for correlations. T = time; BC = birth control; Preg. = pregnancy; BE = behavioral expectation; BW = behavioral willingness.
* $p < .05$. ** $p < .001$.

expected, BW at T2 was significantly (and positively) predicted by T1 behavior, as well as the T2 predictors of attitude toward the behavior, subjective norms, and a (positive) prototype regarding individuals who engage in the behavior. In combination, these variables accounted for 40% of the variation in the latent BW variable. Also consistent with predictions, BE at T2 was significantly and positively predicted by T1 behavior, as well as T2 attitudes, subjective norms, and BW. In combination, these variables accounted for 55% of the variation in scores on the latent BE variable.

Predicting behavior. As in Study 1, the T2 measures of BE and BW were again significant and independent predictors of T3 behavior. As indicated by the standardized path coefficients (see Figure 2), both BE and BW uniquely explained variation in T3 behavior net T1 behavior. In this sample, however, BE was a stronger predictor than was BW.

Indirect effects. The results presented in Figure 2 suggest that the three exogenous variables assessed at T2, plus T1 behavior, have an indirect influence on behavior at T3, through their effects on BE and BW at T2. To evaluate this, we tested the statistical significance of the indirect effects of these four predictor variables on T3 behavior, using a procedure developed by Sobel (1987). All four variables were found to have statistically significant indirect effects on behavior 6 or 12 months later, through the intervening cognitive variables assessed at T2 (all Zs > 2.18, $p < .05$). Also, as expected, BW significantly influenced subsequent behavior indirectly, through BE ($Z = 2.82$, $p < .005$). The total amount of variance accounted for in T3 behavior was 66%, which compares favorably with applications of rational models to health behavior (van den Putte, 1993; cf. Conner & Sparks, 1996).

Table 4
Factor Loadings and Standard Errors for Measurement Model (Study 2)

Construct and indicator	Unstandardized factor loading	*SE*	Standardized factor loading
Time 1 behavior			
No BC	1.00	—	0.76
No BC last time	0.92	.09	0.60
Subjective norm			
Friends	1.00	—	0.87
Peers and parents	0.43	.06	0.58
Attitude			
Risk/Danger	1.00	—	0.55
Outcome (self)	1.28	.22	0.77
Prototype			
Mature	1.00	—	0.80
Self-assured	1.00	.06	0.87
Attractive	0.89	.06	0.70
BE			
No BC	1.00	—	0.62
Sex without BC	1.80	.16	0.90
BW			
Withdrawal	1.00	—	0.82
No sex	0.90	.05	0.87
Sex without BC	0.48	.04	0.60
Time 3 behavior			
No BC	1.00	—	0.68
No BC last time	0.92	.09	0.54

Note. Dashes indicate that the standard error was not estimated. BC = birth control; BE = behavioral expectation; BW = behavioral willingness.

Table 5
Correlations Among the Latent Constructs (Study 2)

Construct	1	2	3	4	5	6	7
1. Subjective norms	—	.27	.44	.42	.22	.37	.41
2. Attitude		—	.43	.38	.19	.19	.22
3. BE			—	.60	.13	.63	.73
4. BW				—	.23	.54	.65
5. Prototype					—	.08†	.18
6. T1 behavior						—	.66
7. T3 behavior							—

Note. BE = behavioral expectation; BW = behavioral willingness; T = time.
† *ns*; for all other values, $p < .001$.

Removing BW–T3 behavior path. To evaluate the importance of the direct effect of BW on T3 behavior, the modeling analysis was repeated with the path from BW to T3 behavior fixed at zero. This resulted in a significant reduction in the fit of the model, $\chi^2(1, N = 469) = 12.1$, $p < .001$, even though the explained variation in behavior decined only slightly, from 66% to 65%. Examination of the results for this latter version of the model indicated that, with the path from BW to T3 behavior fixed at zero, the path from BE to T3 behavior increased substantially, from .38 to .50. However, the indirect effect of BW on T3 behavior through BE also increased substantially, from .10 to .15. These results indicate that the fit of the model is improved by including the path from BW to T3 behavior and, when that direct path is removed, BW has a substantial indirect effect on T3 behavior through BE. Finally, a different model that did not include either BW or prototypes produced an R^2 of .61 for T3 behavior, as opposed to .66 for the entire BW model. That figure dropped to .52 when previous behavior was excluded. In short, the new elements from the model did add significantly to behavioral prediction.

Sex differences. Analyses were also conducted testing for sex differences in the structural parameters of the model, using the multiple-group procedure in the LISREL VIII program. It should be noted that in conducting these analyses, the measurement model (i.e., the factor loadings) was held constant across the two groups. A comparison of a model in which the causal paths were also forced to be equivalent for the two sexes with a model where the causal paths were allowed to vary was nonsignificant, $\chi^2(11, N = 469) = 12.2$, $p > .30$. Therefore, it appears that the causal paths were essentially equivalent for male and female participants. Finally, a separate analysis conducted on just those participants who indicated at T3 that they were not virgins ($n = 343$) produced a model that was almost identical to the full model described here. All paths remained significant and the overall fit was good (CFI = .97).[4]

[4] Also, we assessed refusal efficacy (Ellickson & Hays, 1991) by presenting an additional, altered version of the BW scenario in which participants were asked to assume that they did not want to have sex

Discussion

The data conformed to the pattern outlined by the P/W model, as the relations among all of the variables were as predicted and were statistically significant. Thus, the results indicate the full P/W model can predict changes in pregnancy-risk behavior reasonably well, just as elements of the model (e.g., prototypes) have been shown in previous studies to predict adolescent drinking and willingness to engage in risky sex (Blanton et al., 1997; Gibbons & Gerrard, 1995). Moreover, these results indicated, once again, that BW is strongly related to BE, that the two predict risk behavior jointly, and that they predict behavior independent of one another.

The primary purpose of Study 2 was to assess the entire P/W model, rather than to compare it directly with the theory of planned behavior or other rational models. Consequently, we operationalized constructs, some of which are shared with reasoned action and planned behavior theories, in a manner that was consistent with the P/W model. In particular, whereas the subjective norm and BE constructs were essentially as defined by those theories, the attitude construct placed more emphasis on outcome. Also, because we assumed that most college students believe they have control over their sexual behavior, we did not include a perceived behavioral control measure as planned behavior theory would suggest. Finally, we used only a BE measure and did not include a "traditional" BI measure.

Although these decisions were consistent with the goals of the study, they do raise an important question for the P/W model that could only be partly addressed in the first two studies. That is, how distinct are the two central constructs of the P/W model—prototypes and especially BW—from what appear to be similar constructs in rational behavior theories, at least one of which is highly correlated with BW, namely, BE and perceived behavioral control? If these constructs are redundant with one another, the need for these new elements would be harder to justify. Consequently, a third study was conducted in which a confirmatory factor analysis was performed on all of the elements of reasoned action and planned behavior theories, plus those of the P/W model. Again, the maximum likelihood estimation algorithm from LISREL VIII was used.

Study 3

Method

Participants and Procedure

Participants in this new sample were 122 male and 175 female undergraduates (mean age of 21) who had responded to ads placed around campus for participation in a study of health attitudes. They each received payment of $15 for participating.

Measures

We were again interested in risky sex, but this time to increase generalizability, we shifted our focus from contraception to condom use. Behavior was assessed with two items: (a) "During the last 4–5 months, of the times you've had sex, how much of the time have you used a condom?" followed by a scale with anchors 1 = *never* and 7 = *all of the time* and (b) "How many times in the last 4–5 months have you had sexual intercourse without using a condom?" followed by a scale with anchors 1 = *never* and 7 = *more than 10 times.* For analyses, all items were coded so that a high score reflected a prorisky sex response. Those who had not been sexually active during this period were told to skip these two questions. They were then assigned the lowest risk score. This time, attitudes toward the behavior were assessed in a manner more consistent with planned behavior theory. Participants were asked to indicate how they felt about the behavior, "Having sex without a condom," by evaluating it on a series of four 7-point semantic differential scales: *foolish* to *wise, unpleasant* to *pleasant, unexciting* to *exciting,* and *negative* to *positive.* Subjective norms were assessed, as before, using two items: (a) "How many of your friends have unprotected sexual intercourse (without a condom)?" followed by a scale from 1 = *none* to 7 = *almost all,* and (b) "How would your friends react if they thought you were having unprotected sexual intercourse (without a condom)," followed by a scale from 1 = *extreme disapproval* to 7 = *extreme approval.* Prototypes were assessed by first presenting the following statement: "A number of young people engage in sexual intercourse without using condoms. Take a moment to think about the *typical person your age who has unprotected sex.* How much do you think *each* of the following describes that person?" This statement was followed by the same 12 adjectives that were used in Study 2 (i.e., smart, confused, and so on).

This time BE was assessed with both an intention and an expectation measure: "Rate the extent to which you intend to have unprotected sex (without a condom) some time in the next 4–5 months" followed by a 7-point scale with anchors *not at all* (1) to *very much* (7) and then "How likely is it that you will have unprotected sex" followed by a 7-point scale with anchors *not at all likely* (1) to *extremely likely* (7). BW was assessed with three items, preceded by the statement

> Imagine that you have met a person that you find highly sexually attractive. Over the course of an evening, the two of you have an enjoyable conversation and you come to realize that this person wants to have sex with you. However, neither of you has a condom. Using the scale below, please tell us how *willing* you would be under these circumstances to (a) Go ahead and have sex with this person, (b) Go ahead but use a method like withdrawal of the penis before ejaculation, and (c) Not have sex.

This list was preceded by a 7-point scale with anchors *not at all* (1) and *very much* (7).

There were two sets of perceived behavioral control items. The first assessed refusal efficacy by including the following two statements below the BW scenario listed above: "If I do not want to have sex, I feel confident that I can keep it from happening in this situation," and "If my partner is pushing me to have sex, I feel that I can say 'no' and make it stick." These two were also preceded by a 7-point scale ranging from *not at all* (1) to *very* (7). Finally, condom efficacy was assessed with three items preceded by the following statement:

> Not all things we want to do are within our control. For instance, many people would like to become millionaires but do not feel like

---

but that their boyfriend or girlfriend did. This single item did correlate with the three BW items (rs = .35, .47, and .52). Of more importance, when refusal efficacy replaced BW in the model, it was related to contraception BE (p = .03), but it was not related to any of the other constructs, including T3 behavior (p = .09). Moreover, when the refusal efficacy item was included as a fourth indicator of BW, it did load moderately well on the construct (.58); however, the BW to behavior path coefficient declined slightly, and the overall model did not fit as well as it did with the three-item BW construct. Thus, refusal efficacy does not appear to be as effective in this sample at predicting pregnancy risk as does BW.

they have the ability to bring this about. Below is a list of possible behaviors. Rate the extent to which you feel you *could* perform this behavior *if you wanted to.*

The three items were "Use a condom with a partner," "Suggest to a partner that a condom should be used," and "Refuse to have sex without a condom," each preceded by a 7-point scale that ranged from *I would be completely unable to do this* (1) to *I would be completely able to do this* (7).

Finally, to again assess the extent to which the risk behavior was planned or not, a subset of the sample (n = 266) was also asked two questions about previous instances of this risky behavior. These items (described in the *Results* section) were then related to participants' BE and BW for future risk behavior.

Results

Part A: The Measurement Model

Table 6 presents the means, standard deviations, and correlations among the measured variables. Sixty-eight percent of the sample had sex during the previous 4–5 months, and 59% of these sexually active students had sex without a condom at least once during that time. Thus, 40% of the total sample had unprotected sex during this period, which is slightly higher than the percentage of students in Study 2 who reported having sex without birth control in the previous 6 months (i.e., 22% at T1, 17% at T3). The mean on the first behavior question, among the sexually active participants was 3.42 (corresponding to condom use slightly more than half of the time), and on the second question it was 3.30 (indicating unprotected sex about 2 or 3 times during this period). As expected, the means on the BE and BW items were low. In contrast, the means on the perceived control measures were very high (5.88 on refusal efficacy and 6.40 on the condom efficacy index), indicating participants thought they had considerable control over their (risky) sexual behavior.

All of the indicators loaded as anticipated on their respective constructs (see Table 7). In particular, the four attitude measures split into two distinct constructs: evaluative ("foolish–wise" and "negative–positive") and affective ("unpleasant–pleasant" and "unexciting–exciting;" cf. Triandis's, 1980, model of attitude–behavior relations). In addition, the same three-factor structure for the prototype as before was evident, and the two perceived behavioral control constructs emerged as expected.

The nine-factor oblique model was found to provide a good fit to the data, $\chi^2(153, N = 297) = 255.3$, $p < .001$, GFI = .93, CFI = .97. Once again, several of the correlations among the latent variables derived from the analysis are worth noting (see Table 8). First, the relations between BE and all elements of the theory of planned behavior are as that theory would predict. The same was true of the P/W model, as BW was related to all antecedent elements as expected. At the same time, these correlations indicate that BW was not redundant with any elements of planned behavior theory, including BE (r = .29) and both types of attitude and behavioral control (all correlation absolute values <.46; M = .32, excluding subjective norms). Both BW and BE were highly correlated with subjective norms (rs = .49 and .62, respectively), which for BE is consistent with previous research on this behavior (cf. Nadler & Fisher, in press). Finally, it can be seen that participants' expectations of engaging in future unprotected sex, much more than their willingness to do so, were very highly related to their recent engagement in this behavior.

Part B: Relation Between Previous Behavior and BE Versus BW

Members of the sample were also asked the following two direct questions, one pertaining to their last incident of unprotected sex, the other to the behavior in general: "Think about the *last time* that you had unprotected sex (without a condom). Please indicate the extent to which you had intended or planned to do the behavior ahead of time." This was followed by a scale with anchors 1 = *not at all intended* and 7 = *completely intended.* The second question was "Of the times that you [had unprotected sex] in the last 4–5 months, how many times did you engage in the behavior *without* intending to?", followed by a scale from 1 = *never* to 7 = *all of the time.* Again, those who had not been sexually active skipped the questions.

The mean response on the last-time item was 4.04, as 51% of the sample indicated the last incident was mostly to completely unintended (i.e., response < the scale midpoint). The mean on the second item was 3.05, as 25% said most of their unprotected sex during this period was unintended, whereas 36% said it was always intended. More important, correlations indicated that the extent to which the last incident of unprotected sex was intended was strongly related to BE for the future (r = .56, $p < .001$) but not to BW (r = −.09, *ns*). When BE was partialed out of BW, the latter correlation became significantly negative (r = −.23, $p < .01$). A similar pattern occurred on the second item, as BW was positively related to the extent to which unprotected sex was generally unintended, whereas the relation between this item and BE was not significant (rs = .24 vs. .09, $p < .01$ vs. *ns*).

Discussion

Generally speaking, the confirmatory factor analysis supported both the theory of planned behavior and the P/W model, as the relations between BE and BW and their various antecedent constructs were significant. At the same time, the analysis provided evidence, once again, that BW and BE were related (although not as highly as before) but were not redundant with one another. Similarly, BW was related to perceived behavioral control and both attitude dimensions, but clearly these were not the same constructs.

In addition, analyses of the direct intention questions provided two significant pieces of information about these participants' recent unprotected sexual behavior: (a) Even though the behavior was thought to be controllable, much of it was unintended, and (b) the behavior related differently to future BW and BE. In particular, if their recent unprotected sex was intended, they expected to engage in this behavior again. On the other hand, if their recent unprotected sex was unintended, they were willing, but not intending to engage again. In short, if their previous

Table 6

Means, Standard Deviations, and Correlations Among All Measured Variables (Study 3)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. How much sex is UPS	—	72**	22**	18*	23**	23**	42**	42**	−19*	−10	−09	−22**	−16*	67**	68**	23**	14*	16*	25**	23**	24**
2. How many times UPS		—	26**	21**	24**	25**	31**	43**	−11	−04	−01	−15*	−18*	66**	67**	15*	10	12*	26**	22**	17*
3. Attitude 1: Wise			—	52**	−02	08	20*	21*	01	03	−10	−17*	−11	26**	29**	12*	06	09	19*	17*	15*
4. Attitude 1: Positive				—	18*	19*	11	20*	−01	01	04	−06	−01	25**	30**	13*	07	15*	06	10	10
5. Attitude 2: Pleasant					—	59**	17*	26**	−15*	−16*	07	−04	−04	18*	23**	23**	21**	26**	13*	18*	11
6. Attitude 2: Exciting						—	12*	24**	−14*	−18*	11	04	−04	25**	27**	15*	16*	14*	15*	13*	13*
7. Friend prevalence							—	52**	−12*	−09	−02	−21**	−16*	39**	41**	33**	26**	24**	26**	25**	32**
8. Friend reaction								—	−15*	−10	−01	−17*	−15*	46**	47**	38**	31**	26**	31**	30**	32**
9. PBC-1: Can keep sex from happening									—	68**	10	19*	15*	−15*	−13*	−37**	−37**	−35**	−21**	−12*	−15*
10. PBC-1: Can say no										—	−01	13*	21**	−10	−10	−31**	−33**	−26**	−10	−05	−04
11. PBC-2: (Condom efficacy) Use condom with partner											—	56**	25**	−08	−08	−16*	−04	−11	−05	04	−01
12. PBC-2: (Condom efficacy) Suggest condom be used												—	37**	−25**	−24**	−34**	−20**	−29**	−18*	−10	−18*
13. PBC-2: (Condom efficacy) Refuse sex without condom													—	−22**	−25**	−42**	−38**	−41**	−30**	−16*	−26**
14. UPS intention (BE)														—	92**	25**	16*	20**	26**	19*	19*
15. UPS expectation (BE)															—	29**	19*	24**	30**	22**	24**
16. Have sex (BW)																—	80**	76**	32**	21**	28**
17. Use other method (BW)																	—	68**	33**	25**	30**
18. Don't have sex (BW)																		—	27**	21**	26**
19. Prototype 1: Mature																			—	61**	70**
20. Prototype 2: Self-assured																				—	64**
21. Prototype 3: Attractive																					—
M	2.78	2.74	2.09	2.89	4.88	4.29	3.18	2.85	5.89	5.86	6.61	6.61	5.99	2.61	2.70	2.09	2.33	2.33	3.49	2.71	3.41
SD	2.20	2.36	1.82	2.10	2.04	1.88	1.50	1.62	1.64	1.65	1.00	0.83	1.65	2.24	2.27	1.64	1.86	1.82	1.03	1.03	0.96

Note. Decimal points have been omitted for correlations. UPS = unprotected sex; PBC = perceived behavioral control; BE = behavioral expectation; BW = behavioral willingness.
* $p < .05$. ** $p < .001$.

Table 7
Factor Loadings and Standard Errors for Measurement Model (Study 3)

Construct and indicators	Unstandardized factor loading	*SE*	Standardized factor loading
Behavior			
How much sex is UPS	1.00	—	.86
How many times UPS	1.05	.07	.84
Attitude 1 (evaluative)			
Foolish	1.00	—	.76
Positive	1.04	.19	.68
Attitude 2 (feeling)			
Pleasant	1.00	—	.75
Unexciting	0.96	.15	.78
Subjective norm			
Friend prevalence	1.00	—	.67
Friend reaction	1.26	.13	.78
Prototype			
Mature	1.00	—	.82
Self-assured	0.92	.07	.75
Attractive	0.96	.07	.85
BE			
UPS intention	1.00	—	.94
UPS expectation	1.05	.03	.97
BW			
Have sex	1.00	—	.95
Use other method	1.01	.05	.84
Don't have sex	0.94	.05	.80
PBC 1 (refusal efficacy)			
Can keep sex from happening	1.00	—	.91
Can say no	0.82	.10	.74
PBC 2 (condom efficacy)			
Use condom with partner	1.00	—	.62
Suggest condom be used	1.15	.15	.87
Refuse sex without condom	1.23	.19	.46

Note. Dashes indicate that the standard error was not estimated. UPS = unprotected sex (without a condom); BE = behavioral expectation; BW = behavioral willingness; PBC = perceived behavioral control.

risky sex was unintended, then their future risky sex is also likely to be unintended as well; nonetheless, for some of them anyway, this behavior will happen. This is consistent with the P/W model, which suggests that the nonintentional component of risk behavior is reflected in the BW construct.

General Discussion

Although others have suggested that adolescents' risky sexual behavior is often reactive rather than planned (Brooks-Gunn & Furstenberg, 1989; see S. Brown & Eisenberg, 1995), to date no studies have directly assessed the first of the three basic assumptions of the P/W model, which is that this behavior, like other health-risk behaviors among young people, does have a significant nonintentional component. The current studies tested that assumption, and in so doing, provided prospective and retrospective evidence that pregnancy-risk and STD-risk behavior among college students, as well as adolescent smoking, are not always intended. Adding this to another recent study indicating that the same is true of drunk driving among college students (Gerrard, Gibbons, Smith, & Ouelette, 1998) suggests that this basic postulate of the P/W model is accurate.

Another tenet of the P/W model is that much of this nonintentional component of adolescent risk behavior can be captured by the BW construct, which is thought to be distinct from related constructs in rational models of behavior, namely, BI or BE. In previous studies, we have shown that BW and BE relate differently to perceptions of vulnerability to the negative outcomes associated with health-risk behaviors (e.g., drunk driving expectation is related to perceived vulnerability to alcohol-related accidents, whereas willingness to drive drunk is not; in contrast, drunk-driving willingness is strongly related to defensiveness or denial of accident risk, whereas BE is not; Gibbons et al., 1998). The current studies add to this previous research by demonstrating, once again, that BE and BW are related to one another but show discriminable patterns in their relations with other variables, including behavior.

Discriminating Between Willingness and Intention

Study 1 indicated that BE and BW were highly correlated but still predicted change in adolescent smoking behavior inde-

Table 8
Correlations Among the Latent Constructs (Study 3)

Construct	1	2	3	4	5	6	7	8	9
1. BE	—	.29	.40	.32	.62	−.15	−.28	.31	.82
2. BW		—	.17	.26	.49	−.45	−.41	.38	.22
3. Attitude 1 (evaluative)			—	.18	.35	.01*	−.18	.22	.35
4. Attitude 2 (feeling)				—	.37	−.23	−.03*	.21	.36
5. Subjective norm					—	−.20	−.26	.50	.64
6. PBC 1 (refusal efficacy)						—	.22	−.19	−.18
7. PBC 2 (condom efficacy)							—	−.23	−.24
8. Prototype								—	.33
9. Prior behavior									—

Note. BE = behavioral expectation; BW = behavioral willingness; PBC = perceived behavioral control.
† *ns*; for all other correlations, $p < .001$.

pendent of one another. They also predicted smoking behavior jointly, indicating that the overlap between the two constructs relates to future behavior, as do their unique components. Consistent with this latter finding, the structural equation modeling analyses in Study 2 indicated that both variables had a unique effect on pregnancy-risk behavior and that there was a significant indirect path from BW through BE to pregnancy risk as well. Thus, once again, BW and BE explained significant percentages of the behavioral variance by themselves and jointly. Finally, the confirmatory factor analysis in Study 3 provided direct evidence that BW and BE, this time for unprotected sex, are related to one another but are not redundant. In summary, converging evidence suggests that BE and BW have much in common—those who are intending to perform a behavior, for example, are also likely to be willing to do it. On the other hand, the direct relation between BW and behavior independent of intention, which was detected in the regression and the modeling analyses, indicates that BE is not a necessary antecedent to health behaviors of this nature; BW alone may sometimes be sufficient.

The Impact of Previous Behavior

One relation in the three studies worth noting is that between previous behavior and BE versus BW. In Study 1, behavior was assessed 1 year after both BE and BW, and the latter was a stronger predictor than the former. In Study 2, the time lag was 6 months, and this time behavior correlated somewhat more highly with BE than with BW (albeit in an older sample). Finally, in Study 3, when all of the constructs were assessed simultaneously, recent behavior was much more highly related to BE than to BW. Keeping in mind that the three studies involved three different behaviors, one interpretation of this result is that expectations relate more strongly to recent behavior because they are a reflection of the individual's current situation (cf. Liska, 1984). Using unprotected sex as an example, some of these college students may have been in a fairly committed relationship at the time in which they were using the pill but not condoms. They may have felt, or wanted to believe, that this relationship would last and, therefore, assumed that their current protection strategies (including lack of condom use) would continue. Thus, the relation between BE and their recent behavior would be high, and it would remain so unless, or until, their circumstances changed.

Specificity

The correlations of BE and BW with behavior, both previous and expected, also address another related issue that is relevant to the conceptualization and measurement of the two constructs. This concerns their respective degrees of specificity relative to one another and vis-à-vis behavior (Fishbein & Ajzen, 1975). On the one hand, the BE measure we used was of a global nature, whereas the BW measure was more specific to the scenario we described. On the other hand, the behavioral measure itself also was global and, in fact, matched the BE items on this dimension (including time frame) more closely than did the BW items. This match (what Ajzen, 1988, has termed *compatibility*) should bolster the relation between BE and both retrospective and prospective reports of recent and imminent behavior (Fazio, 1990), and that appeared to be the case. What this suggests, more generally, is that BE measures, because they are a reflection of one's recent behavior and current situation, will predict behavior quite well—better than BW items—in the near future. Over time, however, circumstances change, which means the relation between BE and behavior will decline (cf. Liska, 1984). Also, as circumstances change, individuals will likely experience more types of risk situations in which their BW will have an opportunity to be expressed. In short, although the BW items are worded in a more specific manner, they may actually be less closely linked to specific (i.e., current or recent) circumstances than are the BE items. The result is that BE predicts much better than BW in the short run, but loses that predictive superiority over time.

Social Desirability

As indicated earlier, BE measures are less subject to social desirability constraints than are intention measures (Beck & Ajzen, 1991). By the same token, it may also be true that saying one is willing to do a risky behavior under conducive circumstances is more socially acceptable than stating that one intends or expects to do it. Although this might add to the (relative) predictive power of BW measures, we do not believe it is an important reason why BW measures supplement BE measures. Instead, we would argue that, in most cases, when people state they do not intend or expect to engage in a particular behavior they are being truthful. That does not mean, however, that they would not be willing to do the behavior if the opportunity presented itself, and they will acknowledge this. In fact, our data indicate that a significant percentage of young people report some level of BW for a number of risky behaviors while also stating no intention or expectation at all. Future studies should focus on this interesting (presumably at-risk) group, in order to determine why they maintain these seemingly inconsistent cognitions.

A Temporal Sequence

BW and BE were measured concurrently in the current studies, which means it is not possible to draw any definitive conclusions about the temporal sequencing of their respective influences. Results of Study 2 were consistent with the assumption of the P/W model that the "flow" of shared influence proceeds from BW through BE, however. Thus, if we were to conceptually partial out the effects of BW on behavior, some of it would be direct: If one is willing, one is simply more likely to do the behavior should the opportunity occur. Some of the effect is indirect, however: Being willing is likely to lead to an increase in perceived likelihood or expectation of performance. One reason for this is that risk opportunities are ubiquitous, and the willing individual is not likely to avoid the circumstances that provide these opportunities. Eventually that person will acknowledge that his or her BW is resulting in performance of the behavior; such an admission is tantamount to expectation. Similarly, BW may also develop into intention with age and

experience (see below). Future analyses that look at the two constructs assessed at different time periods should allow for a more complete test of this hypothesis.

Relating BW to Other Variables

Moderation

One factor that is likely to moderate the strength of the BW–behavior relation is age or experience. The adolescents in Study 1 who smoked reported higher BW than BE, and in fact BW was a better predictor of behavior for them. Although relatively few adolescents intend to smoke or have unprotected sex, a number are interested enough that they might consider it should the opportunity afford itself. Thus, BW may be more of a factor for younger people. As the individual gains experience with the behavior, BE should become a better predictor of future behavior. Experience is likely to evoke more consideration of the behavior and its consequences, and consideration is associated with BE (Gibbons et al., 1998). Also, should the behavior become habitual, as with smoking or heavy drinking, then BW will become much less of a factor. In either case, the BW–BE ratio should decline with both age and experience. Some evidence of this can be seen in Study 2, in which BE within this older sample was a stronger predictor of behavior than was BW, the opposite of what was found with the younger sample in Study 1. Notable exceptions to this age trajectory would be situations in which an adult finds him- or herself presented with opportunities to engage in risky behaviors with which he or she has little experience. An example might be drunk driving. Perhaps a better example would be adultery, much of which is neither planned nor rational (Buunk & Gibbons, 1997). In such circumstances, the adult is not much more advantaged, in terms of predicting behavior, than is an adolescent, and so BW measures should prove to be better predictors of the behavior. Generally speaking, BW is likely to be less important for high incidence risk behaviors.

Model Parameters

The P/W model was originally intended to predict and explain a particular kind of behavior within a specific population: health risk among young people. Generally speaking, we believe it is most effectively applied to this context—*effective* being defined as the extent to which it adds explanatory power to existing (rational) models. More specifically, BW is not likely to add much predictive power vis-à-vis behaviors that are rational and involve premeditation, such as those that promote health or socially desirable behaviors, such as volunteerism. There are, however, a number of other behaviors that are reactive in nature, and therefore have a willingness component, that are not health-relevant. These would include other prosocial behaviors, such as bystander or emergency intervention, and other risky behaviors, such as income tax cheating or scientific dishonesty. Once again, these are actions that are often not intended or planned but instead are reactions to fortuitous opportunities. Moreover, another aspect of the P/W model, prototypes, is likely to be influential for any behaviors—positive or negative, health-relevant or not—that have an identifiable social image associated with them (cf. Gibbons & Gerrard, 1997). Future research on these issues should serve to further clarify the domain of the model.

Conclusion

Rational models, which emphasize intention as the only proximal antecedent, have been quite successful at predicting certain types of behaviors, especially when used with adult samples. For example, BI has been shown to relate strongly to protective actions that involve some planning, such as breast cancer screening (Hill, Gardner, & Rassaby, 1985), flossing (McCaul, O'Neill, & Glasgow, 1988), and childbearing among older, married women (Davidson & Jaccard, 1979). This is quite consistent with the rational approach, given that these are clearly reasoned actions that may be viewed, essentially, as goal states or behavioral achievements (Ajzen, 1985, 1991). For risky behaviors, however, especially among younger people, there is an additional element that is related to performance, and that is the individual's willingness to engage in the behavior when circumstances facilitate it. The current studies demonstrate the utility of this and related constructs in predicting, and thereby furthering understanding of, these important but enigmatic behaviors.

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