

Risky Decisions Despite Counter Evidence: Modeling a Culture of Safer Sexual Practices

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ABSTRACT

To create a culture of safe practices, we need to understand how and under what conditions the public makes risky decisions about their health. Because risky sexual behaviors are known to be common in young adults, we investigated their decision making regarding sexual activities that could incur a high risk of HIV infection. Sixty young urban adults maintained journals for two weeks and were interviewed regarding condom use and sexual history. We characterized four patterns of condom use behavior: consistent (35.0%), inconsistent (16.7%), consistent to inconsistent (35.0%), and inconsistent to consistent (13.3%). Directionality of reasoning was analyzed in the explanations provided for condom use decisions. The consistent and inconsistent patterns were associated with data-driven heuristic reasoning, where behavior becomes automated and is associated with a high level of confidence in one's judgment. In the other two patterns, the shift in behavior was due to a significant event that influenced a change in directionality to explanation-based reasoning. We discuss these results within the framework of identifying potentially high-risk groups for whom customized intervention strategies (such as computer-based educational programs) can be used to reduce risk, thereby creating a culture of safer sexual practices.

Keywords: Decision-making, risk assessment, public health, health behaviors

INTRODUCTION

To create a safe culture within the community, it is essential to understand how and under what conditions the public make “near miss” and risky decisions about their health. In light of the widespread epidemic of HIV infection, there is nowhere that this point is more important for public health than in promoting safer sex practices in young adults – individuals who are often high risk takers.

According to the World Health Report 2004, the dominant mode of HIV transmission is unprotected sexual intercourse¹. Young adults engage in unprotected intercourse even though they are aware that they risk HIV infection by doing so, and they recognize that condom use is an effective means of protection against infection.

Young adults have not conventionally been viewed as high risk, but they have a rapid incidence rate of HIV. Between 2000 and 2003, the number of newly reported HIV cases increased for the 18-24 year old age group, while decreasing in other age groups². The incidence of HIV in the monogamous, heterosexual population (usually not considered high risk) is also on the rise, both in the United States and in developing countries. In 2003, heterosexual adults and adolescents comprised 34% of the new diagnoses². Our study attempted to identify this group and to explain why these people incur such risks. Our goal is to understand what mediates risky sexual behavior in these populations in order to propose

suitable interventions that will promote a culture of safer sexual practices in the community.

This paper addresses the public health issue of the increasing incidence of HIV infection. This research is consistent with studies in public health that endeavor to study the mediators of decision making in relation to issues such as disaster preparedness³ and response to contagion. It also draws on consumer health approaches that study the health beliefs and competencies of lay people and digital divide populations. The research is formative and can lay the ground work for interventions by identifying when in the decision making process we should intervene and the nature of intervention that should be used. In our view, understanding decision making and reasoning patterns related to risky sexual behaviors will direct us towards interventions that effectively target specific high-risk groups. We focus on the applicability of this research to the customization of educational interventions for specific groups.

Young Adults' Risky Sexual Behavior

Condom use has been the target of hundreds of studies of high-risk sexual behavior in heterosexual young adults⁴. Individual studies have examined the association between reported condom use and psychosocial factors, attitudes toward condom use, demographics, and HIV knowledge. In a review and meta-analysis of HIV risk reduction interventions for heterosexual adults, results showed significant

reduction in sex-related risk behavior, particularly condom non-use, and STD infections⁵. In a recent study, Downs et al.⁶ implemented an interactive video intervention for HIV prevention over a six-month period with adolescents who were seeking care at community care sites. A crucial aspect of the video intervention was the interactive nature, which mandated time for the adolescent to reflect on the information and situations before moving on to the next part of the video. The important result was a trend in the video intervention condition of a higher proportion of condom use and a sustained high rate of abstinence reported in the follow-up sessions among young women, who were previously sexually active.

Theoretical Rationale

Health cognition is a subfield of cognitive science devoted to the study of cognitive processes in health-related tasks. Understanding the thought processes involved in health-related reasoning, in order to promote more effective practices, has been the subject of our concern. Investigations into the process of reasoning, with a focus on specific directionality, have been one area where advances in cognitive science have made significant contributions, such as in the domains of medicine^{7,8} and physics⁹.

The studies in these domains have found that there are two broad models of reasoning that influence decisions: forward-directed reasoning, also known as data-driven reasoning (in which inferences flow from the data to hypotheses) and backward-directed reasoning, also known as goal-directed reasoning (where data are checked against the generated theory or hypothesis). Forward-directed reasoning is a form of heuristic, which is usually used when one is very familiar and confident in a situation. For example, a young woman uses negative results on an HIV test (the data) to draw a conclusion that she and her partner are safe from infection, and they do not need to use a condom during sexual activity (the hypothesis). The heuristic used here is that negative results are associated with no infection, and thus it is safe to practice unprotected sexual intercourse. Although this type of reasoning is highly efficient, it is often error prone in the absence of adequate knowledge of the situation⁸. The use of heuristics introduces considerable bias in health-related reasoning, often resulting in a number of decision errors. Human thought is fallible and we cannot appreciate the fallibility of our thinking unless we draw on an understanding of how our thinking processes operate in real world decision tasks.

The other type of reasoning, explanation-based or goal-directed reasoning, takes more time and is less efficient than data-driven reasoning because the decision maker has to keep track of multiple goals

and hypotheses. Goal-directed reasoning is mostly used in complex situations and in situations of uncertainty⁸. This type of strategy does not usually take a straight path from evidence to decision—it more closely resembles a trial and error strategy. Once a dead end is encountered, the decision maker must retrace previous steps and reevaluate the original hypothesis. For instance, suppose a young man has been dating his partner for two weeks, is unsure if he can trust her, and maintains that he has to use a condom for sexual activity. As the relationship progresses, he looks for cues that the partner is trustworthy and attempts to redefine the status of the relationship. The young man's hypothesis is that in order for a relationship to be sexually safe, there must be trust in the relationship. He searches for evidence of trust in order to support his hypothesis. When there is enough evidence to support the hypothesis, he concludes that it is safe to have sexual intercourse without a condom. If there is enough evidence against his hypothesis, he reevaluates his hypothesis in light of this new evidence.

The use of such heuristics is helpful in the decision making process, but heuristics also introduce biases, which lead to erroneous (and risky) decisions. Our research focuses on identifying and characterizing the precise conditions under which such decisions are made and how these risky decisions are linked to the reasoning processes of young adults regarding condom use as a safer sex practice.

In our current study, we examined a group of heterosexual young urban adults to investigate why this group is at risk and to characterize the reasoning that is contributing to decisions to use or not to use condoms during sexual intercourse.

METHODS

Sixty men and women were recruited from a New York City undergraduate institution via flyers, posters, and announcement in classes. Interested students were screened for eligibility prior to enrollment in the study. Eligibility requirements included (a) age (18-24), (b) heterosexual orientation, (c) fluency in English, (d) a moderate level of HIV knowledge, and (e) currently sexually active. Fifty percent were African-American (n=30), 36.7% were white (n=22), 5% were Asian (n=3) and 8.3% reported themselves as "other" (n=5). In addition, only 10% identified as Hispanic (n=6). The average age was 21 years.

Enrollment in the study involved the completion of two weeks of daily journals (modified from Howard et al.¹⁰), chronicling participants' sexual encounters, followed by an in-depth interview. This is as close to naturalistic data collection as we could get, given the nature of the sensitive personal information. Daily

journal collection methods have been used extensively in the study of interpersonal relationships¹¹, and successfully in other studies of the sexual behavior of young adults¹². An advantage is that it captures the real decisions that participants make in their daily lives, as opposed to hypothetical situations, which may not reflect actual behavior¹³.

The in-depth interviews were scheduled and conducted as closely after the last day of diary collection as possible. During the session, the interviewer asked the participant to elaborate on each encounter logged in the two-week diary. From there, the interviewer probed for more information regarding the following topics: attitudes towards sex, relationship history, specific sexual encounters, and the avoidance of sexual encounters, HIV knowledge, and HIV education. All interviews were audio recorded and subsequently transcribed in preparation for coding and analysis.

Data Analysis

The interview protocols were analyzed using qualitative methods. We used a grounded theory approach, in which we reviewed a subset of the interview protocols for emergent common themes using a data-based, or bottom-up, procedure¹⁴. Emergent themes were used to create codes in the temporal coding scheme.

For temporal coding, we outlined participants' sexual relationships chronologically, according to one of these phases: past sexual history, initial non-stable relationship phase with primary partner, transition phase between non-stable and stable relationship with primary partner, stable relationship phase with primary partner, and encounters with partners outside the primary relationship. Each relationship was described in terms of (a) the phase, (b) the episodes that occurred during that phase, (c) the events that transpired during that episode, and (d) the details associated with each event.

Semantic representation. In analyzing each interview transcript, we used a socio-cognitive approach, where the unit of analysis was an individual's reported perceptions and interpretations of the events, which were collected in the interview. Propositional and semantic methods of information representation were found to be useful for the analysis of such interview data¹⁵. Node-linked structures (semantic networks) were generated from relationships between these propositions. These networks provided a basis for evaluation of knowledge structures. Strategies for reasoning used to make decisions were identified within the semantic network¹⁶. The networks were also able to show how various factors combine to influence the decision-making process.

As an illustrative example, Figure 1 shows how the participant's trust (proposition 1.1) was the primary factor that led to her believing that she was infection-free (proposition 2.1) and feeling that an HIV test was not necessary (proposition 3.1). The excerpt from the interview from which the part of the representation was derived is given in the accompanying box.

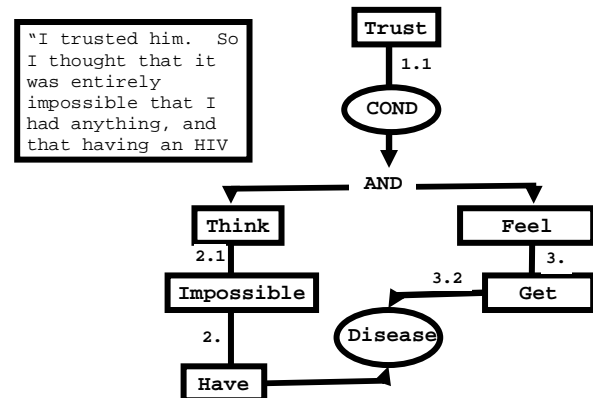


Figure 1: A propositional representation used to determine directionality of reasoning.

Directionality of reasoning. We used the previous analysis to identify the directionality of reasoning for each pattern of condom use. The presence of a conditional or causal relationship signaled the type of reasoning used by the participant. Conditional relationships were indicative of data-driven reasoning, from facts to hypothesis, such as “If x, then y.” Causal reasoning is indicative of backward-directed reasoning as accounting for theory or hypothesis from facts. In Figure 1, *trust* is the “fact” that is conditionally related to the participant “not getting tested for HIV”. In other words, if there is “trust” in the relationship, then “there is no need to get tested for HIV”. In this case, the “fact” was the participant’s perception of her relationship, which may very well have been inaccurate. This example shows forward-directed reasoning, where the *trust* “fact” is the basis of the hypothesis that the participant was not infected with HIV and did not need to get tested for the virus.

RESULTS AND DISCUSSION

1. Patterns of safer sex practices - condom use

We identified four different patterns of condom use in the analysis of our interview data: (1) **Pattern A:** condom use was consistent through all phases of sexual history, (2) **Pattern B:** condom use was consistent during initial dating phase, inconsistent during stable phase, and consistent with partners outside primary relationship, (3) **Pattern C:** condom use was inconsistent initially, then a negative event

occurred (e.g., pregnancy, abortion, separation) resulting in consistent condom use, and (4) **Pattern D**: condom use was inconsistent through all phases. The reports of 21 (35.0%; 13 men, 8 women) represented Pattern A, 21 (35.0%; 6 men, 15 women) represented Pattern B, 8 (13.3%; 6 men, 2 women) represented Pattern C, and 10 (16.7%; 5 men, 5 women) represented Pattern D.

2. Reasoning patterns associated with safe and risky sexual practices

Pattern A initially displayed behavior consistent with goal-directed reasoning (due to the awareness of the possible repercussions of not using a condom). Participants in this pattern made a conscious decision to use condoms consistently. Over time, their behavior became automatic, and their decision became associated with data-driven reasoning.

Pattern B involved a change in condom use associated with a change in comfort level of the relationship. In the beginning of the relationship, the participants had not yet established trust in their partners. Therefore, they evaluated each sexual interaction with their partner using goal-directed reasoning. Before trust was established, participants made the decision to use condoms during sexual intercourse. As trust developed in the relationship, participants felt more comfortable with their partner and more confident that it was safe to terminate condom use. From that point, their decision not to use condoms became a habit and the heuristic of not using a condom was implemented each time the participant had sexual intercourse with this partner. When a participant became involved with another “additional” partner, condoms were also used. We believe that, as in the first relationship, condom use will continue until some trust is established, after which condom use will be terminated.

Similarly, **Pattern C** was defined by a change in behavior, from condom non-use to condom use. This was associated with a shift in reasoning from using a heuristic (data-driven) to questioning one’s actions (goal-directed reasoning). Participants initially did not use condoms and were confident in their decision, which was reinforced by a lack of any consequences due to their risky behavior. At some point, a negative event, such as pregnancy, abortion, or separation, occurred to them or to someone they knew which led to a reevaluation of past behavior. All of these participants subsequently started using condoms consistently in order to prevent any future negative consequences.

Pattern D participants reported using condoms inconsistently. Their inconsistent behavior was closely related to fluctuations in their reasoning and decisions to use condoms. There were no immediate

negative or undesired outcomes noted in the data from failure to use a condom. This appeared to have reinforced this behavior and their confidence in their decision not to use a condom, providing a natural validity for their actions. Sometimes, participants thought about the possible risks of not using a condom and decided to use a condom in that particular situation.

3. Identification of High-Risk Groups

Using semantic representations of the interview protocols, we identified two groups of current inconsistent condom users (Pattern B and Pattern D) as the high-risk groups for contraction and transmission of the HIV virus. Reasoning strategies associated with change in behavior over time (as discussed above) were exemplified in the temporal nature of the constructed semantic networks.

Pattern B is a potentially high-risk group for HIV contraction and transmission, because decisions are not based on facts or scientific evidence, but on perceptions and feelings, which may be inaccurate.

Figure 2 shows the shift from consistent to inconsistent condom use based on changes in affect and relationship status. In the past, this female participant had casual partners, of whom she was distrustful, as indicated in the link from the episode of *sexual intercourse*. As a result of her lack of trust, she decided consistently to use condoms with those partners. Progressing to the *stable dating phase* with her current primary monogamous partner, she had established trust in her partner and the longevity of their relationship (see *atr afct*). Following the timeline, there was a shift from condom use to condom non-use as a result of the shift in affect and perceptions of the relationship. In the event that she had a casual partner outside of this primary relationship, she reverted back to her original decision to use condoms with that new partner, due to a lack of trust.

Trusting, “monogamous” partners may perceive their relationship as low risk, in terms of contracting HIV or other sexually transmitted infection. However, if one partner engages in sexual activity outside the relationship, does not use a condom, and contracts HIV from the encounter, the partner then brings the infection back to his or her primary partner, increasing that partner’s chances of infection (with repeated exposure). Inconsistent condom use among monogamous couples can dramatically increase the risk of HIV and can be a vector of contagion among a seemingly low risk population, a trend that is now prevalent in South Africa and Asia and is beginning to appear in North America.

Pattern D is the other high-risk group. Data shows that this group habituated to this behavior early in

their sexual activities. However, sometimes these individuals do use condoms during sexual intercourse, due to pregnancy- or infection-related concerns, which is consistent with their reports of uncertainty. In addition, most engage in sexual intercourse with multiple partners, increasing the risk involved in their behavior.

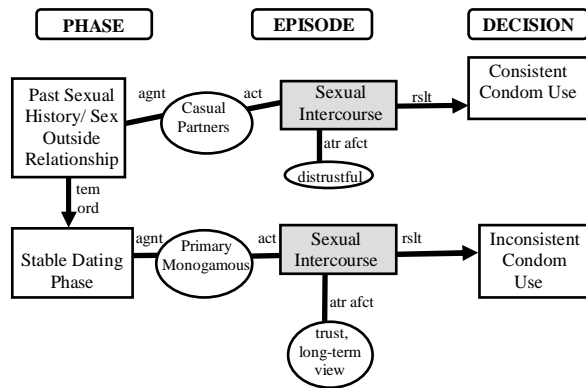


Figure 2: Semantic network representative of current inconsistent condom use behavior (Pattern B)

CONCLUSIONS

This study has led to the generation of a rich corpus of narrative interview and diary data that vividly describes the circumstances that lead to risky sexual decision making. Our analytic techniques allow us to go beyond the surface of the behavior of our participants, and provide insight into the cognitive processes that give rise to such behavior, particularly the participant's reasoning. We have identified four different patterns of condom use reflecting changes in behavior and reasoning over time. Based on these insights, we will seek to develop rapid computer-based interview methods for classifying young adults with respect to the four patterns. This future research will in turn assist us in designing suitable online interventions that are custom-tailored to an individual's patterns of thought and decision making. We note, in particular, that simple education about HIV and AIDS transmission would have little impact on the behaviors and decisions illustrated in this study. We believe that tailored educational interventions that employ vivid real world scenarios may prove to be a more compelling approach to effecting behavior change.

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