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Goal salience: the influence of impulsive and reflective states on sexual decisions

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Abstract

At any time people engage in the pursuit of multiple goals and need to regulate the allocation of effort between a short-term goal and long-term goals. In two studies the interplay between goals and cognitive state were explored. We found that people in impulsive states put more effort in attaining short-term goals than in attaining long-term goals when sex goals were relatively important (Study 1). Results from Study 2 show that goal-attainment has two opposing effects on sexual risk decisions, depending on the cognitive state. For people in impulsive states, hedonic principles are most salient and these principles guide their decisions, resulting in less risky decision making when health goal attainment was certain. People in reflective states are guided by deliberate processes, resulting in risky decision making when health goal attainment was certain. Implications for improving health behavior are discussed.

Keywords: short-term goal, long-term goal, salience, sexual decisions, cognitive states

Goal salience: the influence of impulsive and reflective states on sexual decisions

People often do things they regret later on. People, saving up for a distant need, give in to luring advertisements and unsafe sex practitioners live wracked with regret after an impulsive sexual escapade. Throughout most of our evolutionary history, a healthy dose of impulsiveness was likely worth the risk (Ditto, Pizarro, Epstein, Jacobson, & McDonald, 2006). However, as the complexity of social environments increased, the ability to control impulses and abstain from immediate desires came to be associated with richer future rewards and less potential risks.

Still, people take risks and some of these risks can have serious consequences. Sexual risk taking, for example, can have serious consequences for one's health. However, a health goal may not be pursued because it is continuously competing with other goals (Gebhardt, 2008). Everyday choice is directed by a variety of goals and there seems to be a conflict between a short-term impulse to attain an immediate incentive goal and the long-term benefits of long-term goals (Strack & Deutch, 2004).

Whether a goal is pursued depends on the salience of that goal. For people in impulsive states, hedonic goals are most salient. People in impulsive states are well known for their incapability of resisting impulses (Ramanathan & Menon, 2006). Instead, the reflective system is guided by long-term goals through a process of deliberate reasoning (Strack & Deutch, 2004). Additionally, goals that are of more importance to a person will be more likely to lead to behavior than less valued goals (Förster, Liberman, & Higgins, 2005).

We propose that when it comes to sexual decisions, there is an interplay between cognitive state and goals. Which goal will influence decision making depends on the relative importance of the goal and the cognitive states people are in. People in impulsive states are guided by short-term goals when making decisions. People in reflective states will follow long-term principles when making decisions. In two studies different opposing goals as well

as cognitive states will be manipulated to test the different ways in which people deal with sexual decisions.

Cognitive state: influence on behavior

Previous research has shown how both impulsive and reflective impulses determine health behavior (Hofmann, Friese, & Wiers, 2008). In the reflective system, behavior results from a decision process where the value and the probability of potential consequences are weighted and integrated to reach a preference for one behavioral option (Strack & Deutch, 2004). If a decision is made, the reflective system activates behavioral schemata through a mechanism of intending. This process of intending is self-terminating: when the goal of the decision is reached, the process is turned off. Long-term goals, like health goals, lead to behavioral intentions if people have the mental capacity and the motivation to process these long-term goals (Strack & Deutch, 2004). Important long-term goals should lead to stronger intentions, exert more force, and lead to less risky decisions.

People are not always in a reflective state, especially when it comes to sexual decisions. The impulsive system requires little cognitive capacity and may control behavior under suboptimal conditions. This impulsive system adheres to the hedonic principle: positive stimulation facilitates approach; negative stimulation facilitates avoidance (Strack & Deutsch, 2004). Impulsive behavior is driven by pleasure seeking goals. These short-term goals, also known as impulses or hedonic goals, may conflict with long-term goals, such as to be frugal or to stay healthy (Ramanathan & Menon, 2006). Impulsive decision-makers are more likely to engage in risky decisions and more likely to engage in intercourse (Donohew et al., 2000). Factors that result in impulsive states include arousal and visceral factors such as drive states (e.g. sexual desire). Loewenstein (1996) and Ditto, et al. (2006) claim that visceral factors cause people to behave in a desired yet risky manner, contrary to their own long-term self-interest. Ariely and Loewenstein (2006) show that arousal has a significant effect on the

subjective attractiveness of different activities and on the willingness to engage in risky sexual activities. Sexual arousal influences the intensity of motivation to choose sex over other goals.

Goal salience and goal importance: influence on goal pursue

Everyday choice and behavior are directed by a variety of goals, defined as internal representations of desired states (Austin & Vancouver, 1996). According to Gebhardt (2008), whether a goal is pursued depends on the state or quality of that goal relative to neighbouring items, also known as the salience of that goal. A health goal may not be regarded as most salient or may not be pursued over time because it has to continuously compete with other goals for limited resources (Gebhardt, 2008). For people in impulsive states, a short-term goal is most salient and these people may experience conflict between this short-term goal and a long-term goal. This will resolve in favor of the short-term goal, which continued to operate in the background and leads to an increase in desire (Ramanathan & Menon, 2006). People in reflective states can experience a conflict between the temptation and the long-term goal. However, as long-term goals are more salient for people in reflective states, this conflict will lead to a renewed shielding of the long-term goal (Ramanathan & Menon, 2006).

Additionally, goals that are of more importance to a person will be more likely to lead to behavior than less valued goals (Förster, Liberman, & Higgins, 2005; Strack & Deutsch, 2004). When health goals are relatively important this will guide behavior more, resulting in less risky sexual decision making. Some goals are of such importance to people that they overshadow other goals. Sex goals are an example of such goals. Perceptions of the positive benefits, like psychological pleasure, of unprotected sex are better predictions of sexual risk taking decisions than the perceived costs (Levinson, Jaccard, & Beamer, 1995; Parsons, Halkitis, Bimbi, & Borkowski, 2000; Siegel et al, 1994).

We expect that when sex goals are relatively important to people there will be a larger effect on sexual decisions. We expect to find this effect in the present study. People in impulsive states will show increasing desire for a short-term goal, whereas people in reflective states will show no increase.

Goal attainment: influence on risk decisions.

To pursue a goal is one thing, to stay committed to a goal is another. How will people remain committed to their long-term goal? Research on this subject is divided. Research by Fishbach, Shah, and Kruglanski (2004) focuses on the hedonic aspect of goal attainment. They suggest that the more people are satisfied with advancement towards their goal, the more they are inclined to increase their efforts due to the experienced pleasure of their accomplishments. If a person is disappointed with the outcome of his or her efforts, he or she is likely to disengage from the goal (Wrosch, Scheier, Miller, Schulz, & Carver, 2003). This indicates that for people in impulsive states, who are guided by the hedonic aspects of goals, goal attainment will enhance the salience of that goal and therefore the goal will remain active.

Other research focuses more on reflective processes and sees goal-directed behavior as more deliberate, a tendency to pursue a goal until it is fulfilled or until the person disengages from goal pursuit (Goschke & Kuhl, 1993). According to Gebhardt (2008), recent research indicates that a goal loses its salience when one is successfully progressing towards it, indicating that when goal attainment is certain, progress is satisfactory and it is more efficient to put effort in other goals. Alternative goals will then increase their influence on behavior (Förster et al, 2005; Louro, Pieters, & Zeelenberg, 2007; Vohs & Baumeister, 2008). Additionally, according to Jeffrey, Onay, and Larrick (2010), goal attainment seems to create a psychological cushion that allows people to make riskier decisions. In the case of goal non-

attainment, this deliberate process operates in a different manner. When a goal is not attained, the goal is still salient and remains active (Zeigarnik, 1927).

We expect to find these different patterns because of the interplay between cognitive states and goal attainment. Because the reflective system activates behavior through a more deliberate process, we expect people in reflective states who have not attained their health goal to remain focused on this goal, resulting in less risky decision making. People in reflective states who have attained their health goal, experience that progress is satisfactory and it is more efficient to put effort in another goal. This will increase the likelihood of sexual risk taking. People in impulsive states, however, are guided by the hedonic aspect of goal attainment. The pleasure of goal attainment will enhance the salience of that goal and efforts to attain the goal will remain. This will result in less risky sexual decision making. Goal non-attainment on the other hand will decrease efforts, thereby increasing risk decisions.

The present research

To investigate the effects of goals for people in impulsive and reflective states, we manipulate these states through two different mindset manipulations. Study 1 will provide participants with the opportunity to work for access to two alternatives using a concurrent schedules paradigm. Participants have to choose between a short-term goal (watching a slightly erotic film) and a long-term goal (participating in a boring task for money). The response demands of the choices are varied, and the index of relative reinforcing value of the choice is defined as the amount of work done to obtain one versus another alternative. This study was designed to test the hypothesis that people in impulsive states will find hedonic tasks more reinforcing than alternative activities associated with long-term goals, in comparison to people in reflective states.

The second study will add the importance of goal attainment and also focuses on two goals, a short-term sex goal and a long-term health goal. To investigate the effect of

attainment of a health goal on sexual risk taking for people in impulsive and reflective states, both goal attainment and cognitive state were manipulated. Goal attainment was manipulated by asking participants to write about a situation where they did attain a relevant health goal. Risk decisions were assessed by asking the participants how likely it was that they would have unprotected sex with an attractive person (the temptation) in a situation, described in a scenario. When health goals are relatively important, we expect people to make less risky sexual decisions, independent of the cognitive states people are in. We also expect to find an effect of sex goals: when sex goals are relatively important, this will lead to riskier sex decisions.

Study 1

Method

Participants and design. A total of 66 students (26 men) at Utrecht University (M age = 22.02 years, $SD = 3.28$) participated in exchange for 2 Euros or course credits. This study used a 2 (impulsive state versus reflective state) x 2 (male versus female) mixed design. Participants were randomly assigned to one of the two conditions.

Procedure. Participants were first introduced to a cognitive state manipulation. An adjusted version of the mortality salience manipulation (Greenberg et al., 1990) was used. Participants were explained the meaning and the importance of being either in an impulsive state or in a reflective state. They were then requested to take time to think about a situation when they were either in an impulsive or reflective state and to answer three questions about this situation: “Describe a situation when you were impulsive/ reflective”, “Describe, as short as possible, the emotions that you experience while thinking about situations when you were impulsive/ reflective” and “Describe, in specific terms, what physical reactions you experience when you are impulsive/ reflective”.

Participants were then introduced to a computer-generated concurrent schedules task. The task was based on Epstein's concurrent chain schedules task (Lappalainen & Epstein, 1990) and measured the reinforcing value of hedonic versus non-hedonic tasks. Participants were explained that they could earn points which, later on, would be traded in for two additional tasks. One task was watching an enjoyable, slightly erotic film, and one was a tiring task to earn extra money. Each screen consisted of two pictures representing the two tasks. There was no effect of picture placement (left or right). Therefore these data were collapsed for analyses. A point was earned for clicking the mouse associated with the chosen picture. Ten points corresponded with one minute of the additional task. Participants were informed that not every click would produce a point and with every round it would get harder to earn points for one of the two tasks. Point totals were displayed between each round. Participants all participated in five rounds and were told that it was their choice to work for either the film and/or the tiring task. Each round was terminated upon the subjects earning 20 points total. Participants were informed of their overall point totals after each round. The reinforcement schedules for both the film and tiring task options were set to a variable ratio 2 (VR2) in the first round of the task. In subsequent rounds, the tiring task schedule was kept at VR2, while the schedule for the film was set at VR2 in round 1 and doubled for each subsequent round (ascending VR4 to VR8 to VR16 to VR32). After completing the five rounds, participants were informed of their total score. Subsequently, participants were informed there would be no additional tasks.

To conclude the experiment, participants filled out two questionnaires with items scored on a 7 point scale, 1 = entirely not true to 7 = entirely true. The first questionnaire concerned the importance of short-term goals, like sex goals, and consisted of seven items, for example: "If I haven't had sex for a while, I'll put extra effort in getting sex". These statements were based on the self-focused reasons, especially pleasure, found most in

previous research. To assess the importance of long-term goals like earning money a second questionnaire was added. This questionnaire concerned the importance of participants' goals concerning money and consisted of eight items, for example: "It is important for me to make a lot of money".

Results and discussion

To check whether the importance of sex goals differed between the different conditions, two independent t-tests were conducted with sex goals as the dependent variable and gender and cognitive state as between subject variables. The t-tests showed significant effects for both gender and cognitive state. Men ($M = 4.42$, $SD = 1.05$) and women ($M = 4.05$, $SD = .85$) showed a difference in how importance sex goals were to them, $t(89) = 1.86$, $p = .07$, $r = .19$). Participants in impulsive ($M = 3.98$, $SD = .89$) and reflective states ($M = 4.43$, $SD = .97$) differed in the importance of their sex goals, $t(89) = -2.27$, $p = .03$, $r = .23$. We will shed light on this in the discussion.

Effort for short-term goals. To analyse the differences in effort for film points, a repeated measures ANCOVA was conducted with round as within subjects factor and cognitive state and gender as between subjects factors. Standardized sex goals were added as covariate. There was a main effect of round, $F(4, 55) = 11.30$, $p < .01$, $\eta_p^2 = .45$, and an interaction effect of cognitive state with sex goals, $F(1, 58) = 8.47$, $p < .01$, $\eta_p^2 = .13$. As expected, both were qualified by the significant three way interaction of round, cognitive state and sex goals, $F(4, 55) = 3.09$, $p = 0.02$, $\eta_p^2 = .18$. To explore this interaction further, we computed simple slopes for the effects of cognitive state on round for participants for whom sex goals were relatively unimportant (-1 SD) and for participants for whom sex goals were relatively important (+ 1 SD), (see Aiken & West, 1991). When participants valued their sex goals more than average, the interaction between round and cognitive state is marginally significant, $F(4, 55) = 2.09$, $p = .09$, $\eta_p^2 = .13$ (see Figure 1). There was a significant

ascending linear effect of round when participants were in an impulsive state, $F(1, 32) = 6.28$, $p = .018$, $\eta_p^2 = .16$. These results indicate that subjects choose to work for film points at an increasing rate across rounds, when in an impulsive state. There was no linear effect of round when participants were in a reflective state. The interaction between round and cognitive state when participants valued their sex goals less than average, were not significant.

Furthermore, there was a significant two way interaction of gender and sex goals, $F(1, 58) = 6.19$, $p = .016$, $\eta_p^2 = .09$, and a significant three way interaction of round, gender and sex goals, $F(4, 55) = 3.37$, $p = .01$, $\eta_p^2 = .19$, indicating that when sex goals were relatively unimportant, men showed a higher overall effort for film points ($M = 45.97$, $SE = 6.85$) than women ($M = 41.78$, $SE = 5.33$). None of the other effects reached significance.

Effort for long-term goals. To analyse the differences in effort for the boring task to earn extra money, a repeated measures ANCOVA was conducted with round as within subjects factor and cognitive state and gender as between subjects factors. Standardized money goals were added as covariate. There was a significant three way interaction of round, gender and money goals, $F(4, 55) = 3.31$, $p = .02$, $\eta_p^2 = .19$ and a marginally significant four way interaction of round, cognitive state, gender and money goals, $F(4, 55) = 2.38$, $p = .06$, $\eta_p^2 = .15$. To explore these interactions further, we computed simple slopes for the effects of gender and cognitive state on money goals for participants for whom money goals were relatively unimportant (-1 SD) and for participants for whom money goals were relatively important (+ 1 SD). A significant interaction was found between cognitive state and gender for participants who valued their money goals more than average, $F(1, 58) = 5.91$, $p = .02$, $\eta_p^2 = .09$. When money goals were relatively important, men showed a higher overall effort for film points ($M = 48.55$, $SE = 9.23$) than women ($M = 25.35$, $SE = 9.49$). Men who valued their money goals more than average put more effort in film points when they were in an

impulsive state, ($M = 61.23$, $SE = 11.96$) than women did ($M = 23.35$, $SE = 9.98$). The effects for participants who valued their money goals less than average did not reach significance.

We found that participants in impulsive states show increasing effort for film points when sex goals are relatively important. The manipulation checks showed that these results cannot be explained by differences in the importance of sex goals for people in different cognitive states. The results are in accordance with our expectations about the importance of sex goals and the literature on the effort that people in impulsive states make to attain short-term goals. The effects did not reach significance for people in reflective states, indicating that people in reflective states did not show an increase in effort for short-term goals.

We also found gender effects. When sex goals were relatively unimportant and when money goals were relatively important, men showed a higher effort for film points than women. The manipulation checks showed that these results cannot be explained by differences in the importance of sex goals for men and women. This could indicate that irrespective of the relative importance of both the sex goals and the money goals, men show a higher effort for hedonic, short-term activities.

In our next study we focus on a different aspect of goals, namely experienced long-term goal success or failure when it comes to health and its influence on risk taking. The difference in cognitive state remains important, but the manipulation itself is changed so it is better suited for a paper version.

Study 2

Method

Participants and design. A total of 131 people (66 men) between the ages of 18 and 43 (M age = 23.58 years, $SD = 5.04$) participated. Participants agreed to fill in the forms in the train between Utrecht Central and Amsterdam Zuid WTC ($n=29$) and in the train between Utrecht Central and Beverwijk ($n=34$). More participants were recruited at Universities, at the

University of Amsterdam (n=23) and at Utrecht University (n=45). This study used a 2 (goal attained versus goal not attained) x 2 (impulsive state versus reflective state) x 2 (male versus female) between subjects design. Participants were randomly assigned to one of the four conditions.

Procedure. Participants who agreed to participate were given four pages and were told that the experiment consisted of different unrelated tasks. They were asked to complete each assignment in the order they were presented.

Participants were requested to write about a situation when they were (un)successful in attaining a valued health goal. They were asked to think about this health goal intensively and take some time to write about the situation. They were told that the aim of this assignment was to find out what makes someone (un)successful in attaining health goals.

Participants were then introduced to a cognitive state manipulation. They were asked to read a bogus article which described the positive effects of being either impulsive or reflective, a procedure modelled after Lockwood and Kunda (1997). Participants were told they were about to read an article from a newspaper. Afterwards they had to indicate from which newspaper this article was.

Next, the participants were presented with a description of a real life situation, based on the scenario used by MacDonald, Fong, Zanna, and Martineau (2000), where a person meets an attractive person of the opposite sex (Evelien or Frank). They talk and enjoy themselves and at the end of the evening they want to have sex, but there is no condom present. In the scenario the woman takes birth control pills, so there is no risk of pregnancy to consider.

The participants were asked to really imagine themselves in the given situation and answer two questions, scored on a 7 point scale. The first question concerned the dependent variable, the sexual risk decision; "Would you have sex with Evelien/ Frank in the presented

situation?” (1= very unlikely/ 7= very likely). The second question was added as a manipulation check and concerned arousal; “How arousing is this situation to you?” (1 = not at all arousing/ 7 = very arousing).

Participants filled out two questionnaires with items scored on a 7 point scale, 1 = entirely not true to 7 = entirely true. The first questionnaire concerned the importance of their sex goals and concerned the same seven items as Study 1. The second questionnaire concerned the importance of participants’ health goals and consisted of five items, for example: “It is important for me to protect myself against sexually transmitted diseases”.

Results and discussion

Arousal. Two independent t-tests showed no significant effect of arousal for both gender and cognitive state. Men ($M = 4.67$, $SD = 1.88$) and women ($M = 3.94$, $SD = 1.72$) found the presented scenario equally arousing, $t(128) = 1.60$, $p = .11$, $r = .14$. Participants in impulsive ($M = 4.46$, $SD = 1.78$) and reflective states ($M = 4.13$, $SD = 1.89$) also found the presented scenario equally arousing, $t(128) = .28$, $p = .78$, $r = .025$.

Sexual risk decisions with sex goals. Because health goals and sex goals were significantly correlated ($r = -.18$, $p = .04$), we used two separate ANCOVA’s, starting with a 2 (goal attained versus goal not attained) x 2 (impulsive versus reflective) x 2 (male versus female) ANCOVA with sex goals as covariate. There was a main effect of sex goals. When sex goals were relatively important (+1 SD, $M = 4.97$, $SE = 0.31$), participants made riskier decisions than when sex goals were relatively unimportant (-1 SD, $M = 2.75$, $SE = 0.33$), $F(1, 115) = 20.08$, $p < .01$, $\eta_p^2 = .15$.

As expected, the three-way interaction of goal attainment, cognitive state and sex goals was significant, $F(1, 115) = 5.46$, $p = .02$, $\eta_p^2 = .05$. To explore this interaction further, we conducted simple slopes for the effects of goal attainment and cognitive state on sexual risk taking for participants who value sex goals less than average (-1 SD) and for participants

who value sex goals more than average (+ 1 SD), (see Aiken & West, 1991, see Figure 2). A significant interaction was found between goal attainment and cognitive state for participants who valued their sex goals less than average, $F(1, 115) = 4.26, p = .04, \eta_p^2 = .04$. Participants who had attained their goal made riskier sexual decisions when they were in a reflective state than when in an impulsive state. Furthermore, a significant interaction was found between goal attainment and cognitive state for participants who valued their sex goals less than average, $F(1, 115) = 4.58, p = .03, \eta_p^2 = .04$. Participants who had not attained their health goal made riskier sexual decisions when they were in an impulsive state than when in a reflective state. The effects for participants who valued their sex goals more than average did not reach significance.

Sexual risk decisions with health goals. To analyse risk decisions using health goals as a covariate, a 2 (goal attained versus goal not attained) x 2 (impulsive versus reflective) x 2 (male versus female) ANCOVA was conducted with health goals as covariate. There was a main effect of gender, $F(1, 117) = 18.07, p < .01, \eta_p^2 = .13$, which showed that men ($M = 4.67, SE = 0.26$) made riskier sex decisions than women ($M = 3.15, SE = 0.26$). Furthermore, a main effect of health goals was found, $F(1, 117) = 8.82, p = .04, \eta_p^2 = .07$. Participants who value their health more make less risky decisions (+1 SD, $M = 3.37, SE = 0.26$), than participants who value their health less (-1 SD, $M = 4.49, SE = 0.26$). All other effects did not reach significance.

Results from this study support our expectation that the impulsive system adheres to the hedonic principle and the reflective system is guided by deliberative processes. Results also indicate that when health goals are relatively important, people show a decrease in sexual risk taking. When sex goals were relatively important, people made riskier decisions than when sex goals were relatively unimportant. However, when looking at the interaction with goal attainment and cognitive state, we see that there is solely a significant interaction when

people value their sex goals less than average. This could indicate that for people who value their sex goals more than average, these sex goals are of such importance that they overshadow other influences.

General Discussion

The presented studies are the first, to our knowledge, to test the interplay between goals and cognitive state when it comes to sexual decisions. In line with our hypotheses we found in Study 1 that people in impulsive states are driven by hedonic principles. People in impulsive states were willing to put increasingly more effort in attaining short-term goals, when they value sex goals more than average. These results cannot be explained by differences in the importance of sex goals for people in different cognitive states. Sex goals are relatively unimportant to people in impulsive states when compared to people in reflective states. This indicates that irrespective of the importance of the sex goals, people in impulsive states are guided by sex-related short-term goals. The results are in accordance with our expectations about the importance of sex goals and the literature on the effort that people in impulsive states make to attain short-term goals. People in reflective states did not show this increase in effort, indicating that people in reflective states are not guided by short-term goals even though sex goals are of relative importance to them.

The results from Study 2 also confirm our expectations that people in impulsive states are guided by hedonic principles. However, hedonic principles are not merely applicable to sex related short-term goals. The most salient goal guides decision making and for people in impulsive states a hedonic goal is most salient. In Study 2, the attainment of the health goal was most salient for people in impulsive states, so attention got focused on this goal, thereby decreasing the chance of risky decision making. In the case of goal non-attainment, the health goal was less salient and attention got therefore focused on the other goal, the sex goal. The health goal was most salient for people in reflective states if these people had not attained

their health goal. This resulted in less risky decision making. People in reflective states who did attain their health goal, experienced that progress was satisfactory and effort got put in another goal, in this case a sex goal. This increased the likelihood of sexual risk taking.

Additionally, results from Study 2 show that an important goal can guide behavior, irrespective of cognitive state. When health goals are relatively important, sexual risk taking decreased. When sex goals were relatively important, sexual risk taking increased. However, results from Study 2 also show a surprising effect. Contrary to our expectation that goal attainment and cognitive state have an effect on sexual risk decisions, we found that when people valued their sex goals more than average, goal attainment and cognitive state had no effect on the sexual risk decisions. This could indicate that sex goals are of such importance for people who value their sex goals more than average, that these sex goals guide behavior, irrespective of the cognitive states people are in and whether a health goal is attained or not.

Although not of central importance, we found gender effects. When sex goals were relatively unimportant and when money goals were relatively important, men showed more effort to attain sex related short-term goals than women. This could indicate that irrespective of the relative importance of both the sex and the money goals, men show a higher effort for sexual activities. This is in agreement with the literature on gender differences and risk taking, stating that men overall score higher on sexual permissiveness, are more sexually active and are more likely to take sexual risks than women (Byrnes, Miller, & Schafer, 1999; Fischtein, Herold, & Desmarais, 2007). The exact meaning of these results are not yet clear and could use further research.

Implementations and suggestions

The aim of the present research was to contribute to the understanding of human behavior, especially to human decision making. Although the puzzle is far from being solved, the present research got us one step closer to its completion. The results from the studies can have

important implications for reducing risk behavior. Firstly, people in impulsive states prefer immediate gratifying goals over long term goals. According to Hofmann, Friese, and Wiers (2008), treatments to improve health behavior are most effective if they also change impulsive influences on behavior. Secondly, we found that the most important goal guides behavior. As seen in Study 2, if health goals were of relative importance, sexual risk taking decreased. If however, sex goals were seen as relatively important, sexual risk taking increased. Reasoned influences are easier to change than impulsive influences. Therefore when improving health behavior it's essential to know the attitudes and beliefs of the people whose behavior we wish to change. Programs for improving health behavior can use this information in developing new programs.

Additionally, our studies made clear that people follow salient cues when making decisions. For people in impulsive states, hedonic goals are most salient and guide behavior. If people in impulsive states are reminded of the long term goals they have attained, this will satisfy their hedonic goals, thereby decreasing the change of less beneficial short-term goal pursue.

In the present research, the goal attainment manipulation was presented before the scenario. It would be very interesting to see if goal attainment had the same effect on risk decisions if the goal attainment manipulation is presented directly after the scenario. If this is the case, it could have important practical implications for reducing unwanted risk behavior. People could be reminded of the progress they are making in their long-term goals when in sexually risky situations, for example by placing banners, coasters or other reminders. Further research in this direction is advisable.

The present research focused on sex goals and sex decisions mainly. Further research could focus on other conflicting goals, like eating sweets versus eating healthy or buying expensive shoes versus saving money, to see if the results extend. We expect to find similar

results as the same processes underlie all short-term versus long-term goals, namely hedonic versus deliberate processes.

Limitations

Although we offered some insights into the dynamics of human choice behavior, the present research has some limitations. The first potential limitation concerns the cognitive state manipulation. Cognitive state was manipulated through two different mind-set manipulations. In the second study, half of the participants agreed to fill in the forms while travelling by train. These people might have been in a hurry which could have influenced the reflective state manipulation. Because we used many different participants at different locations and different times, we don't expect that this possible hurriedness had negative effects on the results.

A second potential limitation concerns the implications for real life situations. The presented scenario was not a real-life situation but participants had to imagine themselves in the given situation. This could have influenced the sexual risk decision. Obtaining real-life risk measurements would be very complex to do and above all highly unethical.

Conclusion

A long time ago, giving in to impulses was a smart thing to do and could even save your life. Nowadays, giving in to an impulsive sexual escapade can have major consequences and delaying gratification can be the wiser choice. It seems that people give in to sexual impulses easily, especially when they find themselves in an impulsive state. However, there is more than meets the eye.

By investigating the interplay between cognitive states and goals, the present research found support for the idea that the most salient goal guides decision making. In this goal salience lies the opportunity to influence people towards less risky decision making by making sure people experience pleasure while thinking about long-term goals and by altering

long-term principles. The present research added a piece to the puzzle of the ever continuing struggle between impulse and reason, but the quest for completion continues.

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Figure 1. Film points earned by participants in impulsive and reflective states across rounds 1–5 with increasing variable ratio (VR) reinforcement schedules for earning film reinforcers for participants who value sex goals more versus participants who value sex goals less (high and low values represent plus or minus one standard deviation from the mean).

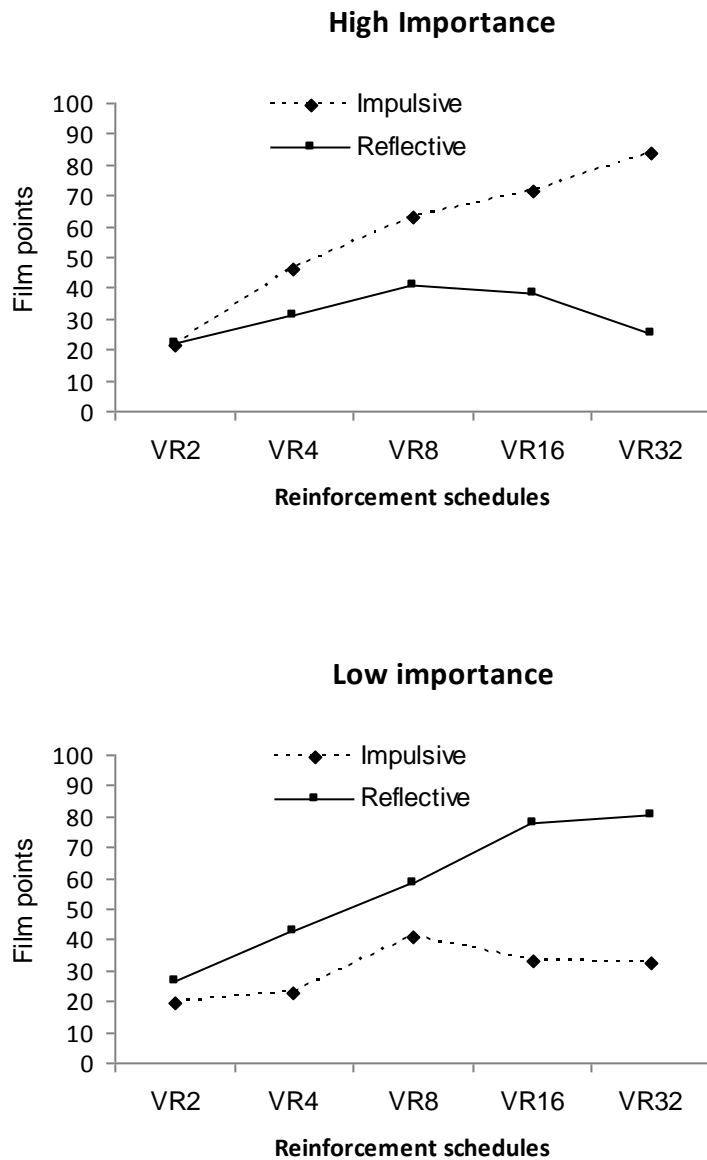


Figure 2. Sexual risk decisions as a function of cognitive state and goal attainment for participants who value sex goals more versus participants who value sex goals less (high and low values represent plus or minus one standard deviation from the mean). Error bars depict standard errors of the means.

