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COMPARATIVE RISK JUDGMENTS
AND RISK-TAKING IN SEXUAL BEHAVIOURS
Evaluations des risques comparatifs
et prise de risque dans les comportements sexuels

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ABSTRACT

HIV infection still represents a major health problem. Risk-taking or the absence of precautionary behaviour is the first determinant for infection. Comparative risk could help explain some part of the risk-taking. However the relation to actual behaviour bears major methodological difficulties which we attempted to address here. Risk status and situation conditionality were considered as independent variables. Comparative risk estimates were considered dependent variables. Two hundred and sixty eight students were included in a correlational design. They filled in self-questionnaires and reported their risk status concerning HIV infection and comparative risk estimates for both conditional and unconditional risk situations. Results confirmed previous research where estimates varied according to risk status and conditionality was related to lower optimistic bias or increase pessimistic bias. When both variables are considered simultaneously, risk-takers appraised comparative risk less pessimistically. Different interpretations accounting for this phenomenon are considered.

RESUME

L'infection au VIH représente encore un problème de santé publique majeure. La prise de risque ou l'absence de comportement de protection est le facteur causal déterminant de l'infection. Le risque perçu comparatif pourrait en partie rendre compte de ce facteur. Cependant la relation directe avec le comportement recèle des difficultés méthodologiques importantes, auxquelles nous tentons de nous adresser ici. Nous considérons deux variables indépendantes, le caractère à risque ou non des sujets et le caractère conditionnel ou non des situations proposées pour l'évaluation subjective des risques comparatifs. Cette dernière évaluation est notre variable dépendante observée. 268 étudiants ont été inclus dans cette étude corrélationnelle. Ils ont rempli des questionnaires auto-administrés portant sur les comportements sexuels et des estimations de risques comparatifs. Les résultats confirment les recherches précédentes où l'estimation subjective des risques varie en fonction du caractère à risque des sujets et du caractère conditionnel des situations. Lorsque les deux variables indépendantes sont considérées simultanément, on observe que les preneurs de risque jugent certaines situations conditionnelles de manière moins pessimiste que le reste de l'échantillon. Différentes interprétations de ce phénomène sont envisagées.

#INTRODUCTION

Sexual risk-taking has long been a major problem in public health. The individual as well as the social costs remain very high in spite of recent therapeutic developments. Current treatments are expensive and a part of the people infected by the virus have no access to it (Cohen, 1996). To understand sexual risk-taking, psychologists have explored various models and evidenced multiple correlates, although the understanding of the phenomenon still represents a real challenge for Health Psychology. This is why it is of major interest to evidence determinants and correlates of precautionary behaviours. The goal of this paper is to explore the relations of different comparative measures of perceived risk to actual behaviours.

##Psychology and risk-taking behaviours

Some authors addressed the question of whether risk-taking is due to an internal disposition (or vulnerability) of the subject to risk. There would be a 'risk-taking trait', stable across various situations. This personality trait could be favored by psycho-biological particularities, inducing more generally stimulation or 'sensation seeking' (Zaleski, 1984). This was also assumed by Wilde (1988) in the field of the general psychology of risk. The relevance of a disposition to risk was criticized by many authors in cognitive psychology (e.g. Huteau, 1985). According to them, risk-taking is a complex variable resulting from a combination of more elementary variables, which do not necessarily appear together (e.g. estimation of probability of success or failure, representation of benefits and losses and their personal meaning for the subject). Consequently risk-taking has been approached as a result of a decision making process. In the perspective of the general psychology of risk, taking a risk has been considered as taking the decision of a risky alternative (Von Winterfeld, 1986). The normative models of the decision theory describe steps subjects are supposed to follow in order to maximize their chances to improve their well-being according to their own values and beliefs (Fischhoff, Svenson & Slovic, 1987). This reasoning could be applied to situations where the health of subjects is definitely and seriously threatened (which is the case in HIV infection). In the field of sexual risk, the models of Catania, Kegeles & Coates (1990) and Fisher & Fisher (1992) assumed that perceived vulnerability is a major determinant of AIDS-preventive behaviour. Yet one implicit assumption of these models is that people are able to adequately assess the risks associated with their behaviour. For long we know however that what we perceive is a distorted view.

The behavioral decision theory developed the concept of 'cognitive bias'. This helps us understand real behaviors (Slovic, Fishhoff & Lichtenstein, 1977 ; Kahneman, Slovic & Tversky, 1982). Researchers have identified a limited numbers of inferential rules used by subjects in this type of situations, on which they rely (Fishhoff et al., 1987). These judgment rules are used to simplify difficult mental tasks. However, they are useful in specific circumstances, but induce important and persistent biases, with serious consequences on decision making in various areas (Slovic, Fishhoff & Lichtenstein, 1982). These biases may concern the availability of information and the feeling to be protected from various negative events or feeling of invulnerability (Tversky & Kahneman, 1981 ; Kahneman & Tversky, 1984).

Thus the scientific modeling of risk-taking can call for some conception of a feeling of invulnerability which would bias the accuracy of risk perception. In fact most models of health behaviour incorporate perceived risk as an important determinant of behaviour. Many authors consider that a specific form of optimism could account for this feeling of invulnerability (Weinstein, 1989)

##Comparative optimism and HIV infection

The feeling of invulnerability can be defined in terms of the subjective probability of becoming the victim of a disease. This is an equivalent of one's perceived risk of such an event. We know however that what is perceived by the subject is often far from reality. The subject may not acquire the proper knowledge of the actual risks or he may feel motivated to play the risks down. For example, Taylor (1989) has shown two facets of cognitive distortions belonging to the broader category of *defensive optimism* or *optimistic bias*. This optimism about one's invulnerability could hinder the adoption and maintenance of preventive behaviours. First the temporal comparison bias in which people minimize the probability of the reoccurrence of an event. In this case, people ignore that chance events are actually independent of each other and that the probability of reoccurrence is exactly the same as for the first occurrence. Second the social comparison bias that has been called 'optimistic bias' or unrealistic optimism (Weinstein, 1980), in which people will consider that a negative event may happen to others, but will not happen to them. Weinstein (1989) has shown that when people are asked to provide a percentage estimate of the likelihood, in comparison with peers, that they will someday experience an illness or injury, most underestimate their risks. It is now a traditional observation to note that the average individual sees himself or herself as below average in risk for a variety of health threats, which of course cannot be.

Weinstein (1980, 1982, 1984) and Perloff and Fetzer (1986) have found evidence for such a social comparison bias that reflects the difference between the perceived risk of oneself and the perceived risk of others within the same reference group. If health risks are expected to apply more to others than to oneself there is no reason to take preventive action. Until now, most research focused on the possible antecedents of unrealistic optimism and little attention has been paid to the possible effects of optimism on preventive health behaviour. It is important to remark that subjective perceptions of susceptibility to health risks are an important component of several theories of health behaviors (Janz & Becker, 1984; Rogers, 1983). These theories state that once people perceive themselves as being susceptible to health problems, they form intentions to take preventive actions or to give up risky health behaviors. In fact, one of the main reasons for the interest in unrealistic optimism is the assumption that optimistic bias may lower feelings of vulnerability and, hence, affect risk-reduction motivation and activities (Weinstein, 1984).

Currently very few studies are available on the measure of the optimistic bias in people concerned by the HIV infection. Very early in the history of HIV, Weinstein (1984) obtained evidence for this illusion of (relative) invulnerability. Taylor, Kemeny, Aspinwall et al. (1992) have explored both specific optimistic bias towards HIV infection and dispositional optimism in a cohort of gay men. They found that there was no relation of optimism to risk-related sexual behavior. They concluded that optimism is psychologically adaptative without necessarily compromising health behavior. These results led the authors to state that the suggestion made by Weinstein (1982) that optimism may undermine effective health behaviors is not supported by their data. However, some remarks must be made on the methods used in this study. The nature of the two questions was closer to an AIDS-specific optimism than an AIDS-specific comparative optimism, since no reference to any social target was made in the questions asked. Subjects had to evaluate their chances of getting AIDS on the basis of the different factors that may contribute to the disease and their past and present behavior. Therefore any comparison with Weinstein's procedure is dubious. Unrealistic optimism was observed for both low and high-risk groups. Van der Velde et al. (1994) investigated the perception of AIDS-related risks for samples that differed widely in their risk status. Their findings indicated that the groups were aware of their relative risk status: high-risk groups gave higher ratings of their own risk than low-risk groups. Most important, all groups showed an optimistic bias and thought that their risks were lower than that of an average person of their age and gender.

Various social biases can influence this optimistic bias. Weinstein (1980) noticed that an optimistic bias was stronger when subjects have difficulty in

considering concretely the victims of accidents and diseases. In that case, individuals rely on a stereotyped representation of these victims. Concerning HIV infection and AIDS, it is highly probable that this disease being related to highly stereotyped social categories (homosexuals, drug abusers, etc.), people would have the illusion they are less threatened (Paicheler, 1996). However, studies showed that risks which are more cognitively 'available' due to personal experience or media coverage tend to be overestimated (Slovic, Fischhoff & Lichtenstein, 1979). Thus, estimates of the likelihood of 'sensational' risks such as the risk of contracting AIDS or being involved in an air crash tend to be too high. For instance, van der Velde et al. (1994) observed that people generally overestimate the risk of AIDS. Hence, different factors may play contradictory roles on the estimation of risk.

##Comparative risk judgment and preventive behaviour

Results have shown that many factors play a role concerning the importance of the optimistic bias. Among these, two are particularly interesting from a decision making perspective. First it has been shown that members or risk populations do differ in terms of optimism and pessimism. van der Velde et al. (1994) have shown that experience reduces bias but does not eliminate it. Prior experience with sexual risk behaviors can indeed reduce defensive optimism. Moreover, persons who are objectively at risk ponder this while making judgments about their likelihood of contracting the HIV. In fact invulnerability or optimistic biases are usually higher in groups not at risk because risk-takers would take into consideration their actual or past behaviours to appraise their relative vulnerability (Weinstein, Rothman & Nicolich, 1995, cited in van der Pligt, 1998). This is suggested by the results of Gerrard, Gibbons & Bushman (1996) who investigated the relationship between perceived vulnerability to HIV and precautionary sexual behaviour. Prospective studies included in their analysis did not support the relation between perceived risk and preventive behaviour. So it seems that traditional unconditional comparative risk estimates are bad predictors of preventive health behaviour because the preventive behaviour itself reduces the real risk and, in this way, leads towards a justified increase of comparative optimism.

A second factor involved consists in the nature of the concrete situation explored in the questions. As Schwarzer (1994) and van der Pligt (1998) noticed there are a wide range of methods used to assess comparative perceived risk. Several authors have advocated that the relations between optimism and health behaviours was not conclusive yet (Weinstein, 1984; Schwarzer, 1994). Overall,

research findings suggest that the predictive power of comparative risk appraisal is modest. However this may be due to methodological heterogeneity and misinterpretation of results. For instance van der Pligt (1998) suggested that conditional risk should be closer to actual decision making processes and therefore should be preferred as opposed to unconditional situations in the measures used. Some support for this was found by van der Velde, van der Pligt & Hooijkaas (1996). Unconditional risk estimates refer to the subjective likelihood that a negative consequence will occur, based on whatever factors individuals take into account (e.g. perceptions of control, perceived efficacy of preventive actions, etc.). Conditional risk refers to the probability of adverse consequence for one's health if no preventive action is taken (or their probability if a specific preventive action is taken). A conditional risk estimate thus requires people to indicate their risk given their present behavioural practices, or changes in these practices.

It is highly probable that in the case of conditional risk the results obtained would be far closer to a real situation than in an unconditional risk. The answers given by subjects are understandable in the decision-making framework.

Whereas most models of health behaviours refer implicitly to conditional risk estimates, most recent research tends to rely on unconditional risk estimates where it is unclear what set of factors people take into account when answering (Schwarzer, 1994). Therefore we should observe a difference in risk-perception between conditional and unconditional situations where conditional situations would increase the level of vulnerability when risks are already taken. Some authors think comparative risk appraisal serves a number of functions but does not seem a prime determinant of behaviour (e.g. van der Pligt, 1998). We would consider as a strong argument against this assertion a result where conditional comparative risk appraisal would be more advantageous to the subject in high-risk than in low-risk groups. In fact it is probable that conditionality of risk situations interacts with risk status of subjects, which has not been explored yet.

#HYPOTHESES

In general we hypothesized that people would assess their personal risk of being infected by HIV favorably, as compared to people of their age and gender (hypothesis 1). This is a consequence of the traditional empirical observation basing the unrealistic optimism phenomenon (Weinstein, 1989). Whereas people on the average tend to show an optimistic bias regarding their future health, there is evidence that at the individual level, this bias is attenuated according to individual health behaviors (van der Velde et al., 1994). For example, smokers give higher mean estimates of perceived susceptibility to lung cancer than non-

smokers, although they do not arrive at 'realistic' risk judgments. In the same line, risky health behaviors such as unsafe sexual practices are associated with higher perceived susceptibility to related health problems (Taylor et al., 1992; van der Velde et al., 1994). In line with previous research we expected people who had taken risks to show a lower bias when appraising their comparative risks than people who had not when traditional unconditional measures were used (hypothesis 2). Moreover there should be a difference according to the features of the situation presented to subjects, the appraisal of conditional risk yielding less favorably biased judgments than classical unconditional measures (hypothesis 3). This should appear in both alternatives whether the risk is absent or present in past behaviour. Realizing some degree of personal vulnerability is a prerequisite for becoming motivated to counteract threats and to avoid risks. As mentioned before, perceived vulnerability to disease is understood as a major causal factor for adherence with health regimen. Here too a distinction should be made: to account for their risky behaviours we should observe more favorable comparative judgments in risk-takers when the risk situation is conditional (hypothesis 4). This comes from the observation that a conditional risk is far more realistic and generates concrete decision making processes in subjects. The basic assumption being that decision making is specific (or biased) in people taking risks, we logically should observe differences in the latter case.

#METHODS

##Sample

Our sample consists in 268 sexually active students recruited at the University of Paris 10 - Nanterre. Their academic origins were economics, literature and law. These subjects were drawn from a larger sample of 345. Seventy-seven subjects were excluded from our analyses because they had not had any sexual activity during the past 12 months. Yet the latter do not differ from the 268 sample in gender, age or academic origin. The mean age is 21.5 yrs (± 1.8 yrs). The sample is composed of 124 male and 144 female students. Subjects were asked to fill in their self-report questionnaires individually and anonymously in a room of the central library of the university.

##Instruments

We used three types of instruments although only the results of the first two are presented here.

a. A questionnaire designed to assess sexual risk-taking behaviours towards HIV based on the report of past behaviours. Questions were taken from the French National Survey on Sexual Behaviour (Spira, Bajos et al., 1993). This allowed us to discriminate two groups whether risk was present (so-called risk-takers) or absent (so-called non risk-takers) in the past 12 months, i.e. on the basis on subjects' risk status. A high probability of risk-taking behaviours was defined as corresponding to one or more of the following patterns in the past 12 months:

- either risk factors present in the partner's general features (such as partner using drug injection) *and* no systematic use of condom with this partner.
- or unprotected intercourse with a new partner
- or several sexual partners *and* no systematic use of condom.

Criteria for defining risk factors in partners, new partners and several sexual partners were taken from Spira et al. (1993). Overall this measure of risk permits to isolate subjects with very low-risk sexual activity from subjects with moderate risk to high-risk sexual activity.

b. Five questions aiming at assessing comparative risk judgments. In the principle they follow Weinstein's procedure (1980). Subjects were asked to judge if their chances to live certain events were lower or higher as compared to people of their age and gender in the same situation. The response format is a seven-point scale where scores vary from -3 to +3.

We used one unconditional risk situation taken from Weinstein (1987):

Q1. "Compared to other people of your age and gender, your chances of getting infected by HIV in the future are: much below average (-3), below average (-2), a little below average (-1), average (0), a little above average (+1), above average (+2), much above average (+3)". This response format was kept for all questions. This question will be referred to in tables as HIV INFECTION (UNCONDITIONAL).

We also used four conditional risk situations:

Q2. "If you had a sexual intercourse with a new partner, without knowing him/her, how would you estimate your chances to be infected by HIV as compared to the average people of your age and gender in the same situation ?"

Q3. "If you had several sexual partners and did not systematically use condoms, how would you... [cf. Q2] ?"

Q4. "If after an unprotected sexual intercourse with an unknown partner, you wondered whether you had been infected by HIV, how would you... [cf. Q2] ?"

Q5. "If you took real risks in your sexual behaviours, how would you... [cf. Q2] ?"

These four conditional situations will be referred to in the following tables as respectively NEW SEXUAL PARTNER (Q2), SEVERAL SEXUAL

PARTNERS (Q3), UNKNOWN SEXUAL PARTNER (Q4), ACTUAL RISKS (Q5).

c. The Life Orientation Test-Revised (Scheier, Carver & Bridges, 1994) measuring dispositional optimism. However results concerning this will not be presented here and can be found in another report (Sultan & Bureau, 1999).

#RESULTS

In order to explore for our hypotheses, an ANOVA and a series of Student's t-test were processed. Results appear in Tables 1 to 3. In the total sample (N=268), the mean estimates of perceived comparative risk was found to be significantly different from zero (Table 1 and 2). Concerning the HIV infection (unconditional) situation, subjects judged their chances to get infected by the HIV as lower than the average in their gender and age reference group. Thus hypothesis 1 is confirmed. Rigorously we cannot speak of a proper bias without referring to the risk status, this appraisal may be accurate and correspond to real risks taken by subjects. Under conditional circumstances, subjects tend to appraise their chances to get infected as higher than the average subjects (Table 1 and 2, four remaining conditions). Here however the wording of questions allows no doubt on the existence of a bias in the pessimistic sense, since subjects were asked to compare themselves to people *in the same situation* i.e. having taken a specific risk. Thus, there was a major difference between conditional and unconditional situations as for comparative risk judgments. It seems that it was far less easy for subjects to optimistically bias their judgments in conditional situations. This was expected (cf. suggestions made by Van der Pligt, 1998) and the evidence seems quite clear.

When the sample was splitted according to risk status based on the 12 past months sexual behaviour, we observed the same pattern of results in both groups of non risk-takers (n=178) and risk-takers (n=90). Yet whereas a rather optimistic tendency was expected in non risk-takers as for the first situation (unconditional, see Table 1), this was not the case with risk-takers (see Table 2). The test for a significant difference between unconditional risk estimates is available in Table 3 (first line). Our data show a clear difference in risk appraisal. Subjects took their previous behaviour in consideration when estimating probabilities of risks. This is in line with the results obtained by Van der Velde et al. (1994) in different samples differing on their risk status and with our hypothesis 2 as well. Yet as already mentioned judgments of risk-takers remain clearly biased. Even if subjects took into consideration their previous behaviours in appraising comparative risks, our results show that those taking risks kept thinking they were less at risk than the average others (see first

situation Table 2). In the non risk-takers sub-sample all conditional situations generated a pessimistic bias. It seems that people behaving safely tended to adopt a very pessimistic attitude when they were confronted with a situation where risk had already occurred. They thought consequences would be so bad as to bias their judgments in a negative way, despite the wording of the question.

[insert Table 1 and 2 about here]

To test for hypothesis 3 a series of within subject comparisons were computed in the total sample (paired t-test). The four types of conditional estimates were significantly different from conditional estimates (first risk situation) and were in all four cases less favorably biased (all $t_s < -15.4$, $df=267$, $p < .001$). These data are in the expected direction.

If we turn to the risk-takers subsample in conditional situations (Table 2), we observe that some situations generated a pessimistic bias where others did not. That is having an intercourse with a new partner (Q2) and having an unprotected intercourse with an unknown partner (Q4) were appraised accurately: estimates did not differ significantly from zero. Two situations were judged pessimistically: having several partners and incurring actual risks. This may be due to communication and general knowledge about HIV infection. Also the objective risk to get infected is probably proportional to the number of partners, involved in these conditions. This also may be a consequence of the particular wording of these two questions aiming at directly confronting subjects to risks, as real as they can be.

Nevertheless the main information obtained here lies in the difference between the two sub-samples in comparative risk appraisal. Let us now turn to Table 4 where both groups are compared. In conditional situation where the risk is assumed to be already taken, risk-takers tend to appraise comparative risks less pessimistically than non risk-takers. This is true for one risk measure where subjects encountered an unknown partner and had unprotected intercourse with him/her. A tendency for a difference was also found for the condition where relationships with several sexual partners were underlined (Table 3). Thus it appears that all situations were not judged equally even if they all deal with the same risk (i.e. getting infected by HIV). Also these results show that the appraisal of conditional risk can be different according to risk status based on self-report. So hypothesis 4 is partly confirmed by our data, particularly the significant effect for Q4 and the marginally significant effect for Q2. The results regarding Q3 and Q5 are in the direction predicted by the hypothesis, but not significant.

[insert Table 3 about here]

In addition to these analyses, we computed non-parametric statistics (Mann-Whitney U-test) to control for a possible strong bias in variable distribution or outliers effects. All results obtained with Mann-Whitney U confirm previous analyses concerning significance range. We also compared our two groups on frequencies of optimists (negative estimates), realists (estimates equal to zero) and pessimists (positive estimates). No significant differences between risk-takers and non risk-takers was evidenced in all four conditional situations. This shows that differences observed in relation to risk status as for conditional risks were due to higher or lower estimates *within* categories of optimists or pessimists, rather than frequency differences between optimists, realists and pessimists. That is why we can speak of a *subtle* difference between our groups. Yet in the unconditional general situation we observed a significant difference in frequencies between categories. In non-risk takers optimists were more frequent whereas realists were more frequent in risk-takers (Chi-square=13.398, df=2, p=.001). This result confirms the observation we made earlier on quantitative estimate difference between groups. These results are consistent with data published by Peeters, Cammaert & Czapinski (1997) where unconditional comparative risk ratings of presumably normal subjects varied between optimism and realism.

#DISCUSSION

This study was designed to explore the links between comparative risk judgments and actual risk-taking, and more generally to explore possible determinants of comparative risk estimates. Risk status and conditionality of risk situations were explored. Our results confirm our hypotheses. They show that both types of factors may have an individual effect. First, risk status appears to moderate comparative risk estimates in a traditional measure of unrealistic optimism. This confirms previous results obtained in clinical samples (van der Velde et al., 1992; van der Velde et al., 1994). Second, when confronted to conditional situations, subjects tend to express a pessimistic bias. Whereas the wording should lead them to an average answer, most people tend to think they have more chances than others to get infected by HIV.

In fact the positive aspects of conditional risk for research in this field are numerous. It is clear that conditional risk resembles more closely the original notion of vulnerability found in models of health behaviors (like Rogers's, 1975 or Becker's, 1974). This was also argued by van der Velde, van der Pligt & Hooijkaas (1996).

According to their reasoning people are inclined to take precautionary action if they believe that inaction significantly increases their risk as compared to taking precautionary action. Thus people should perceive a high susceptibility to the disease given inaction. In addition, the main drawback of an unconditional measure of risk concerns the direction of causality between unconditional risk estimates and behavioural intentions. Also a conditional risk estimate seems to be less dependent upon differences in actual risk status (based on past behaviour for example), and is therefore more likely to be related to other factors in a consistent and interpretable manner.

In addition, when comparing two groups with different risk status on conditional risk estimates (i.e. when exploring the interaction between both independent variables), we observed a tendency of risk-takers to be less unrealistically pessimistic. To interpret this results we must go back to the wording of the two questions which lead to differences in that case. The first consists in the new sexual partner condition. In that case, it may be that subjects rely on themselves: the choice of the partner may appear somewhat controllable despite the conditional wording of the question. This would be reflected by attitudes such as: "usually, I choose my partners better than others do". Studies have shown that various irrational criteria are taken into account by subjects to assess health features of the potential partner (e.g. Kegeles, Adler & Irwin, 1989). So an increase in illusion of control could explain the difference between groups in the new sexual partner situation (question 2). Controllability has long been isolated as a major determinant of self-favorable comparative risk appraisals in various fields (Delhomme, 2000). The second consists in the unknown sexual partner condition. Of course results can be due to media coverage and common knowledge on the unknown partner situation. It is remarkable in that sense that the several sexual partner condition did not yield any difference between groups in risk estimates. Theoretically yet this condition is the only one that directly refers to some kind of anticipation. It was designed to stress realistic aspects and make people concretely represent themselves having to think about a probability of risk. Our data show that people taking risk tend to evaluate such probabilities more favourably. This could be explained two ways. First people concerned by the risk would adopt defensive and quite strong (see significance) reactions which nature remains to precise. This interpretation is linked to affect regulation and the way subjects take into consideration anticipatory affect in their decision-making. Richard, van der Pligt and de Vries (1996) have increased the awareness that unsafe sex is likely to result in unpleasant post-behavioural feelings. Their manipulation of time perspective when thinking about affective reactions resulted in the increased salience of negative effective reactions such as worry and regret and also influenced expectations about future risk behaviour

in increasing intentions to use condoms (i.e. adopt precautionary behaviours). Second, the interpretation can rely on motivational factors. During the decision-making process appraising risks less pessimistically than others would relate to self-protection.

An explanation that could account for differences in pessimism between risk-takers and non risk-takers lies in the need of subjects to maintain a positive self-perception (self-enhancement). For risk-takers, the benefit coming from a downward comparison (in that case, people more at risk) would be higher than the benefit that an accurate information on the self would yield (Taylor, Netter & Wayment, 1995). For example, Pyszczynski, Greenberg, Solomon et al. (1995) have shown that subjects consider themselves less similar to a target if they learn by chance that the target suffers from a serious illness (as opposed to a benign illness). So, authors often suggest that this similarity bias protect the self against a threatening vulnerability.

If so we should observe a higher tendency to protect themselves by increased optimism in vulnerable people. Some support to this was found in the field of non-adherence in heart-disease patients showing some signs of depression (Sultan, Bungener & Andronikof, in press).

In order to consider the threat and adopting corrective actions (i.e. precautionary health behaviors), the subjects would need specific resources. This was partly demonstrated by results showing difficulties in adopting protective actions and adhering to treatment or regimen in depressed or anxious patients (Sultan et al., in press). In some patients, the state of resources and emotions would not allow the individual to cope with additional difficulty since it would be contrary to the normative rule of maximizing their well-being.

However in both conditions leading to differences between groups an alternative interpretation can be called for. It seems that conditional risk increasing reality in simulation increases also anxiety or negative affect. Some support for this can be found in the results obtained here according to which specific conditional situations clearly lead to pessimistic bias, be it the wording of questions. This is particularly true in people with no risky behaviours. Therefore it is tempting to interpret differences between our groups as a lower sensibility to anxiety in risk-takers, i.e. as specific features in risk estimation correlates responsible for the risk status. In fact other analyses have revealed that a negative or positive affectivity could be related to comparative risk appraisals (Sultan & Bureau, 1999). This is in line with explanations of perceived invulnerability which tend to focus on the need to reduce feelings of fear and anxiety. As noticed by Van der Pligt (1998), support for the role of these mechanisms is provided by research showing more biased risk estimates in situations of increased threat.

For instance, Bauman & Siegel (1987) showed that men with a risky life-style who deny or underestimate their risk of an HIV infection also experienced lower anxiety.

This possible motivational explanation of optimism (optimism as a way to reduce fear) was also suggested by Weinstein (1980). He noted that if optimism was found to increase with event seriousness, this would point to an ego-defensive origin of optimism. Some support for this was found by van der Velde, van der Pligt & Hooijkaas (1992).

In summary methodological issues raised in the introduction of this paper have only been partly addressed. Limits of our work primarily concern its correlational design. To bring more solid evidence on the causal relation of conditional risk to actual risky behaviours and confirm our conclusive assumptions an experimental design should be preferred in future research. Also a possible order effect between measures cannot be discarded. Although two different versions of the questionnaires were used (unconditional or conditional risk placed first), this effect could not be assessed for practical reasons. Under these circumstances it is probable that if such an effect existed, it was counterbalanced, though we cannot be sure of it.. Our data suggest that comparative risk appraisal may explain some part of the variance of risk-taking and therefore should qualify the common opinion that comparative optimism does not really account for actual risk-taking (van der Pligt, 1998). This would be however, only provided that simulations place subjects in a most real decision making process.

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Table 1
 Mean and Standard Deviation of Comparative Risk Appraisal for NON RISK-TAKERS (n = 178)
 Moyenne et Ecart-types de l'évaluation des risques comparatifs pour les non preneurs de risque (n = 178)

Comparative Risk Questions	M	SD	t	p
HIV INFECTION (UNCONDITIONAL)	-1.284	1.223	-13.999	<0.001
NEW SEXUAL PARTNER	0.315	1.037	4.047	<0.001
SEVERAL SEXUAL PARTNERS	0.747	1.310	7.611	<0.001
UNKNOWN SEXUAL PARTNER	0.446	1.102	5.388	<0.001
ACTUAL RISKS	0.672	1.241	7.208	<0.001

Note. t and p values refer to a two-tailed Student's t-test of a comparison to a theoretical mean (=0). Comparative Risk Appraisal was assessed by a 7-points scale where negative values mean less chances and positive values mean more chances than the average of people. Zero means as many chances.

Note. t et p se réfèrent à un test de Student bilatéral d'une comparaison à une moyenne théorique (=0). L'évaluation des risques comparatifs s'est faite par une échelle en 7 points où les valeurs négatives signifient moins de risques et les valeurs positives plus de risques que la moyenne des autres. Zéro signifie autant de risques.

Table 2

Mean and Standard Deviation of Comparative Risk Appraisal for RISK-TAKERS (n = 90)

Moyenne et Ecart-types de l'évaluation des risques comparatifs pour les preneurs de risque (n = 90)

Comparative Risk Questions	M	SD	t	p
HIV INFECTION (UNCONDITIONAL)	-0.744	1.223	-5.775	<0.001
NEW SEXUAL PARTNER	0.089	0.907	0.929	0.355
SEVERAL SEXUAL PARTNERS	0.633	1.302	4.614	<0.001
UNKNOWN SEXUAL PARTNER	0.156	0.820	1.800	0.075
ACTUAL RISKS	0.533	1.201	4.212	<0.001

Note. t and p values refer to a two-tailed Student's t-test of a comparison to a theoretical mean (=0). Comparative Risk Appraisal was assessed by a 7-points scale where negative values mean less chances and positive values mean more chances than the average of people. Zero means as many chances.

Note. t et p se réfèrent à un test de Student bilatéral d'une comparaison à une moyenne théorique (=0). L'évaluation des risques comparatifs s'est faite par une échelle en 7 points où les valeurs négatives signifient moins de risques et les valeurs positives plus de risques que la moyenne des autres. Zéro signifie autant de risques.

Table 3

ANOVA Comparison of Comparative Risk Appraisal Between the Two Groups,
NON RISK-TAKERS versus RISK-TAKERS (N = 268)

Comparaison par ANOVA des évaluations de risques comparatifs chez les deux
groupes non preneurs de risques versus preneurs de risques (N = 268)

Comparative Risk Questions	NON RISK-TAKERS n=178		RISK-TAKERS n=90		F	p
	M	SD	M	SD		
HIV INFECTION (UNCOND.)	-1.284	1.223	-0.744	1.223	11.913	0.001
NEW SEXUAL PARTNER	0.315	1.037	0.089	0.907	3.105	0.079
SEVERAL SEXUAL PARTNERS	0.747	1.310	0.633	1.302	0.398	0.529
UNKNOWN SEXUAL PARTNER	0.446	1.102	0.156	0.820	4.887	0.028
ACTUAL RISKS	0.672	1.241	0.533	1.201	0.765	0.383

Note. F and p values refer to an ANOVA where risk status is the factor and comparative risk estimates are dependent variables. Non-parametric Mann-Whitney U gives same results.

Note. F et p se réfèrent à une ANOVA où le facteur est la prise de risque et les évaluations subjectives de risques comparatifs sont les variables dépendantes. Le test non paramétrique de Mann-Whitney donne les mêmes résultats.