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Is it bad to have secrets? Cognitive preoccupation as a toxic element of secrecy¹

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ABSTRACT. This *ex post facto* study examined the effect of secrecy on well-being in a sample of 287 HIV-positive individuals, using both self-report data and objective immune parameters. The effects on well-being of three components of secrecy were studied; self-concealment, possession of a secret, and cognitive preoccupation. Confirming our hypotheses, we found a positive effect of possession of a secret on quality of life, depression and anxiety, but only after controlling for both self-concealment and cognitive preoccupation. The effects of self-concealment and cognitive preoccupation on well-being were negative. Since cognitive preoccupation partly mediated the effect of self-concealment on well-being, we concluded that cognitive preoccupation is a toxic element of secrecy. Our results imply that HIV-positive individuals that keep their serostatus secret are not *per se* at risk to directly experience negative effects of concealing their serostatus, as long as they do not have a disposition to conceal personal information and do not ruminate about their secret(s).

KEYWORDS. Secrecy. Well-being. Cognitive preoccupation. HIV/AIDS. *Ex post facto* study.

RESUMEN. Este estudio *ex post facto* examina el efecto de los secretos en el bienestar psicológico en una muestra de 287 individuos seropositivos con VIH, utilizando datos

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de autorregistros y parámetros objetivos de inmunología. Se estudiaron los efectos de los secretos sobre el bienestar psicológico teniendo en cuenta tres componentes: auto-ocultamiento, posesión de un secreto y preocupación cognitiva. Confirmando la hipótesis, los resultados indican que la posesión de un secreto influye en la calidad de vida, en los niveles de depresión y ansiedad, pero sólo después de controlar el auto-ocultamiento y la preocupación cognitiva. Los efectos del auto-ocultamiento y de la preocupación cognitiva sobre el bienestar psicológico fueron negativos. Como la preocupación cognitiva influía parcialmente en el efecto del auto-ocultamiento en el bienestar psicológico, se concluye que la preocupación cognitiva es un elemento tóxico del secreto. Los resultados indican que los individuos seropositivos no están *per se* en riesgo de experimentar directamente los efectos negativos del ocultamiento de su estado de seropositivos en la medida en que no tengan una disposición a ocultar información personal y a no rumiar sus secretos.

PALABRAS CLAVE. Secretos. Bienestar. Preocupación cognitiva. SIDA/VIH. Estudio *ex post facto*.

This study examined the association between secrecy and well-being. The goal was to determine if preoccupation with a secret is a toxic element of secrecy, negatively affecting well-being. In particular, we examined the associations between measures of objective (CD4 cell count and HIV RNA viral load) and subjective well-being (depression, anxiety, and quality of life) with three components of secrecy: secrecy as a stable personality trait (self-concealment), secrecy as a process (the possession of a secret), and the extent to which someone is preoccupied with one's secret (cognitive preoccupation).

We examined the effect of secrecy on well-being in a sample of HIV-positive patients, because individuals with a positive serostatus are inclined to keep their serostatus secret from at least some people in their close environment. For example, Klitzman *et al.* (2007) found that 24% of seropositive men did not disclose their serostatus to casual partners that had a negative or unknown serostatus. In addition, seropositive individuals were more likely to share their serostatus with close friends than with their family members or colleagues (Mayfield Arnold, Rice, Flannery, and Rotheram-Borus, 2008). Hence, although a positive serostatus is often shared with at least some other people, sharing one's positive serostatus with all members belonging to one's social environment is rare. Keeping one's serostatus secret may make one susceptible to the negative effects secrecy may have on well-being.

Wismeijer (2011) defines secrecy as the conscious and active behavior of selectively hiding information from others. Secrecy is a social phenomenon, since secrets are always kept from other people. Moreover, secrecy is a conscious process; whether a secret is kept is a conscious decision and requires constant awareness of the secret and the people (not) to share it with. And lastly, secrecy requires active engagement in strategic behavior towards the social environment to prevent the secret from being revealed. These behaviors are not only directed at the social environment, but also towards the self; thoughts related to the secret have to be consciously suppressed to decrease the chances of inadvertently mentioning the secret.

Anything can become a secret: highly personal and significant information like adultery and abuse (major secrets), but also more trivial information, such as eating a cake when on a diet or planning a surprise for someone (minor secrets). Throughout this paper, unless explicitly mentioned otherwise, we use the word ‘secret’ to refer to major secrets as these are likely to be more important in relation to well-being than trivial or positive secrets (Kelly and Yip, 2006; Wismeijer, 2011). The main reason people keep secrets is that their revelation often has (negative) consequences, depending on other people’s reactions and the significance of these people to the secret keeper (Bok, 1984; Larson and Chastain, 1990). Hence, people keep secrets because of their socio-protective function in avoiding disapproval and stigmatization (Baider, 2010; Stiles and Clark, 2011).

However, the literature also suggests that secrecy comes at a price: concealing a secret may have (direct and indirect) negative consequences for well-being (Frijns, Keijsers, Branje, and Meeus, 2010; Obasi and Leong, 2009; Vogel and Armstrong, 2010). Cole, Kemeny, Taylor, Visscher, and Fahey (1996), for example, found that greater concealment of homosexual identity among seropositive gay men was associated with a more rapid disease progression over a 9-year period. More specifically, greater concealment was associated with lower EDT lymphocyte levels, an earlier AIDS diagnosis, and dying from AIDS earlier.

Recent research has shown, however, that for understanding the negative association between secrecy and well-being it is essential to distinguish between the act of keeping a secret and being a secretive person, that is, the disposition to keep secrets (Kelly and Yip, 2006; Wismeijer, 2011). Self-concealment refers to the dispositional tendency (personality trait) to keep secrets, and is defined by Larson and Chastain (1990, p. 440) as «the active concealment from others of personal information that one perceives as distressing or negative». Self-concealment has consistently been found to be negatively associated with physical and psychological problems (*e.g.*, Larson and Chastain, 1990; Masuda *et al.*, 2011; Uysal, Lin, and Knee, 2010; Wismeijer, 2011), also after controlling for other variables such as social support, self-disclosure, and occurrence of a trauma. In contrast, Kelly and Yip (2006) found in a non-clinical sample that possession of a secret was not significantly related to well-being nine weeks later, but after controlling for self-concealment it was associated positively with well-being. The negative relationship between possession of a secret and well-being found in the literature is therefore probably misleading and shows the danger of considering secrecy to be a unidimensional concept (Kelly and Yip, 2006).

The first goal of the present study is to replicate the aforementioned findings on the associations between secrecy and well-being in a sample of HIV patients, formulated in three hypotheses.

Hypothesis 1: Self-concealment has a positive effect on possession of a secret.

Hypothesis 2: Possession of a secret has a positive effect on well-being, controlling for self-concealment.

Hypothesis 3: Self-concealment has a negative effect on well-being, controlling for possession of a secret.

These three hypotheses, represented by the three bottom arrows in Figure 1, imply inconsistent mediation. That is, the negative effect of self-concealment on well-being becomes stronger after controlling for the effects of possession of a secret.

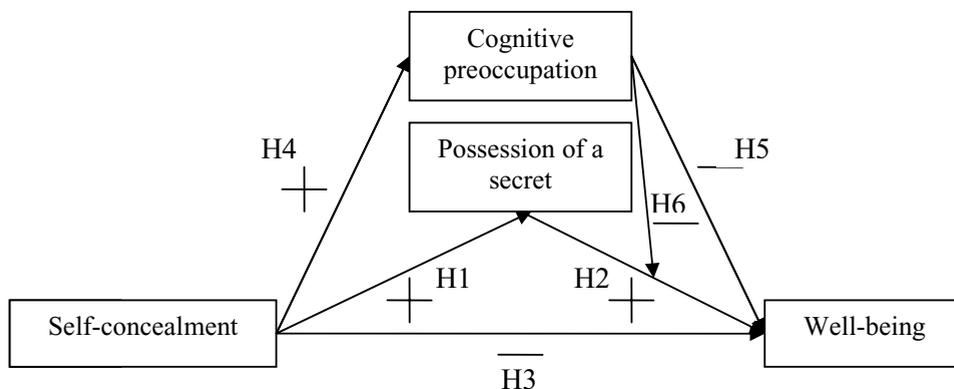


FIGURE 1. Model representing the hypotheses to be tested.

The second goal of the study is to zoom in on the role cognitive preoccupation plays in the effect of secrecy on the well-being of HIV-positive individuals. Golub, Tomassilli, and Parsons (2009) found that HIV-positive individuals may choose seroconcordant partners as a strategy to conceal their HIV status from HIV-negative individuals and thereby avoid social rejection. However, they found that this strategy may not be successful to avoid rejection as seroconcordant partners can serve as constant reminders of both their serostatus and of their stigma. Golub *et al.* (p.1239) therefore suggested that «attempts to conceal a stigmatized identity may lead to a preoccupation with stigma that may impact both emotional well-being and social functioning».

The idea that keeping something secret may lead to a preoccupation with the secret is the basis of the preoccupation model of secrecy by Lane and Wegner (1995). According to this model secrecy causes thought suppression, which leads to intrusive thoughts, which in turn causes renewed thought suppression, and so on. In this cycle, obsessive preoccupation with the secret arises which may even result in psychopathology. Lane and Wegner confirmed the prediction of their model in a series of experiments. First, they found that keeping a word secret indeed enhanced cognitive accessibility to the secret word. Thought suppression and secrecy were also found both to be positively associated with increased intrusiveness of the suppressed thoughts. Additionally, color-naming responses in a Stroop task were slower in participants keeping a secret, which suggests that thought suppression requires mental effort. Thought suppression is thought to be an important contributing factor in various emotional disorders, such as depression, posttraumatic stress disorder, and obsessive-compulsive disorder (Barnes, Klein-Sosa, Renk, and Tantleff-Dunn, 2010). In a similar vein, Wismeijer, Van Assen, Sijsma, and

Vingerhoets (2009) showed that self-concealment was positively related to a maladaptive emotion-regulation style, in particular characterized by a preoccupation with one's mood without being able to adequately label this mood.

These findings regarding the association between cognitive preoccupation and well-being suggest that cognitive preoccupation may be the toxic element of secrecy. This is formulated in the next two hypotheses.

Hypothesis 4: Self-concealment has a positive effect on cognitive preoccupation.

Hypothesis 5: Cognitive preoccupation has a negative effect on well-being, controlling for self-concealment and possession of a secret.

These two hypotheses are represented by the upper right and left arrows in the path model in Figure 1 and imply that cognitive preoccupation at least partly mediates the negative effect of self-concealment on well-being. That is, the negative effect of self-concealment on well-being becomes weaker after controlling for cognitive preoccupation.

Additionally, the effect of possession of a secret on well-being, after controlling for self-concealment, might be moderated by the amount of cognitive effort spent on the secret. That is, the effect of possession of a secret on well-being might be stronger for individuals spending much cognitive energy on their secret. This interaction effect is represented by the arrow of cognitive preoccupation with a negative sign pointing to the arrow of possession of a secret on well-being, corresponding to our last hypothesis.

Hypothesis 6: The effect of possession of a secret on well-being decreases in cognitive preoccupation.

Method

Participants and procedure

Participants were recruited from the Department of Infectious Diseases of St. Elisabeth hospital (Tilburg, The Netherlands). HIV-positive patients were approached by the nursing staff at the hospital clinic to participate in the present study. Participants gave informed consent before completing the questionnaires. The purpose of the study was explained to all patients and they also received a patient information form in which the voluntary character of participation was stressed. Patients were explained that the decision to participate or not did not influence further treatment policy and that even after agreement, they were free to stop their participation at any time. All patients were aware of their disease status. Exclusion criteria were the presence of severe psychopathological or somatic comorbidity, the presence of cognitive impairments, and insufficient knowledge of the Dutch, English or French language. All questionnaires were available in Dutch, English and French. The sample consisted of 313 patients, of which 242 (77.30%) were males. Mean age of the sample was 44.50 (range 21-75, *SD* = 10.30).

Measures

- Secrecy. Secrecy was measured using the Tilburg Secrecy Scale (TSS; Wismeijer, Van Assen, Sijtsma, and Vingerhoets, 2011) which consists of five subscales: *Self-concealment*, *Possession of a secret*, *Apprehension about disclosure*, *Cognitive preoccupation* and *Social distance*. All subscales consist of 5 items.

In this study the three subscales *Self-concealment*, *Possession of a secret*, and *Cognitive preoccupation* were used. Item examples of these scales are: «I usually don't share personal information with other people» (*Self-concealment*), «I have a secret that I will absolutely never share with anyone» (*Possession of a secret*), and «I have a secret I think about a lot» (*Cognitive preoccupation*). The items are rated on 5-point Likert scales (1 = *this does not apply to me at all*, 5 = *this is very applicable*) and are positively worded. Cronbach's alpha of the *Self-concealment*, *Possession of a secret*, and *Cognitive preoccupation* scales for this sample were .83, .89, and .85, respectively.

In addition, seven questions assessed if respondents had disclosed their positive serostatus to core members of their social environment being their partner, father, mother, other family/brother(s)/sister(s), friends, acquaintances and colleagues. Answering categories were «yes», «no» or «not applicable» for the questions regarding the partner, father or mother. For the other questions the answer categories were «to (almost) nobody», «to the majority not», «to about half yes, to about half no», «to the majority», «to (almost) everybody», and «not applicable».

Four measures were used to assess five components of well-being: depressive symptoms, anxiety, quality of life, immune status, and disease severity.

- Depressive symptoms and Anxiety. Depressive symptoms and anxiety were assessed using the 14-item self-report Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983), with seven items addressing depression, and the other seven items measuring anxiety. An example of a depression item is «I feel as I am slowed down». An example of an anxiety item is «I feel tense or wound up». Items have to be answered using a 4-point scale. The answering categories are not the same for every item. For instance, the categories for the item «I feel as I am slowed down» are *nearly all the time*, *not often*, *sometimes*, and *most of the time*, whereas the categories for the item «I feel tense or wound up» are *most of the time*, *a lot of the time*, *from time to time*, *occasionally*, and *not at all*. Some items are positively worded, others negatively. The psychometric qualities of the HADS are considered satisfactory (Zigmond and Snaith, 1983). In this study, Cronbach's alpha for depression equalled .84, and for anxiety .85.
- Quality of Life (QoL). QoL was assessed with the World Health Organization Quality of Life HIV Assessment Instrument (WHOQOL HIV Group, 2004). In this study, the short version was used consisting of 31 items (the WHOQOL-HIV BREF), including six QoL domains: a) *Physical health*, b) *Psychological health*, c) *level of independence*, d) *Social relationships*, e) *Environment*, and f) *Spirituality*. Additionally, two items examine general QoL. All items are rated on a 5-point Likert scale. Answering categories differ between domains. For instance, 1 may be *not at all*, *never*, or *very poor*, and 5 may be *very good*, *an extreme amount* or *completely*. An example of an item from the physical health domain is «How much are you bothered by any physical problems related to your HIV-infection?». The WHOQOL-HIV BREF is a HIV-specific, multidimensional, self-report QoL measure. It is easy to score and has good psychometric properties, with a Cronbach's alpha of .95 for the total score in this study.

- Immune status and disease severity. Blood samples were taken from all patients and immune parameters were assessed as part of the standard treatment protocol of the HIV outpatient clinic. Clinical indicators of immune status and disease severity include the CD4 cell count and HIV RNA viral load. CD4 enumeration was carried out using flow cytometry with the BD FACSCCount System, a single-platform volumetric flow cytometer. HIV RNA viral load was assessed using the Abbott m2000 system (m2000sp and m2000RT), an automated system that uses real-time polymerase chain reaction (PCR). Immune status and disease severity were assessed on the date closest to the assessment using the questionnaires. On average, blood samples were taken 14 days after filling out the questionnaires. The maximum time between the blood test and completing the questionnaire was 182 days, although for the majority of respondents (91.20%) the time lag was less than 30 days, with the 10th and 90th percentile equal to 0 days and 28 days, respectively.

Statistical analyses

Fifteen patients failed to fill out the TSS and eleven failed to complete the WHOQOL-HIV BREF. These patients were therefore not included in the analyses, which left us with a total sample size of 287. Only .8% of all data were missing. Exploratory analyses were performed to investigate whether the data were normally distributed. Only Viral Load showed severe non-normality, which was transformed using an inverse transformation. Descriptive statistics are reported in the preliminary analyses section of this paper and include an examination of whether the patients indeed kept their HIV-positive status secret. We considered our choice of using a sample of HIV-positive patients validated if the majority of patients keep their serostatus secret to at least one person.

The path analyses were carried out using AMOS 17.0, applying the full information maximum likelihood estimation procedure. Each variable in the path models was measured using the corresponding scale's sum score. To saturate the model we added covariances between the errors of the well-being scales. These errors and their covariances are not depicted in the figures. Sobel tests were carried out to test for mediation (MacKinnon, 2008). One-tailed tests were executed since all hypotheses were directional. The exploratory and descriptive analyses were carried out using SPSS 17.0.

TABLE 1. Descriptive statistics of scale scores ($N = 287$).

<i>Variable</i>	<i>Mean</i>	<i>SD</i>
Quality of Life	15.10	2.50
Depression	4.70	4.20
Anxiety	5.90	4.30
CD4 count	595.70	311.70
1/Viral Load	.02	.01
Self-concealment	2.70	1.10
Possession of a secret	2.80	1.30
Cognitive preoccupation	2.20	1.10

Results

Preliminary analyses

The majority of patients (220; 76.6%) kept their HIV-positive status secret from at least one person but also shared their serostatus with at least one person, 24 patients (8.4%) did not share their serostatus with anyone, 43 patients (15%) did not keep their HIV- positive status secret from anyone. Table 1 reports the means and standard deviations of the variables used in the path analyses of this study. Correlations between scale scores are reported in Table 2. The correlations between self-concealment, possession of a secret, and cognitive preoccupation were large and ranged from .58 to .62. The three secrecy scales did not correlate significantly with CD4 count and Viral Load, but correlated significantly with the three other measures of well-being, that is, QoL, anxiety, and depression. All significant correlations point to a negative association between secrecy and well-being. The three self-report measures of well-being were also not correlated with CD4 count and Viral Load, whereas the latter two had a moderate positive correlation with each other.

TABLE 2. Correlations between scale scores ($N = 287$).

	<i>SC</i>	<i>POSS</i>	<i>CP</i>	<i>QoL</i>	<i>Depression</i>	<i>Anxiety</i>	<i>CD4</i>	<i>1/VirLoad</i>
Self-concealment	-	.58***	.60***	-.38***	.43***	.37***	.07	.07
Possession of a secret		-	.62***	-.15**	.16**	.16**	.01	.00
Cognitive preoccupation			-	-.45***	.40***	.47***	-.04	-.02
Quality of Life				-	-.78***	-.79***	-.07	-.05
Depression					-	.71***	.05	.06
Anxiety						-	.04	.06
CD4 count							-	.28**
1/Viral Load								-

* $p < .05$. ** $p < .01$ *** $p < .001$; one-tailed tests

Note. SC = Self-concealment, POSS = Possession of a secret, CP = Cognitive preoccupation, QoL = Quality of Life, 1/Viral Load = transformed Viral load.

Path analyses

Inconsistent mediation of the effect of self-concealment on well-being by possession of a secret

The model is represented by the solid lines in Figure 2 and was first fitted to the data. Estimates for this model (Model 1) are reported in Table 3. Hypothesis 1, stating that self-concealment has a positive effect on possession of a secret, was confirmed; the standardized effect was .58 (first row Table 3). Hypothesis 2 was partly confirmed; the effect of possession of a secret on well-being after controlling for self-concealment was only present for quality of life and depression, but not for CD4 count and Viral Load. There was an effect of self-concealment on the three self-report measures of well-being controlled for possession of a secret, but not on CD4 count and Viral Load, hence partially confirming Hypothesis 3. The Sobel tests signify that there was inconsistent mediation of the effect of self-concealment on quality of life and depression by possession

of a secret; the effects of self-concealment on these two variables became significantly stronger after controlling for possession of a secret.

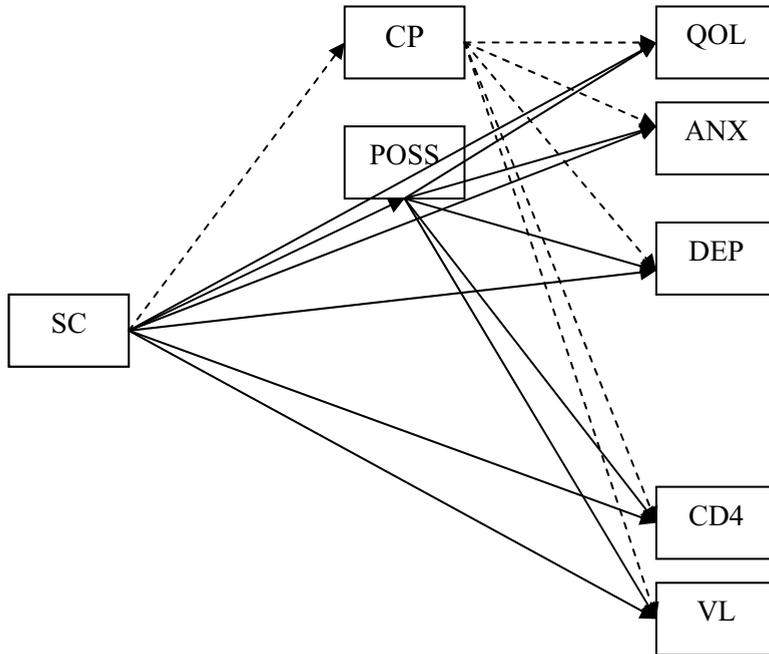


FIGURE 2. Effect of self-concealment on well-being mediated by possession of a secret and cognitive preoccupation.

Note. SC = Self-concealment; POSS = Possession of a secret, CP = Cognitive preoccupation; QOL = Quality of Life; ANX = Anxiety; DEP = Depression; CD4 = CD4 count; VL = transformed Viral load. The solid lines represent model 1 that tests for inconsistent mediation of the effect of self-concealment on well-being by possession of a secret. The solid and dashed lines together represent model 2 that tests for mediation of the effect of self-concealment on well-being by cognitive preoccupation.

Mediation of the effect of self-concealment on well-being by cognitive preoccupation

The model in Figure 2, with both solid and dashed lines, was fitted to the data. Estimates for this model (Model 2) are reported in Table 3. Hypothesis 4 stating that there is a positive effect of self-concealment on cognitive preoccupation was confirmed; the effect of self-concealment on cognitive preoccupation was large (.59, first row of Table 3). There was a negative effect of cognitive preoccupation on the three self-report measures of well-being, after controlling for the effects of self-concealment and possession of a secret, but not for CD4 count and Viral Load. Hence, Hypothesis 5 was partially confirmed. The Sobel-tests for cognitive preoccupation show that the effect of self-concealment on these three measures was mediated by cognitive preoccupation, after controlling for possession of a secret. Interestingly, the conclusions with respect to

Hypothesis 2 and Hypothesis 3 changed after also controlling for the effect of cognitive preoccupation. That is, after controlling for the effect of cognitive preoccupation, a positive effect of possession of a secret on the three self-report measures of well-being emerged but there was still no effect on CD4 count and Viral Load. Moreover, there was inconsistent mediation of the effect of self-concealment on these three measures by possession of a secret, indicated by the significant Sobel Z values with their sign opposite to the sign of the association between self-concealment and the three measures.

TABLE 3. Total standardized effects of self-concealment on well-being, standardized direct effects of self-concealment, possession of a secret, cognitive preoccupation, and the interaction between possession of a secret and cognitive preoccupation on well-being, and Sobel tests.

		<i>POSS</i>	<i>CP</i>	<i>QOL</i>	<i>Depression</i>	<i>Anxiety</i>	<i>CD4</i>	<i>VirLoad</i>
<i>Model 1</i>	SC total	.58***	.60***	-.38**	.43**	.37**	.07	.06
	SC			-.44***	.51***	.41***	.09	.10
	POSS			.11*	-.14*	-.08	-.04	-.05
	Sobel Z			1.65*	-2.06*	-1.14	-.55	.00
<i>Model 2</i>								
	SC			-.27***	.39***	.22***	.14	.13
	POSS			.31***	-.27***	-.28***	-.02	.01
	CP			-.48***	.33***	.51***	-.13	-.09
	Sobel Z POSS			4.23***	-3.71***	-3.92***	.07	.00
	Sobel Z CP			-6.05***	4.38***	6.33***	-1.48	-1.00
<i>Model 3</i>								
	SC			-.28***	.40***	.23***	.14	.13
	POSSCP			-.34	.41	.26	-.06	-.08

* $p < .05$. ** $p < .01$. *** $p < .001$; one-tailed tests.

Note. SC = Self-concealment, POSS = Possession of a secret, CP = Cognitive preoccupation, POSSCP = product variable POSS x CP, QOL = Quality of Life, depression = HADS depression, anxiety = HADS anxiety, CD4 = CD4 count, VirLoad= transformed Viral load.

Cognitive preoccupation as a moderator of the effect of possession of a secret on well-being

The model in Figure 3 was fitted to the data to test Hypothesis 6. The covariances between variables cognitive preoccupation, possession of a secret, their interaction (POSSCP), and between the error terms saturate the model. The errors and their covariances are not depicted in the Figure. Estimates for this model (Model 3) are reported in Table 3. Only the standardized estimates of the effect of self-concealment and the interaction effect are shown. Hypothesis 6 is rejected; the effect of possession of a secret on well-being was not moderated by cognitive preoccupation.

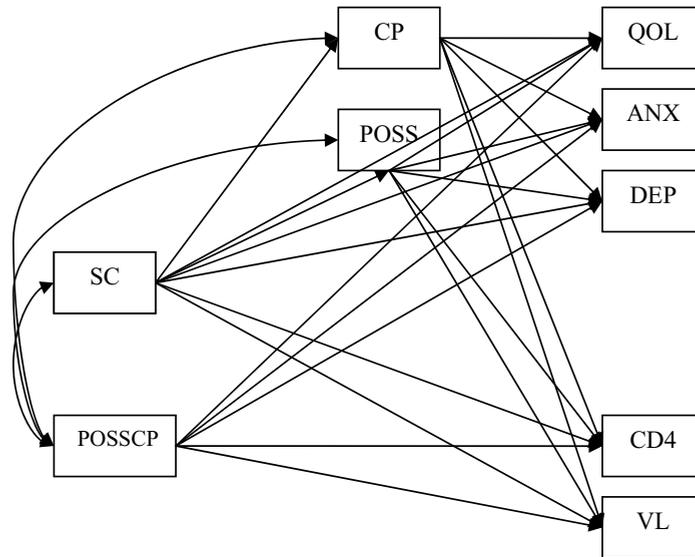


FIGURE 3. Cognitive preoccupation as a moderator of the effect of possession of a secret on well-being.

Note. SC = Self-concealment; POSS = Possession of a secret, CP = Cognitive preoccupation; QOL = Quality of Life; ANX = Anxiety; DEP = Depression; CD4 = CD4 count; VL = transformed Viral load.

Discussion

This study examined the effect of three components of secrecy on well-being in a sample of HIV-positive individuals. We selected a sample of HIV patients because we expected that the majority would keep their HIV-positive status secret from at least one person. Indeed, we found that 85% kept their serostatus secret from at least one person, in line with the literature (Mayfield Arnold *et al.*, 2008). First, we attempted to replicate the findings of Kelly and Yip (2006), which showed that possession of a secret is positively associated with well-being after controlling for self-concealment. Second, we tested if cognitive preoccupation is the toxic element of secrecy, that is, if cognitive preoccupation is to a large extent responsible for the negative effect of secrecy on well-being.

Confirming the findings of Kelly and Yip (2006) we found that the effect of possession of a secret on quality of life, depression and anxiety was positive, but only after controlling for both self-concealment and cognitive preoccupation. The effects of self-concealment and cognitive preoccupation on these measures of well-being were negative. To summarize, self-concealment and cognitive preoccupation affect self-reported well-being negatively, whereas sole possession of a secret has a positive effect on self-reported well-being.

The positive effect of possession on well-being only became visible after controlling for self-concealment and cognitive preoccupation, whereas Kelly and Yip (2006) found this positive effect already after only controlling for self-concealment. An explanation for this discrepancy might be that we used a different kind of questionnaire to measure secrecy. Kelly and Yip used the Self-concealment Scale (Larson and Chastain, 1990) to assess self-concealment. However, this scale also contains items with a cognitive preoccupation content (Wismeijer, 2011). Hence, by controlling for self-concealment they simultaneously partially controlled for cognitive preoccupation. Overall, our findings corroborate Kelly and Yip's conclusion that it is important to comprehensively assess secrecy when studying the consequences of secrecy on well-being.

Importantly, no effects were found of secrecy on immune status and disease severity (CD4 count and Viral Load), and the effect of possession of a secret was not stronger for those scoring high on cognitive preoccupation. The absence of an effect on immune status and disease severity might be due to a low power to detect a small effect size. Another possible reason is that the self-report measures and the two immunity measures were not assessed at the same time; for a small number of individuals these measurements could be even two or three months apart. As immune parameters, such as CD4 lymphocyte counts, may highly fluctuate over time we suggest examining the association between secrecy and immune status and disease severity in a longitudinal study assessing all measures simultaneously on all occasions. Since we do not have an alternative explanation for the absence of an interaction effect of possession of a secret and cognitive preoccupation on well-being, for now we conclude that there is no such interaction effect.

This study has a few limitations. First, we do not know the full content of the secret(s) of the HIV-positive individuals in our sample. However, the relevance of secrets is not so much determined by their content (the valence of which is highly idiosyncratic) but rather by the way the secrets affect the emotional and psychosocial functioning of the individual (Pachankis, 2007; Wismeijer, 2011). The far majority of the participants in this study (85%) kept their positive serostatus secret from at least one person in their close social environment. A positive serostatus has been shown to have a major impact on the individual and is experienced as highly distressing, frequently resulting in anxiety and depression (Ferrando and Freyberg, 2008). It follows that keeping one's positive serostatus secret represents a major secret, although participants may have had more major secrets. Second, we used a correlational rather than an experimental or longitudinal design. Therefore we cannot rule out the possibility that the causal ordering of the variables is different than depicted in the models. For instance, does self-concealment cause cognitive preoccupation, or the other way around? Although we cannot be sure that self-concealment precedes cognitive preoccupation, the results of our analyses on the effects of secrecy on well-being as reported in Table 3 are unaffected by the temporal order of these two variables. Third, as already discussed, there was a time lag for some participants between the questionnaire and immune measures, which may have contributed to the nonsignificant associations of the immune measures and the other variables. A final limitation is that in theory, other variables such as personality traits could explain the association between secrecy and well-being.

Wismeijer and Van Assen (2008) found that neuroticism mediated a small part of the relationship between self-concealment and well-being, whereas extraversion did not mediate this relationship. Other personality variables may be involved as well, for example experienced social support. Ullrich, Lutgendorf, Stapleton, and Horowitz (2004) demonstrated that greater concealment of homosexual identity among seropositive gay men was associated with lower CD4 counts. This was only the case, however, for men with an extensive social network, suggesting that concealing a secret might especially have detrimental effects on health when there is a large social network left unused.

Our study has an important implication for both HIV research and clinical practice. The results suggest that HIV-positive individuals that keep a major secret (such as possibly hiding their serostatus) are not *per se* at risk to experience negative effects as a consequence of concealing their secret(s). Until now clinical research on secrecy in general mainly focused on promoting disclosure, implicitly assuming that non-disclosure is a risk factor for diminished well-being (Wismeijer 2011). However, we showed that the well-being of HIV-patients may be enhanced, rather than diminished, by keeping secrets, as long as the patient does not have a disposition to conceal personal information and is not preoccupied with his or her secret. This result is in line with the self-presentational view on psychotherapy (Kelly, 2000), which states that disclosing secrets might get into the way of creating a social desirable image, which in turn withholds patients from keeping favorable views of themselves. Therefore, the findings suggest that, in contrast to current practice, HIV consultants should be wary to unconditionally promote serostatus disclosure among their patients. In addition, research on the effects of serostatus disclosure on well-being should abandon the standpoint that serostatus disclosure is by default beneficial and include the potential beneficial effects of secrecy in their models. We conclude that future research on serostatus disclosure and its link with well-being will benefit from including self-concealment and cognitive preoccupation as mediating variables.

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