



## Do neuroticism and extraversion explain the negative association between self-concealment and subjective well-being?

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### ABSTRACT

The present investigation empirically examined if the negative association between self-concealment and subjective well-being is spurious because it results from the associations of both variables with their common causes neuroticism and extraversion. We concluded from applying structural equation modeling to the data obtained from two independent student samples that neuroticism, but not extraversion, explains part of the negative association between self-concealment and subjective well-being. More than 60% of the negative association between self-concealment and subjective well-being could not be explained by Neuroticism. Implications of our findings for both research and clinical therapy are discussed.

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### 1. Introduction

Self-concealment (SC; Larson & Chastain, 1990) refers to the personality characteristic to conceal information from others, as opposed to regarding secrecy as a function of mainly situational determinants. The concept of SC is derived from the trait component of inhibition as studied by Pennebaker (1989) and is defined as the “predisposition to actively conceal from others personal information that one perceives as distressing or negative” (Larson & Chastain, 1990, p. 440). Self-concealed personal information is a subset of private personal information, consciously accessible to the individual and actively kept from the awareness of others. It is negative in valence and, if disclosed at all, usually only confined to a small number of persons because of its highly intimate content (Larson & Chastain, 1990). Since its introduction by Larson and Chastain (1990) the concept of SC has been commonly applied, predominantly in clinical psychological studies on anxiety and depressive symptoms as will be discussed below.

#### 1.1. Self-concealment as a predictor of subjective well-being

Several studies have shown that SC is positively associated with various measures of psychological distress such as anxiety (e.g., Pennebaker, Colder, & Sharp, 1990; Ritz & Dahme, 1996),

depression (e.g., Kelly & Achter, 1995), maladjustment (e.g., Kawamura & Frost, 2004), and overall psychological distress (e.g., Cramer, 1999). Further, recently Wismeijer, van Assen, Sijtsma, and Vingerhoets (submitted for publication) found SC to be negatively related with self-reported life satisfaction, psychological well-being, health status, and positively with fatigue.

#### 1.2. Neuroticism and extraversion as predictors of subjective well-being

The Big Five personality factors Neuroticism (N), or emotional stability, and Extraversion (E) are reported as the two most important predictors of subjective well-being (SWB) (DeNeve & Cooper, 1998; Diener, 2000; Vittersø, 2001). In particular, N has been shown to be positively associated with anxiety (e.g., Weinstock & Whisman, 2006), the experience of negative affect (e.g., Hutchinson & Williams, 2007), worrying (e.g., Muris, Roelofs, Rassin, Franken, & Mayer, 2005), and a wide array of psychosomatic symptoms (Rosmalen, Neeleman, Gans, & de Jonge, 2007). To conclude, N is negatively related with SWB.

In contrast, E has been repeatedly shown to exert a positive effect on SWB (Argyle & Lu, 1990; Spangler & Palrecha, 2004). For instance, Zelenski and Larsen (1999) found that positive events triggered more happiness in Extraverts than in Introverts. However, Vittersø and Nilsen (2002) have argued that the predictive effect of E on SWB is considerably inflated if N is not controlled for. Therefore, they stress that both N and E should be assessed and

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added simultaneously to any model that attempts to predict SWB, instead of one or the other.

### 1.3. Neuroticism and extraversion as predictors of self-concealment

There is reason to assume that N and E may predict SC, although no literature exists that studied this directly. First, both SC and N reflect the experience of negative affect and self-consciousness, and are associated with psychological and psychosomatic complaints. Further, both high self-concealers (Wismeijer et al., submitted for publication) and neurotics (Muris et al., 2005) tend to adopt a ruminative response style. Finally, both constructs have been repeatedly shown to be negatively associated with perceived social support (e.g., Cepeda-Benito & Short, 1998; Kelly & Achter, 1995). Because of their similarities in content and effects, we hypothesize that N has a positive effect on SC.

In contrast, we contend that E is negatively associated with SC. For instance, social interactions form a vital positive source of stimulation for extraverts, but seem to form a threat and negative source of stimulation for self-concealers (Pachankis, 2007). As a result, extraverts actively look for and create social situations to participate in, whereas self-concealers avoid them.

### 1.4. Do neuroticism and extraversion explain the negative effect of self-concealment on subjective well-being?

The two previous subsections suggest that N and E are associated with both SC and SWB. Since N is assumed to be positively associated with SC, and negatively to SWB, N may be responsible for the negative association between SC and SWB. The same conclusion may hold for E, since E is negatively associated with SC and positively associated with SWB. Hence, the negative association between SC and SWB might be spurious and be explained by their common causes N and E. If N and E are indeed the common causes, then there is no (or a much smaller) association between SC and SWB after controlling for N and E. This model is depicted by the arrows in Fig. 1.

However, it is also possible that part of the negative association between SC and SWB cannot be explained by N and E. This is the case if (1) there are aspects of SC that are related to SWB but are not related to N and E, or (2) if SC has an opposite association with

SWB than would be expected from both variables' associations with N and E. Evidence in these directions indeed exists for N and, to a lesser extent, for E. First, SC reflects avoiding negative social evaluation (Larson & Chastain, 1990), whereas N focuses on emotional reactivity in response to negative environmental stimuli (e.g., Larsen & Ketelaar, 1991). That is, in contrast to N, the social avoidance motivation represents a cardinal component of SC, and this motivation can be expected to be negatively related to SWB. Second, neurotics are known for over-reporting physical and psychological complaints (Rosmalen et al., 2007), whereas self-concealers can be expected to under-report these symptoms, since they tend to conceal personally distressing information. Third, high self-concealers have a negative attitude towards seeking counseling and have negative expectations about counseling (Cepeda-Benito & Short, 1998; Kelly & Achter, 1995). The inverse has been reported for N (Schaub & Tokar, 1999), whereas positive attitudes towards and expectations about counseling are positively related to well-being. Finally, extraverts generally tend to have and convey to others a more positive image of themselves (Hurley, 1998), which is a determinant of SWB, whereas self-concealers (who generally do not have a positive self-image (Cramer & Lake, 1998) essentially also convey a more positive image of themselves to others, but for fear to overtly discuss their flaws.

To conclude, we hypothesize that N and E will explain part of the negative association between SC and SWB, but that, after controlling for N and E, SC will still be negatively related to SWB because of the specific associations between SC and SWB that cannot be explained by N and E.

## 2. Method

### 2.1. Participants and procedure

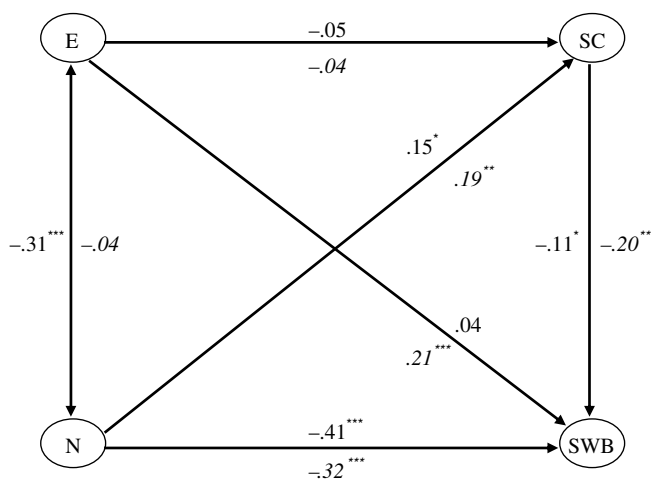
Two samples were considered. The two samples consisted of social and behavioral sciences students from a Dutch university. The participants in the first sample were 395 undergraduate students (134 men, 261 women), and in the second sample 325 other undergraduate students (136 men, 189 women). The mean ages of the two samples were 22.10 (SD = 2.59) and 21.83 years (SD = 2.15), respectively.

The scales measuring SC, N, E, and SWB (described below) were part of larger questionnaires. Completing the questionnaire and analyzing the data were requirements for passing an obligatory course on questionnaire construction in the academic years 2004–2005 (first sample) and 2006–2007 (second sample). The students were told that their answers would be checked for missing, random, and copied responses. If, for whatever reasons, students did not want to fill out the questionnaire, they could pass the course by instead completing a test on the use of SPSS to analyse questionnaire data. Since there were some differences between both samples in the measures of N and E (wording and number of answering categories), and SC (extra items were added), we did not combine the two student samples into one larger sample. This also allowed us to replicate in the second sample the results found in the first sample.

### 2.2. Measures

#### 2.2.1. Self-concealment

SC was assessed employing a Dutch translation of the Self-Concealment Scale (SCS; Larson & Chastain, 1990; Wismeijer, Sijtsma, van Assen, & Vingerhoets, in press). The SCS measures the tendency to keep negatively valenced private and intimate information secret and consists of 10 items that are rated on 5-point adjectival scales (lowest score 1 means 'does not apply to me', intermediate



**Fig. 1.** Hypothesized model and standardized estimates of parameters in the structural model part for both samples. Note: The arrows show the directions of causality of the hypothesized model. The left and upper values correspond to the estimates for the first sample, the values in italics to the estimates for the second sample. All tests are one-tailed; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . E = Extraversion; SC = Self-concealment; N = Neuroticism; SWB = Subjective Well-Being.

score 3 means 'moderately applies to me', highest score 5 means 'completely applies to me'). All items are positively worded with respect to the construct of interest, thus higher ratings indicate higher SC. In the second sample, the 10 items of the SCS were embedded in a list that also contained 15 new items on SC. Cronbach's alpha for the original 10 SCS items was equal to .82 and .84 in the two samples.

### 2.2.2. Neuroticism and extraversion

N and E were measured using a Dutch translation of Mowen's Personality Scale (Mowen, 2000). Mowen's scale consists of 15 items, three for each of the Big Five personality factors. Mowen derived his scale from Saucier's 40-item Five-Factor Model scale (1994), which is a brief version of Goldberg's (1992) questionnaire. In the first sample, participants were asked to indicate how one feels or behaves generally, using answer categories 'never' (score 1), 'sometimes' (score 2), and 'always' (score 3). The items used in the second sample contained a personality description, and participants had to indicate to what extent the description applied to her/him, using 5-point adjectival scales (lowest score 1 means 'very much disagree', intermediate score 3 means 'not disagree and not agree', highest score 5 means 'very much agree'). The items for E were all negatively worded, and were recoded such that higher scores correspond to higher levels of E. The internal consistencies of N and E in both samples were equal to (second sample between brackets) .68 (.78) and .85 (.85), respectively.

### 2.2.3. Subjective well-being

SWB was measured using a Dutch translation of the World Health Organization-Five Well-being Index (WHO-5; Bech, 1998). By means of five items, participants were asked how they had felt in the last 2 weeks, expressing their feeling using answer categories 'not at all' (score 0), 'sometimes' (score 1), 'less than half of the time' (score 2), 'more than half of the time' (score 3), 'most of the time' (score 4), 'constantly' (score 5). Cronbach's alpha for the WHO-5 was equal to .76 and .78 in the two samples.

### 2.3. Data analytic strategy

The means and standard deviations of the variables and the correlations between the variables (after imputing missing values) are reported for both samples in the preliminary analyses results section. We tested if the correlations differed from zero. The measurements contained measurement error, in particular the short scales using three (E and N) or five (WHO-5) items. To remove the effects of measurement error from the consideration of the associations between the latent variables SC, N, E, and SWB, we applied structural equation modeling (SEM) of the covariance matrix, using the ML estimation procedure of AMOS 7.0. The SEM analyses were conducted in two steps, as suggested by Anderson and Gerbing (1988). In the first step, the measurement model is specified and its fit assessed; this is reported in the measurement model results section. In the second step, a structural model specifying the causal relations between the latent variables as hypothesized is fitted. Our hypothesis that the effect of SC on SWB is only partially explained by N and E is tested using the structural model; this is reported in the structural model results section. The test was carried out using an analogy of the methodology of Baron and Kenny (1986) for mediation testing. That is, we asserted that N at least partly explains the effect of SC on SWB if (1) SC is associated with SWB, (2) N is associated with SC after controlling for E, and (3) N is associated with SWB after controlling for E. The same approach is followed for E (swapping "N" for "E"). We also applied the Sobel test to test for common causation. We first tested for gender differences in associations between the variables by including an interaction with gender in each regression analysis. Since the

associations between the variables did not differ significantly between men and women we only report the results on the total groups.

## 3. Results

### 3.1. Preliminary analyses

Two participants from the first sample, and three from the second sample had one missing observation on one of the items. For each missing, a score was imputed by estimating the response using a regression analysis with the other items of the corresponding scale as predictors, and by adding a random residual to the response using MVA/regression of SPSS 14.0. Hence, the analyses were conducted using all cases of both samples.

Table 1 shows the correlations between the four scales (upper right half), and their mean item scores and standard deviations (last two columns) for both samples. The results for the second sample are presented in italics. All associations were in the expected direction, with the exception of the associations between E and N and between E and SC in the second sample ( $p < .10$ ).

### 3.2. Measurement model

The null hypothesis of perfect fit of the measurement model was rejected ( $\chi^2 = 563.04$ ,  $df = 183$ ,  $p < .001$  in the first sample,  $\chi^2 = 436.83$ ,  $df = 183$ ,  $p < .001$  in the second sample). To improve the fit and to prevent misspecifications of the measurement model to affect the estimates of the associations between the latent variables, we made some changes to the measurement model. After inspecting the modification indices, we decided to add four covariances between the errors of four pairs of items, one of the WHO-5, and three of the SCS. The covariance was only added if it concerned items of the same scale and, to prevent mere data fitting, if its modification index was larger than 9 in both samples. After adding the four covariances, the misfit of the measurement model decreased substantially ( $\chi^2 = 435.90$ ,  $df = 179$ ,  $p < .001$  in the first sample,  $\chi^2 = 327.89$ ,  $df = 179$ ,  $p < .001$  in the second sample). The RMSEA of .06 ( $p = .009$ ) for the first sample indicates a reasonable to good fit (Byrne, 2001, pp. 84–85), whereas a good fit was found for the second sample (RMSEA = .05,  $p = .44$ ). Values of the other commonly reported fit indices CFI, TLI, GFI are .89, .87, .90, respectively, for the first sample, and .94, .92, .91 for the second sample.

The correlations between the latent variables and their significance are reported in the lower left half of the correlation matrix in Table 1. Except for the nonsignificant correlations between E and SC in both samples, and between N and E in the second sample, all correlations are in the expected direction and significant at the

**Table 1**

Correlations between variables, and their mean item scores and standard deviations

	E	N	SWB	SC	M	SD
Extraversion (E)		-.23**	.13**	-.15**	2.27	.45
Neuroticism (N)		-.06	.17**	-.09	3.56	.81
Subjective Well-being (SWB)			-.29***	.17***	1.72	.46
Self-concealment (SC)			-.31**	.18**	2.44	.80
Extraversion (E)	.17***	-.44***		-.20***	2.90	.77
Neuroticism (N)	.23***	-.37***		-.24***	2.93	.77
Subjective Well-being (SWB)	-.09	.17***		-.18***	2.08	.70
Self-concealment (SC)	-.05	.19***		-.27***	2.12	.77

Note: The latter two columns present the means and standard deviations of the mean item scores. The upper right half of the correlation matrix contains correlations between the observed scales, the lower left half contains the correlations between the latent variables as obtained by SEM. Results for the second sample are printed in italics, for the first sample a normal font is used. All tests are one-tailed; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

.001 significance level. Applying Cohen's (1988) rules for interpreting effect sizes, most effect sizes are small to medium, and one effect, from N on SWB is large. Finally the negative association between SC and SWB satisfies the first condition of a possible common causation of this association by N and E.

### 3.3. Structural model

Since the structural model of the latent variables has as many parameters (six) as there are correlations between latent variables the fit of the measurement and structural model is identical. The standardized estimates of the structural model are depicted in Fig. 1; the measurement part of the model has been omitted to make the figure more transparent. Estimates for the second sample are presented in italics. There are two differences in the estimates for both samples; E had an effect on SWB in the second but not in the first sample, and N was correlated with E in the first but not in the second sample. However, these differences had no effect on the conclusions of our analyses, as will become clear below.

Our hypothesis that the relation between SC and SWB is at least partially explained by N and E was tested using the estimates of the structural model. First, after controlling for E, N had an effect on SWB ( $p < .001$  for both samples) and on SC ( $p = .02$  for the first sample,  $p = .006$  for the second sample). Hence the last two conditions for common causation were satisfied for N. Our hypothesis that N could at least partially explain the effect of SC on SWB was confirmed by the results of Sobel tests;  $z = -1.94$  ( $p = .03$ , one-tailed) and  $z = -2.39$  ( $p = .01$ , one-tailed) for the first and second sample, respectively. Second, after controlling for N, there was an effect of E on SWB in the second sample ( $p < .001$ ), but not in the first sample. Further, controlling for N, E had no effect on SC ( $p = .25$  for the first sample,  $p = .27$  for the second sample). Since the last two conditions for common causation were not satisfied for E, we conclude that E did not partly explain the effect of SC on SWB.

Further, after controlling for N and E, SC still had a negative effect on SWB in both samples ( $p = .04$  for the first sample,  $p = .001$  for the second sample). Comparing the correlation between SC and SWB ( $-.18$  and  $-.27$ ) with the direct effect of SC on SWB ( $-.11$  and  $-.20$ ) shows that 39% of the negative effect of SC on SWB was explained by N and E in the first sample, and 26% in the second sample.

Finally, latent N and latent E together explained 3.7% and 2.9% of the variance of latent SC for both samples, respectively, which corresponds to a small to moderate effect size (Cohen, 1988). Latent N, E, and SC together explained 20.6% and 21.8% of latent SWB, respectively, which corresponds to a large effect size.

## 4. Discussion

Evidence from previous research pointed out that N may have a positive effect on SC and a negative effect on SWB. Further, it was hypothesized that E has a negative effect on SC and a positive effect on SWB. Consequently, we expected that N and E at least partly explain the negative association between SC and SWB that is consistently reported in the literature. To our knowledge, the present study is the first that aims to test if the relation between SC and SWB is spurious, that is, whether it is a result of their associations with their common causes N and E. It is surprising this has not been studied before since already in their seminal paper Larson and Chastain (1990) commented that it is unclear if the negative relation they found between SC and SWB was due to N.

The results of SEM applied to the data we obtained in two independent student samples supported our hypotheses that, when controlled for E, N is positively associated with SC and negatively

associated with SWB. However, contrary to our expectations, after controlling for N, E had a positive effect on SWB in only one sample. This suggests that N indeed attenuates the relation between E and SWB as argued by Vittersø and Nilsen (2002) and Vittersø (2001). Further, after controlling for N, E had no effect on SC in both samples, which suggests that SC and E are only associated due to a common component with N. Finally, the most important finding of this study is that, as expected, SC had a negative effect on SWB after controlling for N and E. This suggests that the capacity of SC to predict SWB is not limited to the distress and anxiety component of SC, components that are shared with N and are believed to possibly explain the association between SC and SWB (Larson & Chastain, 1990). Hence we conclude that N, but not E, explains part of the negative relation between SC and SWB. More than 60% of the association between SC and SWB, however, was left unaccounted for by N and E together.

Our findings have implications for both research and clinical practice. We suggest that future research pays more attention to other components of SC in relation to SWB than N (and E). Fruitful avenues might be further studying the mere process of concealing private personal information, and the social inhibitory processes (such as social anxiety) that are related to SC. Insights into the conceptual domain of a construct is crucial to understand its relations with other variables. Therefore, research is needed that assesses how SC converges with and diverges from other relevant constructs, similar to how Ritz and Dahme (1996) compared SC with repression and rationality/emotional defensiveness.

Our results show that clinicians must be wary to attribute a clients' reluctance to share personal details as simply one of the symptoms of anxiety or psychological distress. Assuming that N or general anxiety is the cause of the client's reluctance to share his or her intimate details could lead to an underestimation of other issues that may be relevant for the therapy, since our study shows that there is a unique negative effect of SC on well-being that is not related to anxiety. We therefore suggest that when treating high self-concealers other aspects of SC than anxiety (such as social avoidance or rejection sensitivity) must be addressed as well in order to facilitate the therapeutic process. This view is along the lines of Kelly's findings: whereas Kelly's (2000) self-presentational view on psychotherapy regards keeping some secrets for the therapist as actually beneficial for therapeutic success, Kelly (1998) and Kelly and Yip (2006) also found that SC predicts more symptoms of psychological distress.

Our study has certain limitations. First, both samples consisted of undergraduate social science students, mostly Caucasian, which limits generalizing to other populations. Second, the external validity of the present study is limited because only self-report assessments were employed. Finally, there were some small differences in the measurement instruments between both samples. However, this also represents an asset in that we now replicated our first study using an independent second sample in which we measured N, E, and SC in a slightly different way. As our main conclusion that the negative association between SC and SWB is not explained by E, and only partly by N, is corroborated in two studies is evidence of the validity of our conclusion.

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