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CONDITIONAL VERSUS UNCONDITIONAL RISK ESTIMATES IN MODELS OF AIDS-RELATED RISK BEHAVIOUR

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This study focuses on the concept of perceived risk and its relations to behavioural intentions and behaviour. Most research on health related behaviour employs a measure of unconditional risk. Given the inconsistent findings concerning the relationship between perceived risk and behavioural measures in the health literature, we investigated the usefulness of a conditional risk estimate as an alternative measure. In total, 247 heterosexual visitors of a STD-clinic participated in this study. Hundred participants had private partners only, 147 engaged in prostitution contacts. The relationship between the unconditional measure of perceived risk and behavioural intentions was found to be dependent upon sample-differences. However, it appeared that when a conditional risk estimate was used, a significant positive relation with intention was observed, regardless of the risk-status of the sample. Given the results of the present study, and the closer resemblance of the conditional risk measure to the original concept of vulnerability or susceptibility, it is argued that a conditional risk measure is more useful than a relatively general, unconditional measure of perceived risk.

KEY WORDS: AIDS, perceptions of risk, conditional risk, behavioural intentions, risk behaviour.

With the introduction of models such as Becker's (1974) health belief model (HBM) and Rogers' (1975) protection motivation theory, subjective probability concepts such as perceived *susceptibility* and *vulnerability* appeared in the health literature (Sutton, 1982). The health belief model distinguishes five factors that influence the adoption of preventive, risk-reducing behavioural practices. These are (a) perceived susceptibility or vulnerability to developing a health problem, (b) perceived severity of the problem, (c) perceived benefits of changes in behaviour, (d) perceived barriers and/or possible negative consequences of these changes, and (e) specific cues to action, such as a symptom or a health communication (see Janz and Becker, 1984).

Rogers' protection motivation theory postulates that information about a health hazard stimulates a cognitive appraisal of the severity and probability of the negative event, and of the efficacy of the recommended preventive action. Both models thus assume that an individual's response to a health threat is (partially) determined by the subjective probability of the event's occurrence *and* the perceived severity of the depicted negative outcome (Sutton, 1982).

One of the assumptions of these models is a correspondence between objective probabilities and the subjective assessment of potential risks (Sutton, 1982). However, it is well established that the accuracy of perceptions of risk vary considerably among people and that they often show little correspondence to epidemiological findings (e.g., Slovic, Fischhoff and Lichtenstein, 1987). Errors in perceptions of risk are not random. Slovic *et al.* (1987), for example, report that the probability of dramatic and sensational causes of death were likely to be overestimated, compared to more common causes. Another bias concerns what Weinstein termed "unrealistic optimism" i.e., the tendency of people to perceive themselves to be less at risk than others around them (Weinstein, 1980, 1982).

Much effort has been directed to understand the factors that shape beliefs about susceptibility, to describe errors and optimistic biases in these beliefs, and to unravel the relationship between perceived susceptibility and precautionary behaviour (Weinstein, 1989). Perceptions of risk are often found to be positively related to preventive health behaviour (see e.g., Cummings, Jette, Brock and Haefner, 1979; McCusker, Stoddard, Zapka, Zorn and Mayer, 1989). However, in some instances, measures of perceived risk are found to be negatively related to preventive behaviour or behavioural intentions (e.g., Joseph, Montgomery, Emmons, Kirscht, Kessler *et al.*, 1987; Rogers and Mewborn, 1976), or not at all (e.g., Rippetoe and Rogers, 1987; Temoshok, Sweet and Zich, 1987). Research on the BHM also indicates that the relationship between perceived risk and behaviour can be opposite to the predicted direction (Becker, Kaback, Rosenstock, and Ruth, 1975; Becker, Nathanson, Drachman, and Kirscht, 1977; Langlie, 1977). Several findings suggest that an increased sense of risk – combined with low expectations of success in dealing with the risk – may provoke a helplessness reaction, and hence, decrease intentions to behave adaptively (Beck and Frankel, 1981). Indeed, in Rogers and Mewborn's (1976) study, a negative relation between perceived risk and behavioural intentions occurred *only* when recommendations for preventive behaviour were presented as relatively ineffective. Similar results were obtained in a study on cigarette smoking (Maddux and Rogers, 1983). Furthermore, Joseph *et al.* (1987) found that higher levels of perceived risk were related to both increased barriers to AIDS risk reduction, and to increased psychological and social distress.

In this context it seems necessary to distinguish between *unconditional* and *conditional* risk estimates. *Unconditional* risk estimates may be defined as the subjective probability that an event will occur based on whatever sets of factors individuals take into account (e.g., perceptions of control, the efficacy of preventive behaviours). Vulnerability or susceptibility is generally defined as the *conditional* probability that an event will occur provided no specific action is taken to reduce risks (see for example, Beck and Frankel, 1981; Sutton, 1982). Thus conditional risk refers to the probability of an event if no preventive action is taken, or the probability of an event if a specific (preventive) action is taken. A conditional risk estimate would require respondents to indicate their risk given their present behavioural practices. Similarly, one could also ask them to indicate their risk if they would change specific behaviours.

Although most models refer to *conditional* risk estimates, many operationalization are phrased in terms of an *unconditional* risk estimate (e.g., "How likely is it that you will get ...", followed by the health risk(s) under study). Sometimes, different measures are combined into an index-score. In a study on AIDS, for example, Joseph *et al.* (1987)

used a composite-scale based on two items. The first item asked participants to consider all factors that may contribute to AIDS, including their past and present behaviour (perceived risk), the second item asked participants to compare their risk to that of an average gay man (comparative risk). Most studies however, tend to rely on a general, unconditional risk estimate. Unfortunately it is unclear what set of factors participants take into account when answering this general question.

In a recent study Ronis (1992) combined the health belief model with the theory of subjective expected utility (SEU) to derive hypotheses about the conceptualization and measurement of health threats. Ronis argued that subjective expected utility theory complements the HBM and that it makes more specific predictions about the relations between beliefs and behaviours. SEU theory assumes that people assess the expected utility or desirability of alternative behavioural actions and select the option with the highest SEU. An important implication of this combination of theories concerns the necessity to measure health threats in ways that are clearly conditional on action. Ronis predicted that preventive behaviour and attitudes toward this behaviour would be more accurately predicted from conditional than from unconditional measures of health risks. He found support for his prediction in a study of judgments about a hypothetical disease and a study on dental flossing behaviour.

As mentioned before, most research testing protection motivation theory or the health belief model use unconditional risk estimates. In the present study, we assessed both conditional and unconditional risk estimates, and related these measures to factors incorporated in protection motivation theory and/or the health belief model (perceived severity, response efficacy, and self-efficacy), and other factors (fear, psychological stress, personal control, and perceived risk status). Additionally, the two different measures of risk were examined in relation to previous (risk) behaviour, behavioural intentions, and subsequent risk behaviour.

In the present study we focus on risk estimates in relation to sexual behaviour. Previous research shows mixed findings concerning the relationship between these subjective estimates and behaviour or behavioural intentions. Interestingly, quite a few studies found lower risk estimates to be associated with higher intentions to engage in safe sex practices (Joseph et al., 1987; Otten and van der Pligt, 1992; van der Velde, van der Pligt, and Hooykaas, 1994). This counterintuitive finding may be the result of the use of an unconditional risk estimate. Respondents may well incorporate their behavioural intentions when assessing their own risk (e.g. "I am not going to change my behaviour, hence my risk is and will be relatively high", or "I intend to engage in safe sex practices, so my risk is rather low"). To assess the differential effects of conditional and unconditional risk estimates we included both in the present study and investigated their role in the context of factors from the HBM and protection motivation theory.

METHOD

Participants

Participants in this study were visitors of a STD clinic of the Municipal Health Service of Amsterdam. The study focused on sexually active hereosexual participants. Visitors of the clinic were asked to participate if they were older than seventeen years of age, and if they had at least five sexual partners in the six months prior to the study.

Haemophiliacs, men with homosexual contacts and intravenous drug users were excluded from the study. Between October 1987 and December 1990, approximately half the people who met the entrance criteria decided to participate: 259 males and 343 females ($n = 602$). Visitors of the STD clinic most likely to refuse participation were younger males of ethnic minorities (see Van der Linden, Van der Velde, Hooykaas, Van Doornum, and Coutinho, 1990). Participants were asked to return to the clinic every four months; 61% ($n = 365$) returned for the first follow-up visit. After the first visit, the percentage of participants not returning for their follow-up visit dropped from 39% to 10–17% for every next visit. The majority engaged in prostitution contacts: 157 males (61%) visited prostitutes, 259 females (76%) worked as a prostitute. On average, male participants had fourteen prostitution and seven private partners, female participants had a total of 524 prostitution and four private partners in the four months prior to the study. Furthermore, medical examination indicated that 25.6% had one or more STDs at entry of the study, 47.5% and 13.9% had a history of STDs in the preceding five years and the preceding four months respectively. Finally, 25.0% reported sexual contacts with AIDS-risk-groups in the five years prior to the study.

The present study was carried out in the later stages of this longitudinal research project; a total of 247 participants were approached at their follow-up visit to the clinic. Of these 147 participants engaged in prostitution contacts, 100 participants had private partners only. The questionnaire described below was administered for the first time in 1989 and 1990. Most participants (63.9%) had participated in the study for more than sixteen months.

Measures

First, the interviewers asked questions about respondents' *reason for clinic visit* (STD-related complaints or not), their ethnicity, gender, age, and sexual practices in the four months preceding the study. *Sexual behaviour* consisted of number and type of partners (private or prostitution partners), frequency of various sexual techniques per type of partner, and condom use per technique and per type of partner. Responses for frequencies and condom use were made on a 5-point Likert-type scale; end-points for both scales were *never* and *always*. A measure of previous risk behaviour was calculated by multiplying the number of partners per technique with the frequency of vaginal intercourse (multiplier 0 when technique was not practiced, via .25, .50 and .75, to 1 if the technique was practiced with all sexual contacts). Finally, the resulting score was multiplied with the frequency of condom use (multiplier 1 if condoms were not used at all, via .75, .50, and .25 to 0 if condoms were always used). For example, a participant with five private partners and five prostitution partners who had often (.75) vaginal intercourse with private partners without using condoms (1), and who always (1) engaged in vaginal intercourse with prostitution partners while using condoms half of the time (.5), obtained a risk-score of $(5 * .75 * 1) + (5 * 1 * .5)$ = 6.25. Because of skewed distributions, the resulting score was log-transformed afterwards. Sexual behaviour was assessed together with the other variables in one interview. In a subsequent follow-up study (approx. four months later) we again assessed sexual behaviour. Additionally, *STD-history* was assessed covering both the period of four months and the period of five years prior to the study.

All other measures were assessed by means of a questionnaire. Unless otherwise mentioned, responses were made on 5-point scales. *Behavioural intentions* were

gauged by asking if participants intended to use condoms in the following four months, separately for various sexual techniques, and separately for private and prostitution contacts. Responses ranged from "definitely not" to "definitely yes". Summing yielded, separately for participants with prostitution partners and participants with exclusively private partners, an overall score for intentions. To assess the *unconditional* risk estimate, participants responded to the question "how do you estimate the chance that you will become infected with the AIDS-virus in the next two years, because of your sexual behaviour?" (own risk). The same probability estimation was asked for an average other of one's own age and gender (others' risk). This question was phrased "how do you estimate the chance that a man/woman of your age, chosen at random, becomes infected with the AIDS-virus in the next two years, because of his/her sexual behaviour?". Responses were made by setting a mark on a continuum ranging from 0 to 100% chance, with every 10% point marked. The *conditional* risk estimate was assessed using the same scale. This question was phrased "How do you estimate the chance that you will become infected with the AIDS-virus in the next two years, if you would not use condoms?". *Perceived risk status* was assessed by asking participants to rate the extent to which they felt they belonged to an AIDS-risk group, on a scale ranging from *absolutely not* (1) to *absolutely* (5).

Several other measures were included in the questionnaire. *Perceived severity* was assessed by rating the severity of an HIV infection on a scale ranging from *not at all severe* (1) to *very severe* (5), *personal control* was assessed by asking participants how much control they thought to have over avoiding an infection with HIV. Scores ranged from *no control* (1) to *complete control* (5). *Self-efficacy* was assessed by asking participants (a) if they thought they were able to use condoms effectively, (b) if they thought they would be able to propose condom use to future sexual partners and (c) to indicate the extent to which they would be able to insist on using a condom (scales for these items ranged from *not at all* to *very much*). Item-scores were summed to yield an index for self-efficacy. A measure for *response efficacy* was established by subtracting the perceived safety of sexual techniques with condoms from the perceived safety of the same techniques without condoms. Difference scores for these techniques were summed afterwards. Responses could range from *not at all safe* to *very safe. Fear* was assessed by six questions (e.g. "are you afraid you might already have been infected with HIV?"), participants rated to what extent they felt they worried about AIDS, responses ranged from *not at all* to *very much*. These items resulted in a Cronbach's alpha of .86. Psychological stress was assessed with an abbreviated and validated version of the *Voeg-Stress-scale* (Jansen and Sikkel, 1981). The reliability of the ten item scale was .83 (Cronbach's alpha), participants responded to the items by indicating whether they applied to them or not.

RESULTS

Participants were split into two groups: those with prostitution partners, and those with private partners only. As shown in Table 1, participants with prostitution partners gave higher conditional risk estimates concerning a possible infection with HIV than participants with exclusively private partners ($F(1,238) = 4.3, p < .001$). *Unconditional* risks were, on average, perceived as somewhat lower by participants with private partners than by participants with prostitution partners. This difference did not reach

Table 1 Mean scores on perceptions of risk and other factors, for subjects with private partners only, and subjects with prostitution partners (N = 247)

	Private partners n = 100		Prostitution partners n = 147	
	Mean	(sd.)	Mean	(sd.)
Unconditional risk[a]	16.18	(15.70)	17.82	(18.20)
Conditional risk[a]	34.74	(28.21)	52.43	(33.12)**
Perceived risk status[b]	2.18	(1.26)	2.60	(1.33)**
Personal control[b]	4.21	(0.76)	3.92	(1.13)*
Previous risk behavior[c]	1.02	(1.10)	1.59	(2.64)*
Subsequent risk behavior[c]	0.81	(1.18)	1.54	(3.31)*

Note : [a]Possible range of scores from 0% to 100% chance. [b]Scores could range from 1 (low) to 5 (high). [c]Scores ranged from 0 to the (log transformed) total number of sexual partners. *p < .05, **p < .01, ***p < .001.

statistical significance (p = .12). However, participants with prostitution partners acknowledged their belonging to an AIDS-risk group (risk status) more often than did participants with exclusively private partners (F(1,238) = 5.9, p < .01).

Furthermore, participants with prostitution partners reported lower levels of perceived control over an infection with HIV (F(1,238) = 4.8, p < .05), had higher levels of previous risk behaviour (F(1,245) = 4.2, p < .05), and, finally, had higher levels of subsequent risk behaviour (F(1,218) = 4.1, p < .05). Differences in self-efficacy, response efficacy, perceived severity, fear, and stress were not found between participants with prostitution partners and participants with exclusively private partners.

Perceptions of risk and behavioural intentions

Overall, the unconditional risk measure was not significantly related to behavioural intentions (r = −.08, ns.). However, replicating earlier results (Van der Velde, Hooykaas and Van der Pligt, 1992), the relationship between the unconditional risk estimate and behavioural intentions varied with participants' type of partner. For participants with prostitution partners, higher levels of perceived own risk were related to lower intentions to engage in safe sex (r = −.27, p < .001). For participants with private partners. Perceived own risk was not related to intentions (r = +.12, ns.). Moreover, higher levels of perceived risk for others were related to higher intentions (r = +.17, p < .05). These results seem to contradict theoretical assumptions: in general a positive relation is predicted between measures of perceived risk and intentions to reduce risks (see for example Sutton, 1982). Although conditional and unconditional risk are related concepts, their role in explaining behavioural intentions was found to be different. Regardless of participants' type of partner, the conditional risk estimate appeared to be positively related to behavioural intentions with private partners (r = +.39, p < .001) and prostitution partners (r = +.29, p < .001). Overall, the conditional risk estimate vulnerability correlated +.33 (p < .001) with behavioural intentions. Figure 1 illustrates these findings. We split up each sample by median split in a group with low and a group with high intentions to engage in safe sex practices. Results show that higher intentions were associated with higher levels of (conditional) risk but not with higher levels of (unconditional) risk. Analysis of variance testing the differences between the two groups confirmed the correlational analysis reported above. For both
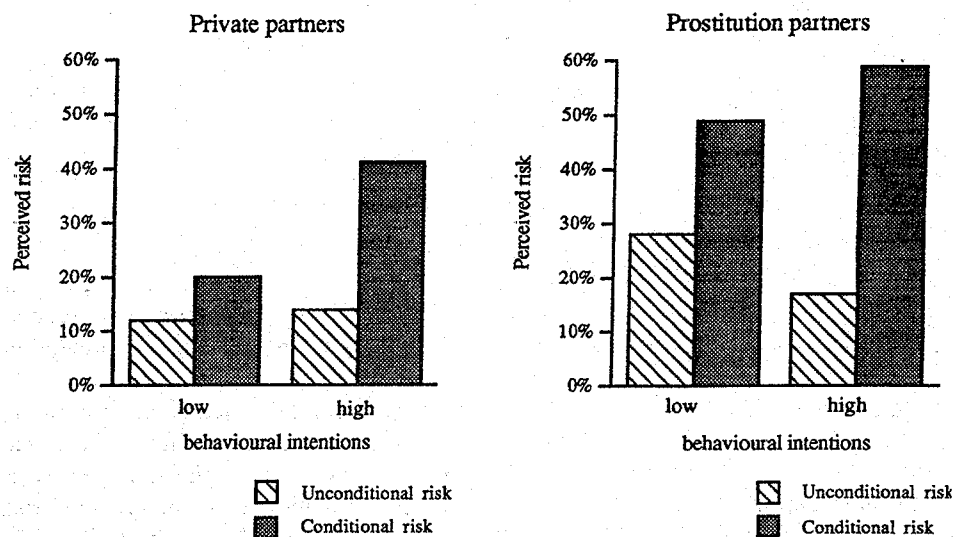
Figure 1 Unconditional and conditional risk as a function of behavioural intentions, for participants with (exclusively) private partners and participants with prostitution partners.

Note:
[1]   Scores for perceived risk could range from 0 to 100%
[2]   Mean behavioural intention scores equaled 3.8 for participants with exclusively private partners, and 4 6 for participants with prostitution partners (possible range of scores from 1 (low) tot 5 (high).

private and prostitution partners, high intention respondents estimated their risk to be higher than those with low intentions ($F(1,76) = 13.6$, $p < .001$, and $F(1,22) = 7.0$, $p < .01$). For private partners, the unconditional risk estimate did not differ for the two groups. For prostitution partners those with high intentions rated their (unconditional) risk to be lower than those with low intentions ($F(1,24) = 8.4$, $p < .01$).

Rogers and Mewborn (1976) and Maddux and Rogers (1983) found a negative relation between vulnerability and behavioural intentions *only* when participants perceived coping responses to be relatively ineffective. Additionally, Joseph *et al.* (1987) hypothesized that such a negative relation may have been caused by higher levels of stress. Although the present data do not provide a direct test of these explanations, the relation between the unconditional risk estimate and behavioural intentions was re-examined for participants with higher levels of response efficacy, higher levels of self-efficacy, and lower levels of stress (dichotomized by median split). For participants with prostitution partners, the relation between perceived risk and intentions remained negative for both participants with lower levels of stress and higher levels of response efficacy ($r = -.27$ in both instances). Although controlling for levels of self-efficacy did decrease the strength of relationship between perceived risk and intentions significantly, this relationship remained negative ($r = -.07$, ns). Further (ANOVA) analysis did not reveal any interaction effects.

In conclusion, the conditional risk estimate seems to be a more stable factor in predicting behavioural intentions; whereas the relationship between perceived (unconditional) risk and intentions was dependent on the type of partner (private or

prostitution), conditional risk was positively related to intentions *regardless* of the risk status of participants' partners. Additional analyses did not corroborate the findings of Maddux and Rogers (1983) and Joseph *et al.* (1987): the negative relation between perceived risk and intentions could not be explained by lower levels of self-efficacy and/or response efficacy, or by increased levels of stress.

Perceptions of risk in relation to other factors

Before examining the relations between perceptions of risk and behaviour, regression analyses (stepwise selection of independent variables) were performed to related perceptions of risk to factors incorporated in behavioural models such as protection motivation theory.

Multiple regression analyses were performed to find factors related to the conditional and the unconditional risk estimate, separately for participants with private and prostitution partners (see Table 2). For participants with private partners, higher levels of the *unconditional* risk estimate were predicted by higher levels of previous risk behaviour, and by higher levels of stress $(F(2,63) = 15.1, p < .001$, multiple $R = .57)$. For participants with prostitution partners, higher levels of perceived risk were also predicted by higher levels of both previous risk behaviour and stress, and by lower levels of perceived control $(F(3,112) = 6.8, p < .001$, multiple $R = .40)$. Higher levels of the *conditional* risk estimate for participants with private partners $(F(3,93) = 9.3, p < .001$, multiple $R = .48)$ were predicted by higher levels of self-efficacy, higher levels of fear, and acknowledgement of belonging to a high-risk group. For participants with prostitution partners, higher levels of *conditional* risk or vulnerability were predicted by higher levels of fear, acknowledgement of belonging to a high-risk group, and, finally, by higher levels of response efficacy $(F(3,131) = 14.7, p < .001$, multiple $R = .50)$.

Table 2 Multiple regression analyses: Factors associated with measures of perceived risks[a]

	Unconditional risk		Conditional risk	
	private partners	*prostitution partners*	*private partners*	*prostitution partners*
	(R²) *Beta*	*(R²)* *Beta*	*(R²)* *Beta*	*(R²)* *Beta*
	(.57)***	(.40)***	(.48)***	(.50)****
Previous behavior	+.51***	+.19*	−.07	−.15
Perceived control	−.05	−.24***	−.05	−.01
Stress	+.21*	+.22***	+.11	+.16
Self-efficacy	−.04	−.10	+.30**	+.12
Fear	+.10	+.17	+.28**	+.33****
Perceived risk status	+.15	+.09	+.27**	+.21**
Response efficacy	+.14	−.12	+.08	+.30***

Note.: [a]Total $n = 247$, [b]Multiple R for the variables in the equation; multiple R's reported here were obtained using significant predictors only in the regression analyses. [c]Positive *Beta* weights indicate higher scores on the conditional and unconditional risk estimates.
*$p < .05$, **$p < .01$, ***$p < .001$, ****$p < .0001$.

Perceptions of risk, cognitive mediators, and behavioural measures

The unconditional risk estimate was predicted primarily by factors associated with previous behaviour and stress, the conditional risk estimate was predicted primarily by fear, self-efficacy, response efficacy, and perceived risk status. Given these differences between the conditional and the unconditional measures of perceived risk, the relations between these measures and cognitive mediators of protection motivation theory are likely to be different as well. Figures 2 and 3 present the results of these analyses, LISREL VI was used to estimate the unknown coefficients. The assumption of a multinormal probability density underlying the data was not violated, which enabled us to use LISRELS' Maximum-Likelihood (ML) estimates. Because these estimates do not, in general, coincide with coefficients of regression among observed variables, zero-order correlations are added in the figures in parentheses (Joreskog and Sörbom, 1983).

Figures 2 and 3 present the relations of perceptions of risk, cognitive mediators of protection motivation theory, and behavioural measures. With one exception, only the paths that were significant (t-value > 2.00) are shown in these figures (and were used to calculate the Chi-square and associated Adjusted-Goodness-of-Fit Index). In all analyses, severity was influenced by at least one of the mediators of protection motivation theory. Severity was, however, not incorporated in the analyses, since it was not significantly related to the behavioural measures.

As shown in Figure 2, for participants with exclusively *private* partners, two differences were found with regard to the two risk estimates. First, self-efficacy was significantly related to the conditional estimate: participants with higher levels of self-efficacy perceived the chance to become infected with HIV – if they would not use condoms – to be higher ($ML = .27$, $t = 2.27$). second, the conditional risk estimate showed a significant positive relation to intentions ($ML = .26$, $t = 2.36$ as opposed to $ML = .18$, ns. for unconditional risk). As shown in Figure 3, neither the conditional, nor the unconditional risk estimate were independent of the other mediators of protection motivation theory for participants with *prostitution* partners. Higher levels of *self-efficacy* ($ML = -.24$, $t = 2.48$) were related to lower levels of *unconditional risk*, higher levels of *response efficacy* ($ML = +.24$, $t = 2.44$) were related to higher levels of *conditional risk*. Figure 3 clearly underlines the negative relationship between the unconditional risk measure and behavioural intentions for participants with prostitution partners ($ML = -.21$, $t = 2.28$). Again, the conditional estimate showed a positive relationship with behavioural intentions; higher levels of perceived vulnerability were related to higher levels of intentions $ML = +.26$, $t = 2.16$).

Differences in explained variance in intention and/or subsequent behaviour were not found (see Figure 3). However, comparing these models between both partner types, the explained variance in intentions was lower, and the explained variance in subsequent behaviour was higher for participants with private partners as opposed to participants with prostitution partners.

DISCUSSION

Results presented in this article confirm earlier mixed findings concerning the relationship between perceived (unconditional) risk and behavioural intention. The literature shows both positive and negative relations between these measures (e.g.,
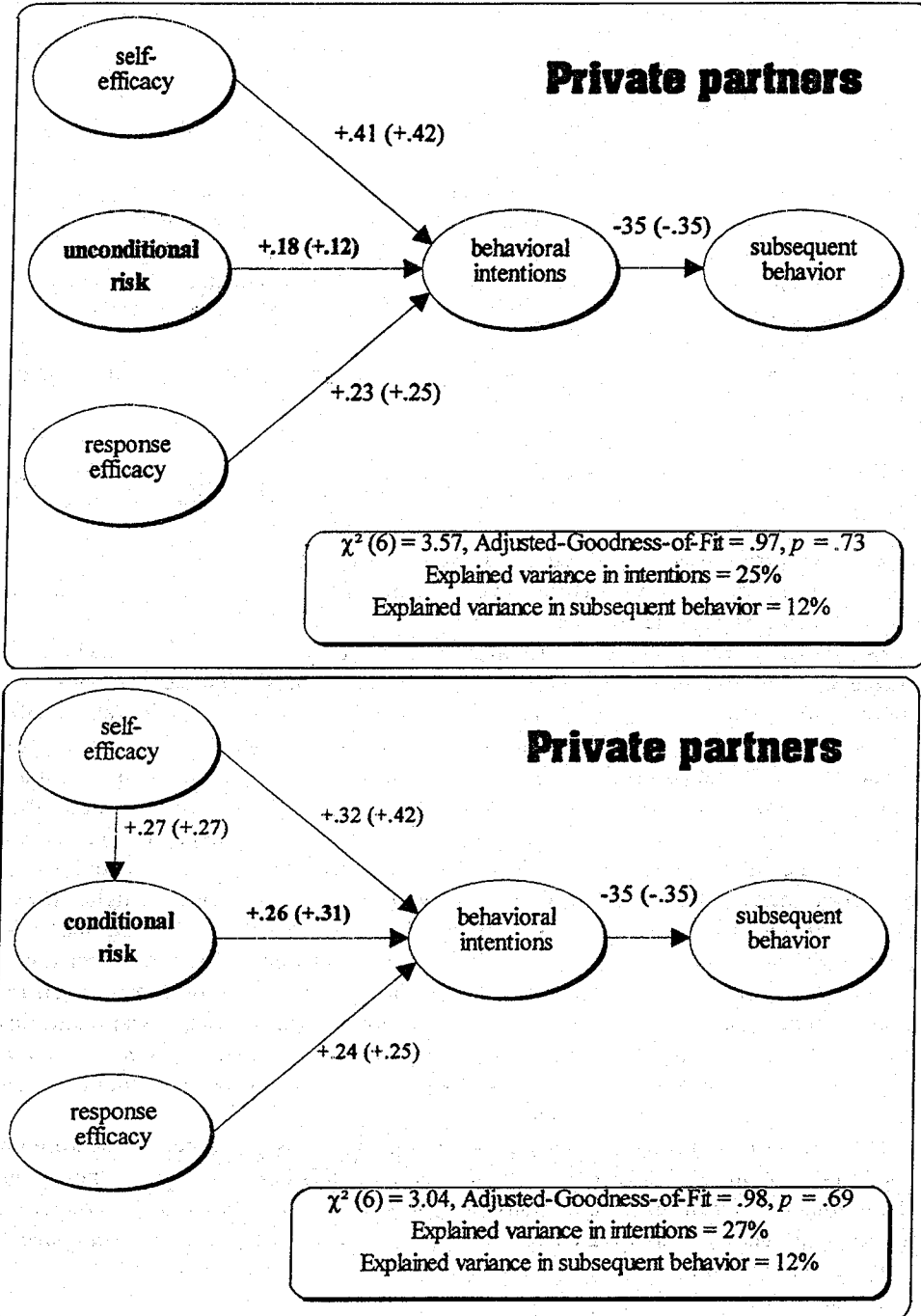
Figure 2   LISREL analyses for unconditional and conditional risk (participants with private partners, $n = 100$).[a]

Note: [a]Indices refer to ML-estimates, correlations are given in parentheses. All paths are significant at $p < .05$, except the path between unconditional risk and behavioral intentions.
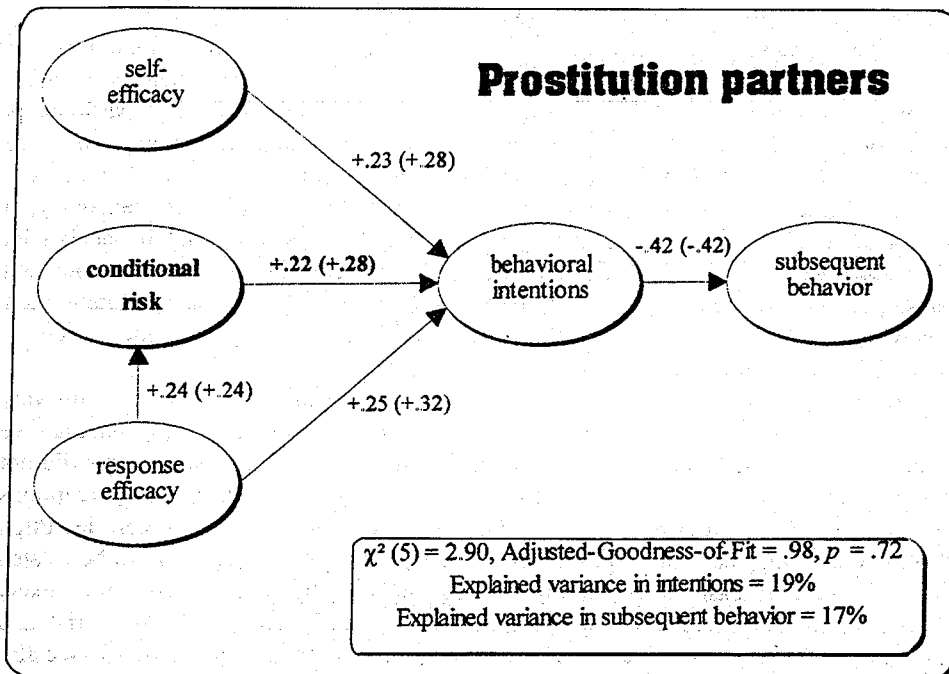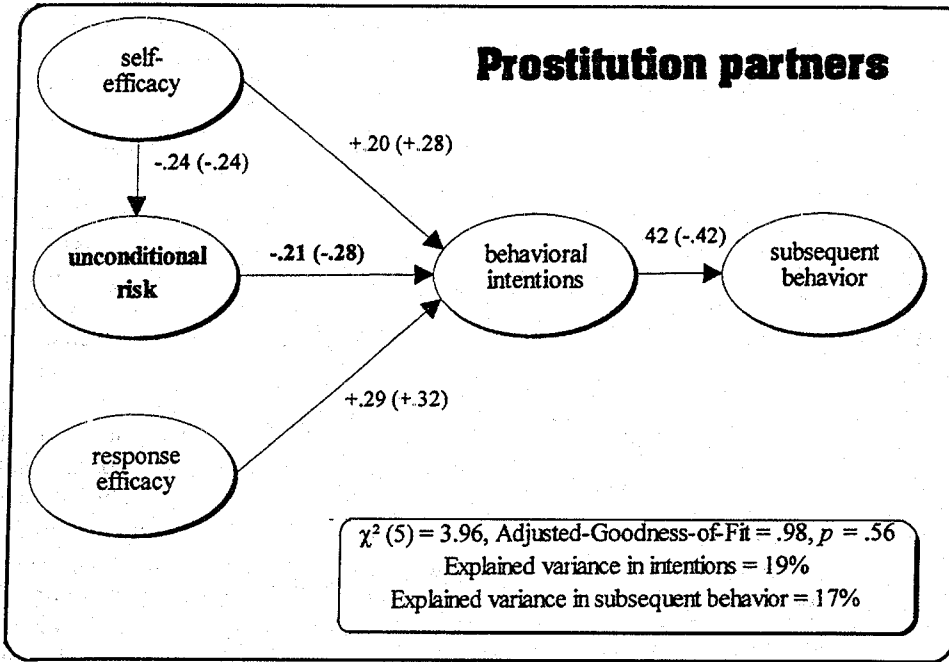
Note: [a]Indices refer to ML-estimates, correlations are given in parentheses. All paths are significant at $p < .05$.

Joseph *et al.*, 1987; Maddux and Rogers, 1983; Rogers and Mewborn, 1976; Van der Velde and Van der Pligt, 1991). We found only limited support for Beck and Frankel's (1981) and Joseph's *et al.* (1987) assumption that the counterintuitive negative relationship is due to inadequate responses, resulting in helplessness and (dis)stress.

A negative relation between perceived own (unconditional) risk and intentions was found only for participants with prostitution partners. For participants with (only) private partners, intentions were not related to the unconditional risk estimate. Although participants with prostitution partners experienced lower levels of personal control, they did not report lower levels of coping responses, nor higher levels of stress than participants with private partners. Considering the consistent positive relation between the *conditional* risk estimate and intentions, other explanations needed to be explored for the sample-differences with respect to the unconditional risk estimate.

In general, it is assumed that people are more willing to behave adaptively (or reduce their risks) once they perceive themselves to be higher at risk – provided that the threat is judged to be sufficiently severe. A negative relation between perceived risk and intentions would therefore imply that people willingly accept higher levels of risk, not planning to reduce risks in the future. Since an infection with HIV is seen as a severe event, they are, apparently, aware of factors that may hinder them to behave adaptively. Bauman and Siegel (1987), for example, found that "sexual impulse control difficulties" impeded participants to reduce their risk. In our sample, female participants with prostitution partners may engage in risky sexual practices, and hence, accept higher levels of risk for commercial reasons.

Another explanation for the differential relationship between unconditional risk and intentions may reside in the way participants perceive the consequences of mal-adaptive behaviour. Especially for participants relatively high at risk (e.g., participants with homosexual or prostitution partners), the same maladaptive behaviour is more likely to result in negative consequences than for participants with partners at relatively low-risk. Since unconditional risk and intentions were assessed simultaneously, a reversed causation effect between intentions and unconditional risk is not inconceivable. Therefore, when a strong relation is perceived between maladaptive behaviour and subsequent negative consequences, participants might attune their risk estimate to their behavioural intentions; lower levels of intentions thus resulting in higher levels of perceived (unconditional) risk.

Contrary to participants with prostitution partners, participants with exclusively private partners did not perceive a relationship between previous maladaptive behaviour and their level of risk in the future. Furthermore, these participants did not seem to acknowledge a direct link between (lower) intentions and (higher) perceptions of risk. In fact, in previous research (Van der Velde, Hooykaas, and Van der Pligt, 1992) concerning the same sample, perceived risk for *others* was found to be related to behavioural measures (including subsequent risk behaviour). It seems likely therefore, that participants in low-risk groups attune both their perceptions of risk *and* their intentions to an estimate of HIV prevalence rates in their social network (see also Van der Velde, Van der Pligt and Hooykaas, 1994).

Conditional and unconditional risk estimates were also differentially related to other factors: whereas unconditional risk was found to be more closely related to factors associated with behaviour (previous risk behaviour and perceived stress), conditional risk was found to be more closely related to factors generally incorporated in models of health behaviour (self-efficacy and response efficacy). However, these differences

between the two risk estimates and other factors barely influenced the results of the LISREL analyses: substituting the unconditional risk estimate with the conditional risk estimate in analyses including other mediators of protection motivation theory did not reveal marked differences. With one notable exception: regardless of type of partner, the conditional risk measure was found to be consistently (positive) related to intentions.

Given the lack of clarity concerning the causal relationship between the unconditional risk estimate and behavioural intentions, it would have been more correct to present a correlational rather than a causal relationship between these two variables. However, for the purpose of comparability, we decided to present a causal relationship.

In sum, using a *conditional* measure of perceived risk instead of an *unconditional* measure, has several advantages. First of all, a conditional measure more closely resembles the original construct as developed by Rogers (1975) and Becker (1974). Ronis (1992) also argued that the concept of perceived risk or susceptibility needs to be refined and suggested that it needs to be made conditional on the alternative actions or inaction. People are inclined to take preventive action if they believe that inaction significantly increases their risk as compared to taking preventive action. Thus, they perceive a high susceptibility to the disease given inaction. Similarly they would be less inclined to take action if they think they are likely to get the disease even if they would take action. In the latter case high perceived risk is not associated with preventive behaviour. General, unconditional risk measures do not provide the possibility to disentangle these mechanisms, hence the need for conditional measures of risk. Another drawback of the unconditional measure of risk concerns the direction of causality between unconditional risk estimates and behavioural intentions. This direction is unclear, since participants may use their behavioural intentions to anticipate future levels of risk. Finally – and most importantly – a conditional risk estimate seems to be less dependent upon differences in actual risk status, and is therefore more likely to be related to behavioural intentions in a consistent and interpretable manner.

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