

University of Groningen

Regret and counterfactual thinking in the face of inevitability

Epstude, Kai; Jonas, Kai J.

Published in:
Social Psychological and Personality Science

DOI:
[10.1177/1948550614546048](https://doi.org/10.1177/1948550614546048)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2015

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Epstude, K., & Jonas, K. J. (2015). Regret and counterfactual thinking in the face of inevitability: The case of HIV-positive men. *Social Psychological and Personality Science*, 6(2), 157-163.
<https://doi.org/10.1177/1948550614546048>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Regret and Counterfactual Thinking in the Face of Inevitability: The Case of HIV-Positive Men

Social Psychological and
Personality Science
2015, Vol. 6(2) 157-163
© The Author(s) 2014
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1948550614546048
spps.sagepub.com



Kai Epstude¹ and Kai J. Jonas²

Abstract

Regret and counterfactual thoughts have been extensively studied in laboratory settings characterized by unlimited future options. Yet, evidence of counterfactual thought and its effects in real-life situations is scarce. The present study demonstrates the influence of regret and counterfactuals on HIV-seropositive individuals ($N = 182$). Results show that HIV-specific regrets as well as counterfactuals exert negative influence on well-being. However, counterfactuals also increased the likelihood to behave differently in the future by indicating stronger safe-sex intentions. Retrospectively, participants experienced a relatively high level of responsibility for their infection, which increased the experience of regret. Taken together, our results show that regret and counterfactuals have functional and dysfunctional consequences in this health-related context. We discuss the theoretical implications as well as the practical consequences of our findings.

Keywords

counterfactual thinking, regret, well-being, health, illness cognition

Thoughts about what might have been are an essential part of human cognition (Baumeister, Masicampo, & Vohs, 2010). Research on these counterfactual thoughts has traditionally emphasized their functionality for self-regulation (Epstude & Roese, 2008; Kahneman & Miller, 1986). In case of a mishap, upward counterfactuals (i.e., imagining a better outcome) help preparing future behavior (Smallman & Roese, 2009). Downward counterfactuals (i.e., imagining a worse outcome) on the other hand might boost positive affect (Markman & McMullen, 2003).

Regret is the central emotion studied in relation to counterfactuals. It usually occurs after unexpected negative events for which some level of own responsibility is acknowledged (Zeelenberg & Pieters, 2007). Conceptually, regret and counterfactuals are both assumed to have preparatory functions for future behavior (Epstude & Roese, 2008). Inherent in this functional perspective is the assumption that regret or counterfactuals can be detrimental, namely in cases where objectively there is no real possibility to correct one's behavior or to undo an event (Epstude & Roese, 2011).

What does such a functional perspective imply for the psychological response to the infection with HIV? Although the treatment of individuals living with HIV has drastically improved over the last years, there is still no cure for it. Moreover, in Western countries most infections are acquired during unprotected sexual intercourse (Trienekens et al., 2012). Therefore, individuals might experience a considerable amount of retrospective control over the infection. The fact

that an outcome cannot be undone and the perceived control over such an outcome has been central to the study of regret and counterfactual thoughts (Epstude & Roese, 2008; Markman & McMullen, 2003). Examining how regret and counterfactuals affect HIV-positive individuals is therefore a unique opportunity to examine the functions and the dysfunctions of the two phenomena in a yet unexplored but highly relevant context.

Counterfactuals and Regrets in Irreversible Contexts

Davis, Lehman, Wortman, Silver, and Thompson (1995) studied counterfactuals, in the face of traumatic life events like the loss of a partner or the death of a child. They found that in these situations counterfactuals do occur and they lead to severely reduced well-being. This research has very pessimistic implications for the study of regret in relation to irreversible events. Thoughts

¹Department of Psychology, University of Groningen, Groningen, the Netherlands

²University of Amsterdam, Amsterdam, the Netherlands

Corresponding Authors:

Kai Epstude, Department of Psychology, University of Groningen, Grote Kruisstraat 2/1, Groningen 9712TS, the Netherlands.

Email: k.epstude@rug.nl

Kai J. Jonas, Department of Social Psychology and Cognitive Science Center, University of Amsterdam, Weesperplein 4, 1018 XA, Amsterdam, the Netherlands.

Email: k.j.jonas@uva.nl

occurring in these situations often focus on what the person could have done or shouldn't have done. The effect of these specific counterfactuals was even stronger than the impact of more general ruminations. Similar to such traumatic events, in the health context, a crucial aspect of counterfactuals is the potential for considerable amounts of self-blame. Individuals who believe that they could have avoided a certain injury or medical condition tend to blame themselves more (Davis, Lehman, Silver, Wortman, & Ellard, 1996). These findings regarding self-blame are complemented by more general research on counterfactuals indicating that perceptions of controllability of an event are a crucial factor in the occurrence of counterfactuals (Giroto, Legrenzi, & Rizzo, 1991). Counterfactuals about controllable experiences also tend to retrospectively increase perceptions of controllability, if there is the chance to show a corrective behavior in the future (Markman & Weary, 1996).

One aspect that has not yet been explored in the context of the Davis et al. (1995; Davis, Lehman, Silver, Wortman, & Ellard, 1996) studies is how a corrective behavior under these circumstances might look like. The functionality of regret oftentimes lies in facilitating beneficial behavior in the future. How can such a function be construed in an irreversible context such as an HIV seroconversion (i.e., changing one's serostatus from negative to positive)? Currently, there is no cure for HIV/AIDS available, yet medication has turned it into a chronic, only potentially lethal disease. Still, an HIV infection is a critical event linked to fears and high levels of uncertainty (Lyons, Pitts, Grierson, Thorpe, & Power, 2000). In Western countries, HIV infections are mostly acquired through unprotected sexual intercourse (e.g., Likatavicius & Van de Laar, 2010). Therefore, we expect that individuals retrospectively perceive potential control over the situation, which increases the likelihood for the occurrence of counterfactuals (Giroto et al., 1991).

The effects of counterfactuals and regrets in the current context could be twofold. On the one hand, potential ruminations about the infection contexts might have a strong effect on well-being and mental health (Nolen-Hoeksema, 2000; Watkins, 2008). Regret as one form of rumination influences depressive symptoms (Markman & Miller, 2006), especially if they occur repetitively (Roese et al., 2009). However, from a more functional perspective, counterfactuals in an HIV context might simply facilitate the formation of health-related behavioral intentions, too. Therefore, we aimed to test how functionality of regret and counterfactuals in irreversible context of a potentially life-threatening disease could be conceptualized. A secondary goal of our research is to understand if and how regrets and counterfactual influence well-being in the HIV context. Despite its practical relevance for developing future interventions, this question so far has never been addressed empirically and can contribute to theorizing on counterfactuals.

The Psychological Consequences of an HIV Infection

Living with a chronic and potentially life-threatening disease is likely to have consequences for an individual's well-being.

When it comes to living with an HIV infection, this effect on psychological health might be especially crucial. The infection is in many cases not due to bad luck or "faith" but due to a certain type of risk behavior in the past. Saying this, we do not want to blame individuals living with HIV for their health status but purely do so for analytical reasons relevant to the study. Given the availability of highly active antiretroviral therapy (HAART), an HIV infection does not mean that AIDS will break out immediately. Currently, an HIV infection for many has taken much more the form of a more or less dormant chronic disease but is still potentially lethal. Thus, AIDS-related disease symptoms might develop only years after the infection. Moreover, with advances in medical research, those can also be controlled much better than in the early years of the HIV/AIDS epidemic. At the same time, HAART is not free from considerable side effects, and HIV-positive individuals can suffer from considerable levels of HIV-related stigma (Deacon, 2006). Thus, knowledge of the infection persists, influencing professional and life choices as well as romantic partnership. Quite likely, it leads to thoughts about how one's life could be different without the infection as well as to the experience of regret. In a classic study, Carstensen and Frederickson (1998) found that HIV-positive individuals tend to adjust their social life in that they become more selective in their social interactions, and affective well-being plays a more important role. According to Carstensen and Frederickson (1998), this pattern resembles older individuals in the general population who perceive their remaining time of life to be limited. However, actual age was not a predictor of these HIV-related findings, rather the occurrence of AIDS-related symptoms predicted the described changes. The infection therefore has effects on both individual well-being and the social life of HIV-positive individuals.

The Present Research

Our study was conducted in the Netherlands. The infection circumstances and treatment background of HIV-positive individuals in the Netherlands is similar to other industrialized countries (Trienekens et al., 2012). The present study was part of a larger survey on sexual behavior and psychological well-being of HIV-positive individuals. Based on the functional perspective, we would predict regrets about having acquired HIV to be dysfunctional for well-being. Nevertheless, relevant future behaviors are prone to be influenced by regrets. First, if the infection was acquired due to unsafe sex, the decision to use condoms in the future has beneficial consequences for one's own health as well as for the health of a partner. Besides avoiding further HIV infections for serodiscordant partners, HIV-seropositive individuals have been shown to be more prone to other sexually transmitted infections, for example, syphilis (Lynn & Lightman, 2004). Second, in line with classic findings in counterfactual research perceiving retrospective control over the situation should lead to stronger HIV-related regrets and potentially ruminative thoughts about the situation.

Third, realizing that dwelling upon the circumstances does not make the infection disappear might be an important aspect of one's own mental health. Having regrets about the infection might therefore not be a bad thing per se, having them repeatedly might cause problems. Consequently, we tested how the experience of general life regrets and specific regrets about HIV infection influence participants' well-being as well as their intentions to practice safe sex in the future. Fourth, we wanted to examine how the availability of specific counterfactual thoughts regarding the infection has an influence on regret and well-being. In the context of an HIV infection, an upward counterfactual could refer to the potential use of condoms, while a downward counterfactual could simply involve a comparison of one's own situation to that of HIV-positive individuals 20 years ago. As it can be inferred from these two examples, the likelihood of having an upward counterfactual might be higher.

Method

Participants

A total of 182 male HIV-positive individuals took part in the study. The mean age of the sample was 50.94 years ($SD = 11.65$). The majority of the sample indicated to have sex only with same-sex partners ($N = 160$) or to have a preference for same-sex partners ($N = 19$). On average, participants were infected with HIV for 121.43 months ($SD = 77.65$).¹ One hundred seventy-one participants received HAART treatment, 11 participants didn't. Those receiving HAART were undergoing treatment for an average of 94.51 months ($SD = 69.65$).

Materials and Procedure

The study was conducted online with a panel maintained by the Dutch Association of HIV-positive individuals (HVN, HIV Vereniging, the Netherlands). Participants were contacted by e-mail and asked to complete the questionnaire, which consisted of a number of standardized scales measuring well-being, control, and safe-sex intentions. Moreover, items measuring specific regrets and thoughts about the infection were part of the questionnaire. The items will be described in more detail subsequently. If not indicated differently, scales for all items ranged from 1 (*completely disagree*) to 5 (*completely agree*).

Dependent Measures

Regret. We measured two different aspects of regret. First, we used a single item measuring the extent to which participants experience regret about having acquired HIV (i.e., *I regret having acquired an HIV infection*). Second, participants were also asked to complete the 6 items on global regrets (taken from Roese et al., 2009). Two items measuring the general tendency to have counterfactual thoughts were added (i.e., *I oftentimes think how things could have been different; I tend*

to think about things I shouldn't have done). Those 8 items were combined into a single mean score ($\alpha = .86$).

Repetitive thoughts. In order to measure repetitive thoughts about having acquired the infection, we employed 2 items. One item measured the extent to which participants had those thoughts (i.e., *I often think that I should have done more to avoid the infection*), while the other one measured the extent to which they did not have such thoughts (i.e., *I rarely think about how and why I acquired the infection*). We reversed the coding of the latter and combined both of the items into a single score ($r = .50, p < .001$).

Subjective well-being. In order to measure subjective well-being, we used the Dutch version of the Satisfaction With Life scale (SWL; Diener, Emmons, Larsen, & Griffin, 1985). We combined the 5 items of the scale into a single mean score ($\alpha = .89$).

Intentions for future behavior. Participants indicated about their intentions to practice safe sex in the future using a slider bar that ranged from 1 (*very low*) to 100 (*very high*; Jonas, Hawk, Vastenburger, & de Groot, 2014).

Perceptions of control. We used a 2-item measure for the extent to which participants experienced control in relation to the HIV infection (i.e., *I was in control of my HIV infection; I don't know how I could have avoided the infection* [reverse coded]). These 2 items were averaged into a single mean score ($r = .37, p < .001$).

Blame. As an additional aspect of control, we measured who is to blame for the infection on a slider scale from 1 (*solely another person*) to 100 (*only me*). Higher values on this item therefore point to higher levels of self-blame.

Counterfactual thoughts. We explained the concept of "If only" thoughts to participants using an example unrelated to health outcomes. We then asked participants to list such a thought they had about their infection. Two independent raters coded participants' responses in terms of whether a counterfactual (or at least parts of it) was present and in terms of direction of the counterfactual thought (upward, downward). Interrater agreement rate was satisfactory (Cohen's $\kappa = .71$).

Results

Zero-Order Correlations

In a first step, we looked at the correlations between the key dependent variables: global regret, HIV-related regret, satisfaction with life, perceived control, safe-sex intentions, and perceived blame (Table 1). The experience of regret regarding the infection is related to decreased subjective well-being ($r = -.24$) as well as an increased experience of global regrets ($r = .37$). A strong and consistent pattern emerges for the tendency to have repetitive thoughts about the infection.

Table 1. Zero-Order Correlations Between the Measures.

	1	2	3	4	5	6	7
1. Regret HIV	–						
2. Global regret	.37**	–					
3. Repetitive thoughts	.44**	.59**	–				
4. SWL	–.24**	–.54**	–.34**	–			
5. HIV control	.21**	.14	.25*	–.05	–		
6. Safe-sex intentions	.06	.23**	.28**	–.08	–.16*	–	
7. Blame	–.003	–.10	–.21*	.09	.27**	.09	–

Note. SWL = Satisfaction with life.

*Significant at the $p < .05$ level. **Significant at the $p < .01$ level.

The stronger the participants indicate that this type of thought, the more regrets they felt ($r = .44$) and the less satisfied they were with their life ($r = -.34$). The more participants perceived to have had control over their HIV infection, the stronger are HIV-specific regrets ($r = .21$) and repetitive thoughts ($r = .25$). An interesting pattern emerged for the blame variable. As expected, it correlates positively with perceived control ($r = .27$). However, the correlation with repetitive thoughts is negative ($r = -.21$), indicating that participants who tend to attribute less blame to themselves have more HIV-related repetitive thoughts. Intentions for safe-sex behavior in the future are positively correlated with global regret ($r = .23$) and repetitive thoughts ($r = .28$) but negatively with perceived retrospective control over the situation ($r = -.16$).

The Effects of HIV-Specific Regret and Ruminative Thoughts

Next, we examined how HIV-related regret and the tendency to have repetitive counterfactuals influence the general feeling of regret, subjective well-being, perceptions of control, blame, and safe-sex intentions. We conducted five separate regression analyses with the respective scales as a criterion variables and HIV-related regrets and the tendency to ruminate about what could have done differently as predictor variables (Table 2). The results indicate that while HIV-related regret only predicts general regret ($B = .14$, $t = 1.90$, $p = .059$) and perceived control ($B = .16$, $p = .067$), participants' tendency to think about what they might have done differently in relation to their infection predicts general regret ($B = .53$, $t = 7.40$, $p < .001$), SWL ($B = -.30$, $t = -3.54$, $p < .001$), safe-sex intentions ($B = .31$, $t = 3.62$, $p < .001$), and blame ($B = -.26$, $p < .001$).

We also examined potential interaction effects between HIV-specific regret and repetitive thoughts (similar to Roesse et al., 2009) on subjective well-being and global regret. After centering the predictors, we found marginally significant interaction effects for subjective well-being ($B = -.17$, $p = .08$) and global regret experiences ($B = .14$, $p = .08$).²

The Predictive Role of Demographic Variables

In order to get an insight into the role of demographic variables in predicting the various psychological constructs, we ran

Table 2. Regression Analyses.

	HIV Regret	Thinking What Could Have Been Done Differently	R ²
Global regret	.14*	.53**	.36
SWL	–.10	–.30**	.13
HIV control	.16*	.11	.05
Safe-sex intentions	–.08	.31**	.08
Blame	.16	–.26**	.06

Note. SWL = Satisfaction with life. Values are standardized β s.

*Marginally significant ($p \leq .06$). **Significant at the $p < .01$ level.

several regression analyses using age, the time since the infection was diagnosed, and the time since the treatment began as predictor variables. The number of months since the infection is known is predictive of repetitive thoughts ($B = -.331$, $t = -2.45$, $p = .015$) and the experience of general regrets ($B = -.25$, $p = .066$). The more time had passed since the diagnosis, the less repetitive thoughts and general regrets were experienced. Similarly, the longer individuals were already treated, the better was their subjective well-being ($B = -.25$, $p = .068$). Age predicts perceived control ($B = -.16$, $p = .059$). The older the participants, the lower the retrospective control over the HIV infection. No other effects were linked to the demographic variables.

Control and Perceived Responsibility

Perceptions of controllability were positively correlated with the variable measuring who's to blame, $r = .27$, $p = .005$. This simply indicates that self-blame is linked to higher perceptions of controllability. However, the blame measure is negatively correlated with the tendency to have HIV-related repetitive thoughts, $r = -.21$, $p = .03$, while not being correlated to HIV-related regrets at all, $r = .003$, $p = .97$. This suggests that the more individuals blame themselves for acquiring the infection, the less they experience repetitive thoughts. Due to the nature of our blame measure (i.e., a bipolar scale ranging from blaming someone else to blaming the self), this might also indicate that a larger degree of other blaming is linked to higher repetitive thoughts.

Counterfactuals

We coded the produced text by the participants for counterfactuals and regarding their direction (upward, downward). All thoughts coded were upward counterfactuals. Sixty-two participants did report one or more counterfactuals regarding their infection, 95 indicated not having such thoughts. We decided to test how the mere availability of counterfactuals influenced participants' well-being and future intentions by comparing the two groups.

Participants reporting counterfactuals had more HIV-related regrets, more general regrets, and were lower in their subjective well-being than participants who did not encounter counterfactual thoughts (see Table 3 for the detailed results). However, despite counterfactuals being linked to these

Table 3. Comparison Between Participants Who Had Versus Had No Counterfactual Thoughts Regarding Their Infection.

Variable	No Counterfactuals		Counterfactuals		<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Regret HIV	2.86	1.54	3.65	1.52	-3.13	154	.002	0.52
General regret	1.90	0.77	2.61	0.91	-5.26	153	<.0001	0.87
Satisfaction with life	3.58	0.80	3.23	1.08	2.27	153	.025	0.37
Repetitive thoughts	2.01	1.09	3.07	1.43	-5.26	154	<.0001	0.87
HIV control	2.88	1.22	3.57	1.03	-3.68	153	<.0001	0.61
Safe-sex intention	61.54	37.66	73.04	32.21	-1.98	154	.050	0.33
Self/other blame	83.18	19.69	73.26	27.16	2.21	106	.030	0.43

negative outcomes, we also found evidence for the functionality of these thoughts. Participants reporting counterfactuals also indicated to have a higher intention to practice safe sex in the future, compared to participants who did not engage in counterfactual thinking. Interestingly, participants mentioning a counterfactual were also more likely to indicate having had control over their infection. At the same time, they also showed lower degrees of self-blaming for the infection. However, the means of this latter variable are indicating a high level of self-blame for both the groups. The relatively lower score for the counterfactuals group might indicate a high degree of reflection about the situation, acknowledging the responsibility of the self as well as the other person involved.

Discussion and Implications

Our findings suggest that regret and counterfactual thoughts are psychological constructs that exert a powerful influence on HIV-positive individuals. Besides a general negative link between regret and satisfaction with life, we also found that a combination of repetitive thinking and regret is particularly detrimental (see also Roese et al., 2009). However, despite these indications of dysfunctional aspects of regrets, we also found a more beneficial relations, namely an increased intention to practice safe sex in the future. In line with previous findings on counterfactuals and regret (e.g., Markman, Gavanski, Sherman, & McMullen, 1995), perceived control over the infection was linked to higher degrees of specific regrets about the HIV infection.

For theorizing on a functional perspective on regret and counterfactuals, the results are certainly informative. Individuals do experience regrets and engage in counterfactual thinking, despite the negative consequences for their well-being. The question why individuals have these thoughts even when it comes to events that cannot be undone anymore has been subject to debate (e.g., Beike, Markman, & Kardogan, 2009; Sherman & McConnell, 1995). They might be linked to insights into the reasons for not attaining a goal. However, increased regrets and the presence of counterfactuals are also linked to an increased willingness to engage in safe sex in the future. Our findings nicely dovetail with other research, showing that counterfactuals compared to factual thinking are linked to negative emotions (Mandel & Dhimi, 2005). In the

present context, factual thinking might have beneficial effects on general well-being compared to counterfactuals. However, in contrast to some previous findings (e.g., Davis et al., 1996), we find that self-blame is less likely when individuals tend to engage in counterfactual thinking and when individuals perceive strong retrospective control over the situation. Our measure of blame does not allow disentangling self- and other blame. Future research needs to explore these links in more detail using more fine-grained measures (as employed by Davis et al., 1996).

It is worth noting that the mean time since infection was relatively high in our sample. Research on regret in other domains has shown that these experiences follow a temporal pattern (Gilovich & Medvec, 1994). In our sample, we found that the longer individuals are infected, the lower the degree of HIV-related regrets and repetitive thoughts. Specifically, relevant to our research is the finding that there is a general decrease in regret over time, mostly when it comes to unattainable but less so for attainable goals (Summerville, 2011). Although there is currently no cure for HIV, staying healthy can be seen as an important aspect of the present situation. Adopting the logic of previous research (Summerville, 2011), one could assume that to the extent that individuals view staying healthy as an attainable goal, regrets about the infection should remain relatively salient. Future research in the HIV context might shed some more light on this idea.

One of the key variables in our research was behavioral intentions to practice safe sex in the future. This type of measure is regularly used in psychological research but not always predictive of actual behavior. Webb and Sheeran (2006) found small to medium effects of intention change on the respective behavior. With respect to the current context, it is noteworthy that experienced or perceived volitional control over the behavior is assumed to be especially likely to strengthen the link from intention to behavior. In our study, retrospective control has a negative relation to safe-sex behavior. Related research recently demonstrated that not using a condom might seem appropriate despite the risks (Jonas et al., 2014). In such cases, individuals would still experience high levels of control. However, they would not engage in safe-sex behavior. In their meta-analysis, Albarracín, Johnson, Fishbein, and Muellerleile (2001) specifically emphasized the consideration of past behavior as a predictor of future condom

use. Counterfactuals can be seen as reminder of past behavior and might therefore be a valuable tool in intervention studies, strengthening the link between intentions and future behavior.

One interesting question for future research is whether the trade-off between negative consequences of regret and counterfactuals (e.g., reduced well-being) and the positive consequences (i.e., stronger future safe-sex intentions) can also be found in more reversible contexts. This might indeed be the case or should be even stronger. Some of the research on fantasies and expectancies show that having very specific expectancies about recovering from a hip surgery was beneficial for the actual recovery process, while having unspecific fantasies had a negative effect (Oettingen & Mayer, 2002). This points to a trade-off that is similar to the one we find. However, it would be important to illuminate that topic with a study specifically designed to test this idea.

Our study provides first evidence on how HIV-seropositive individuals experience regrets about their infection and how these regrets influence their well-being. As the literature on regret suggests, there is a functional aspect to the experience of this emotion (e.g., Epstude & Roese, 2008) in that it helps correcting future behavior. In the present study, this is indicated by the increase in safe-sex intentions. However, it would be misleading to interpret our findings such that negative affective experience is good for an individual. Instead, it is important to address the repetitive experience of these regrets and the related counterfactuals in interventions. However, it should be emphasized that these thoughts are nothing unusual. Dealing with them is a crucial aspect of coming to terms with the HIV infection. Our finding on the increased safe-sex intentions may help to improve individual and public health in the long run, too.

Acknowledgment

We would like to thank Robin Achterhof and Hans Schepers for their help with coding the counterfactual statements, and Fabian Baas for his help with programming the online questionnaire.

Authors' Note

Both authors contributed equally to this article.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The research was funded by a grant from the Aids Fonds Nederland (grant number: 2011102) and was conducted in collaboration with the HVN, HIV Vereniging, the Netherlands.

Notes

1. In cases where participants only indicated a year instead of a specific month, we always took the month of June of the respective year as the basis for further calculations.

2. For subjective well-being, the simple slope analysis revealed that both predictors at +1 *SD*, HIV-related regrets ($B = -.241, p = .0001$) and repetitive thoughts ($B = -.189, p = .03$) were driving the effect, while both being nonsignificant at -1 *SD* (HIV-related regrets, $B = -.122, p = .11$; and repetitive thoughts $B = -.07, p = .16$). Put differently, high levels of regret and repetitive thoughts decrease well-being. For global regret experiences, all simple slopes (both high [+1 *SD*] and low [-1 *SD*]) for both predictors remained significant. With HIV-related regret being a slightly stronger predictor (at +1 *SD*: $B = .383, p = .0001$ and at -1 *SD*: $B = .286, p = .0001$) than repetitive thoughts (at +1 *SD*: $B = .183, p = .013$ and at -1 *SD*: $B = .085, p = .039$) the pattern revealed that global regret is both driven by HIV-related regrets and repetitive thoughts.

References

- Albarracín, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of reasoned action and planned behavior as models of condom use: a meta-analysis. *Psychological Bulletin, 127*, 142–161.
- Baumeister, R. F., Masicampo, E. J., & Vohs, K. D. (2011). Do conscious thoughts cause behavior? *Annual Review of Psychology, 62*, 331–361.
- Beike, D. R., Markman, K. D., & Karadogan, F. (2009). What we regret most are lost opportunities: A theory of regret intensity. *Personality and Social Psychology Bulletin, 35*, 385–397.
- Carstensen, L. L., & Fredrickson, B. L. (1998). Influence of HIV status and age on cognitive representations of others. *Health Psychology, 17*, 494–503.
- Davis, C. G., Lehman, D. R., Silver, R. C., Wortman, C. B., & Ellard, J. H. (1996). Self-blame following a traumatic event: The role of perceived avoidability. *Personality and Social Psychology Bulletin, 22*, 557–567.
- Davis, C. G., Lehman, D. R., Wortman, C. B., Silver, R. C., & Thompson, S. C. (1995). The undoing of traumatic life events. *Personality and Social Psychology Bulletin, 21*, 109–124.
- Deacon, H. (2006). Towards a sustainable theory of health-related stigma: Lessons from the HIV/AIDS literature. *Journal of Community & Applied Social Psychology, 16*, 418–425.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*, 71–75.
- Epstude, K., & Roese, N. J. (2008). The functional theory of counterfactual thinking. *Personality and Social Psychology Review, 12*, 168–192.
- Epstude, K., & Roese, N. J. (2011). When goal pursuit fails: The functions of counterfactual thought in intention formation. *Social Psychology, 42*, 19–27.
- Gilovich, T., & Medvec, V. H. (1994). The temporal pattern to the experience of regret. *Journal of Personality and Social Psychology, 67*, 357–365.
- Giroto, V., Legrenzi, P., & Rizzo, A. (1991). Event controllability in counterfactual thinking. *Acta Psychologica, 78*, 111–133.
- Jonas, K. J., Hawk, S. T., Vastenburg, D., & de Groot, P. (2014). “Bareback” pornography consumption and safe-sex intentions of

- men having sex with men (MSM). *Archives of Sexual Behavior*, 43, 45–53. doi:10.1007/s10508-014-0294-2
- Kahneman, D., & Miller, D. T. (1986). Norm theory: Comparing reality to its alternatives. *Psychological Review*, 93, 136–153.
- LikataVICIUS, G., & Van de Laar, M. J. (2010). HIV and AIDS in the European Union, 2009. *Euro Surveillance*, 15(48), 1–4.
- Lynn, W. A., & Lightman, S. (2004). Syphilis and HIV: A dangerous combination. *Lancet Infectious Diseases*, 4, 456–466.
- Lyons, A., Pitts, M., Grierson, J., Thorpe, R., & Power, J. (2010). Ageing with HIV: health and psychosocial well-being of older gay men. *AIDS Care*, 22, 1236–1244.
- Mandel, D. R., & Dhami, M. K. (2005). “What I did” versus “what I might have done”: Effect of factual versus counterfactual thinking on blame, guilt, and shame in prisoners. *Journal of Experimental Social Psychology*, 41, 627–635.
- Markman, K. D., Gavanski, I., Sherman, S. J., & McMullen, M. N. (1995). The impact of perceived control on the imagination of better and worse possible worlds. *Personality and Social Psychology Bulletin*, 21, 588–595.
- Markman, K. D., & McMullen, M. N. (2003). A reflection and evaluation model of comparative thinking. *Personality and Social Psychology Review*, 7, 244–267.
- Markman, K. D., & Miller, A. K. (2006). Depression, control, and counterfactual thinking: Functional for whom? *Journal of Social and Clinical Psychology*, 25, 210–227.
- Markman, K. D., & Weary, G. (1996). The influence of chronic control concerns on counterfactual thought. *Social Cognition*, 14, 292–316.
- Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, 109, 504–511.
- Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology*, 83, 1198–1212.
- Roose, N. J., Epstude, K., Fessel, F., Morrison, M., Smallman, R., Summerville, A., . . . Segerstrom, S. (2009). Repetitive regret, depression, and anxiety: Findings from a nationally representative survey. *Journal of Social and Clinical Psychology*, 28, 671–688.
- Sherman, S. J., & McConnell, A. R. (1995). Dysfunctional implications of counterfactual thinking: When alternatives to reality fail us. In N. J. Roese & J. M. Olson (Eds.), *What might have been: The social psychology of counterfactual thinking* (pp. 199–231). Hillsdale, NJ: Erlbaum.
- Smallman, R., & Roese, N. J. (2009). Counterfactual thinking facilitates behavioral intentions. *Journal of Experimental Social Psychology*, 45, 845–852.
- Summerville, A. (2011). The rush of regret a longitudinal analysis of naturalistic regrets. *Social Psychological and Personality Science*, 2, 627–634.
- Trienekens, S. C. M., Koedijk, F. D. H., van den Broek, I. V. F., Vriend, H. J., . . . Van der Sande, M. A. B. (2012). *Sexually transmitted infections, including HIV, in the Netherlands in 2011*. RIVM report number: 201051001/2012. Bilthoven, the Netherlands: National Institute for Public Health and the Environment.
- Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin*, 134, 163–206.
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, 132, 249–268.
- Zeelenberg, M., & Pieters, R. (2007). A theory of regret regulation 1.0. *Journal of Consumer Psychology*, 17, 3–18.

Author Biographies

Kai Epstude is an assistant professor of psychology at the University of Groningen. He studies social cognition, with a particular focus on counterfactual thoughts and related affective experiences.

Kai J. Jonas is an assistant professor of social psychology at the University of Amsterdam. His research interests are automatic behavior, social perception, emotion, and sexual health.