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## Suppression of negative affect in cancer patients. Trauma and defensiveness of self-esteem as predictors of depression and anxiety

**Abstract:** The results of the work show that the relatively small differences in declared, negative emotional states (such as depression or anxiety) between people suffering and not suffering from cancer can be explained by the suppression of negative affect in the former. It was assumed that the suppression is related to a compensation of an automatic, affective self-assessment – i.e. implicit self-esteem, lower in cancer patients. The results confirmed that the connection of cancer and depression (similarly cancer and anxiety) became significantly stronger while the self-esteem defensiveness and past stress are statistically controlled.

**Key words:** cancer, anxiety, depression, stressful events, self-esteem defensiveness

### Introduction

Physicians and researchers have long sought to explain the incidences of cancer by the influence of psychical processes on the condition of the body (Bishop, 2001; Bleiker, Hendriks, Otten, Verbeek, & van der Ploeg, 2008). Numerous studies examined the role of psychological factors in the initiation, development and relapse of cancer and did not give a clear answer about such a link (Garssen, 2004; Lutgendorf, Constanzo, & Siegel, 2007; Lutgendorf, Constanzo, & Sood, 2012). Contemporary meta-analyses have found no convincing evidence of an association between stressful life events and the occurrence or recurrence of cancer (Butow et al., 2000; Duijts, Zeegers, & Borne, 2003; Petticrew, Fraser, & Regan, 1999, Levav et al., 2000; Lillberg et al., 2003). But for specific types of cancer (such as melanoma and lymphatic, lung, hematopoietic, uterine and ovarian cancer, Levav et al., 2000) and for events connected with a great sense of loss (such as the death of a child or other close family member, Butow et al., 2000; Chen et al., 1995; Garseen, 2004; Lillberg et al., 2003) the considered relationship was demonstrated.

Contemporary prospective studies have shown minimal evidence that the specific traits of personality are risk factors for the development of cancer (Lutgendorf et al., 2007, 2012). No relationship has been found between development of cancer and neuroticism, extraversion, hostility and dependence (Nakaya et al., 2010; Schapiro et al., 2001). However, some earlier results suggest a unique constellation of traits in cancer patients, which has been termed by Themoshok (1987) as “Type-C” or “cancer-prone” personality. These patients were characterized as appeasing, self-sacrificing, and outwardly calm, and it could be the result of suppressing emotions, particularly those negative (Gross, 1989; Themoshok et al., 1985). It has been also shown that low expression (or high suppression) of emotions is connected with worse outcomes of treatment and poorer survival among patients with different types of cancer (Reynolds et al., 2000; Weighs, Enrigh, Simmens, & Reiss, 2000) however, not all findings have been consistent (Lutgendorf et al., 2007).

Suppression of negative emotions in cancer patients may explain the results of several studies which showed no (or minor) differences in declared anxiety and declared depression between cancer sufferers and healthy

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participants (e.g. Price et al., 2001), despite the fact that cancer patients have a substantial reason for the occurrence of negative emotions – that is the menacing illness by itself and unpleasant medical procedures accompanying treatment (Brothers, Yang, Strunk, & Anderson, 2011, Gross, 1989). Higher, self-reported scores on overt measures of emotional repression, such as the repression-sensitization scale of MMPI, was already shown prior to cancer diagnosis (Dattore, Shanz, & Coyne, 1980; Wirsching, Stierlin, Hoffman, Weber, & Wirsching, 1982). However, the self-reported repression (Welsh R scale in the MMPI) did not allow the prediction of cancer in the future in a large, long-term prospective study (Persky, Kempton-Rawson, & Shekelle, 1987).

Kneier's and Themoshok's experiment (1984) revealed that cancer patients in a fearful situation reported in questionnaires a low level of anxiety, but the physiological components of fear reached a high level. This "body-mind" discrepancy is probably due to the denial of the negative affect, as too difficult to adapt to (or accept). The physiological indications are consistent with therapists' observation of excessive, difficult to control responses of cancer sufferers to fearful events, as well as with data showing that 30–40% of patients suffering from cancer simultaneously suffer depression and anxiety disorders (Bucceri, 1998; Jehn et al., 2006; Stommel, Given, & Given, 2002). The concept of "cancer proneness," "cancerous personality" or "personality susceptible to immunosuppression" assumes the tendency to repress emotional reactions to difficult life events (Dattore et al., 1980; Eysenc, 1985; Watson, Pettingale, & Greer, 1984). The researchers explain greater incidence of cancer among repressors by the impaired reaction of immune defense and by the hormonal changes as a result of long maintenance of stress due to inhibited expression of dissatisfaction and, in parallel, ineffective coping with stressors (Kiecolt-Graser, & Glaser, 1986; Penedo et al., 2006; Reiche, Nunes, & Morimoto, 2004; Saul et al., 2005; Septon, & Spiegel, 2003; Zorrilla, Luborsky, & McKay, 2011).

Suppression (or repression) of anxiety, which we which can be understood as a dominance of a physiological component of anxiety over its declared level, may appear in order to avoid expression or even awareness of negative affect. We assume that people with these defensive tendency evaluate themselves negatively when experiencing negative emotions, and they protect themselves against this.

This characteristic seems to be akin to the phenomenon of defensive self-esteem. Studies have shown that people with so-called defensive high self-esteem display defensive self-enhancement, manifesting as unrealistic optimism, reduction of distance between actual and ideal self, and preference for excessively positive feedback (Bosson, Brown, Zeigler-Hill, & Swann, 2003; Jordan, Spencer, & Zanna, 2005; Schroeder-Abe, Rudolph & Schutz, 2007). They also have weaker abilities to self-regulate emotions following failure compared to people with so-called secure high self-esteem (Kernis, Lakey, & Heppner, 2008; Lambird & Mann, 2006; McGregor

& Marigold, 2003). Defensive high self-esteem is recognized by the coexistence of high explicit self-esteem (ESE) and low implicit self-esteem (ISE) (Jordan, Spencer, Zanna, Hoshino-Browne, & Correll, 2003). ESE – a conscious declaration of one's own value – is assessed in self-reports. ISE, as an unconscious, affective association with the self, is activated automatically (Greenwald & Banaji, 1995). ISE is obtained using indirect measurement in which respondents do not know what is being measured or are not able to control the results (e.g. Gawronski, LeBel, & Peters, 2007, Gawronski & Bodenhausen, 2006). The meta-analysis showed higher correlations between implicit and explicit attitudes in domains when people rely on "gut feelings." (Jordan, Whitfield, & Zeigler-Hill, 2007; Hofmann, Gschwendner, & Schmitt, 2005). This convergence does not exist when people ignore hints from the body the body – as in the case of defensive, high self-esteem. A similar phenomenon seems to be the repression of "unwanted" emotions – when physiological indicators do not correspond to the reported indicators. Reports are more compliant with the subject's standards as a result of the reasoning process. Thus the repression (or milder suppression) of negative emotions may have much in common with the phenomenon of suppression of negative affect associated with the self – what amounts to non-acceptance of the self when it does not make a positive (or neutral) impression.

### Research problem

One of the goals of the study was to analyze once again the relationship between the occurrence of cancer and the number of stressful events prior to the illness, due to the lack of conclusive results in this area. Based on Lillberg and colleagues' (2003) findings, differences between cancer patients and non-cancer controls were expected particularly for amount of events connected with a great sense of loss such as the death of a child or other close family member. We hypothesized:

*H1. In the 10 years period preceding the illness, people suffering from cancer experienced larger amount and intensity of stressful events than controls over the last 10 years.*

This study was also designed to show that for people suffering from cancer, as repressing unwanted emotions, the defensiveness of self-esteem, manifested in compensation of ISE by ESE, (and measured as a dominance of ESE over ISE), is stronger.

*H2. In cancer patients a dominance of ESE over ISE is greater than in controls.*

Our main interest was to demonstrate how experienced trauma and self-esteem defensiveness are associated with reported anxiety and depression, taking into account a group of people suffering from cancer. We started from the assumption that people with cancer experience stronger depression and anxiety than non-cancer controls. Beyond the fact of illness and discomfort following medical procedures, the reason

for this may be the greater number of traumatic events prior to illness. If so, controlling for the number of traumatic events should weaken the link between cancer episode and depression or between cancer episode and anxiety. We hypothesized:

- H3. After statistical control of the quantity or intensity of past stressful events, the link between cancer episode and reported depression (reported anxiety) is weaker.*
- According to the assumption that suppression of negative emotions in cancer patients is akin to building ESE in a way that compensates for low ISE, and that at the root of both processes is a more fundamental, defensive process, i.e. avoiding negative affect associated with the self, the statistical control of this self-esteem defensiveness should disclose a stronger link between the occurrence of cancer and depression/anxiety.
- H4. After statistical control of dominance of ESE over ISE, the link between cancer episode and reported depression (reported anxiety) is stronger.*

### Research design

#### Participants

The study involved 150 people, including 88 women and 62 men aged 19 to 84 years. The first group consisted of 85 patients ( $M = 59$  years,  $SD = 10$ ) presently ill with cancer – that is, suffering cancer now, or cancer relapse occurring not earlier than five years ago. The second group was composed of 76 people in whom cancer had never been detected ( $M = 53$  years,  $SD = 14$ ).

Patients from the first group suffered from various types of cancer (such as breast, colorectal, lung, prostate and testicular cancer). They agreed to participate in the study while waiting for medical procedures (such as chemotherapy) in the oncology center. The control group was tested in a medical clinic while waiting for a visit to the doctor's office. The reason for this visit was not an immediate threat to their life.

#### Measures and procedure

Participants were informed about the completely voluntary nature of participation. At the outset, the number of stressful events with the Social Readjustment Rating Scale (SRRS, Holmes & Rahe, 1967) was measured. The original scale was shortened – only items with values not less than 30 points on a scale of 1 to 100 (the strength of induced stress) were used. Participants marked the events which they experienced in the 10 years before being diagnosed with cancer while control subjects reported for the last 10 years.

Then, the Name Letter Test (NLT) by Nuttin (1987), a commonly used measure of ISE (Bosson et al., 2003), was implemented. Participants estimated on a scale from 1 to 7 how much they like each letter of the alphabet. The assumption underlying the construction of this measure is that affective associations concerning the self spill over into evaluations of objects associated with the self (Buhrmester, Blanton, & Swann, 2011) – including initials or letters

of their own name. The extent to which individuals demonstrate preference of “their own” letters over other letters reflects the extent to which they perceive themselves favorably. This preference is conceptualized as an implicit measure of self-esteem. Using the initials of each person, the index of NLE was calculated (Kitayama & Karasawa, 1997). In the next step, two questionnaire measures of ESE, which require reflection about the self, were used.

ESE as a trait. Participants responded to the 10 items of Rosenberg's (1965) Self Esteem Scale (RSES). Sample items include: “I am able to do things as well as most other people” or “At times I think I am no good at all.” Responses ranged from 1 (strongly disagree) to 5 (strongly agree). After recoding, items were averaged to form the RSES indicator where high scores reflect higher self-esteem as a trait.

ESE as a state. Participants responded to the 11 representative items from the State Self-Esteem Scale (Heatherton & Polivy, 1991). Sample items include: “Now I feel confident about my abilities,” or “I feel displeased with myself at this moment.” Responses ranged from 1 (strongly disagree) to 5 (strongly agree). After appropriate recoding, items were averaged to form the SSES indicator where high scores reflect higher self-esteem as a state.

Then Beck Depression Inventory (BDI, Beck, Steer, & Brown, 1996) was used. For measuring the severity of depression participants filled this 21-question self-report, with items such as “I wake up a few hours too early and cannot fall asleep again,” “With great effort, I force myself to do anything” or “I am not able to make any decision.” For every answer the respondent could receive 0 (no symptom of depression) to 3 points (very strong symptom of depression). The points were added and averaged to form a depression indicator. High scores reflected greater depression.

Finally, the State-Trait Anxiety Inventory (STAI, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was used to assess the level of anxiety. Participants responded to 20 items to assess trait anxiety (indicating how they feel in general) and 20 items to assess state anxiety (indicating how they feel at this moment). State anxiety items include: “I am tense; I am worried” or “I feel calm; I feel secure” (reverse coded). Trait anxiety items included: “I worry too much over something that really doesn't matter” or “I am content; I am a steady person” (reverse coded). Responses ranged from 1 (strongly disagree) to 4 (strongly agree). After appropriate recoding, items were averaged to form the anxiety trait and anxiety state indicators where high scores reflect stronger anxiety.

### Results

Basic statistics and correlations between measured variables are given in Table 1.

Reliability of the questionnaires used was considered sufficiently high. Older people – as expected – reported higher levels of anxiety and depression (Penninx et al., 1998), as well as larger numbers of stressful events

**Table 1. Means, standard deviations, correlations and Cronbach's alpha (on the diagonal) for the study variables**

Measure	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Age	55.7	12.6		.16*	.20*	.38**	-.25**	-.20*	-.24**	.47**	.49**
2. Anxiety – state	1.80	.40	(.72)		.63**	.41**	-.49**	-.34**	-.13	.13	.15
3. Anxiety – trait	2.01	.34		(.85)		.56**	-.57**	-.41**	-.06	.26**	.27**
4. Depression (Beck)	.27	.26			(.82)		-.53**	-.49**	-.23**	.44**	.47**
5. ESE – trait	4.32	.46				(.80)		.68**	.24**	-.30**	-.29**
6. ESE – state	4.25	.44					(.73)		.38**	-.39**	-.39**
7. ISE (NLE index)	.36	1.57								-.27**	-.31**
8. Stressful events	1.13	1.27									.95**
9. Stress. events weighted	63.20	70.51									

Note. *N* = 161. \*  $p < 0.05$ . \*\*  $p < 0.01$ . In parentheses: Cronbach's  $\alpha$  for questionnaire methods.

(they have experienced more events such as the death of a spouse or retirement). A typical result was also lower self-esteem reported by the older participants (compare Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). ISE correlated significantly and positively with ESE, which is not a typical phenomenon, but it may indicate a conscientious fulfillment of the NLT (although the respondents did not know the purpose of this test). Typical results – on the level of significance and direction – were the correlation between the rates of anxiety, self-esteem and depression. The number of stressful events correlated positively with the anxiety as a trait and with depression, and correlated negatively with all three measures of self-esteem. These results confirm that stressful events have a negative impact on the well-being of affected people.

Prior to verify the hypotheses a comparison between anxiety and depression, ESE and ISE in study groups was shown.

#### Anxiety and depression in study groups

The anxiety – trait scores were analyzed in a 2 x 2 (diagnosis: cancer, non-cancer x gender) analysis of covariance (ANCOVA) with age as a covariate (covariate was entered in order to statistically control for the differences that could result from the age of participants). The analysis revealed only a significant main effect of gender:  $F(1,145) = 25.28$ ,  $p < .001$ ,  $\eta^2 = .15$  which shows that women experience a higher level of anxiety ( $M = 2.12$  in scale of 1 to 4,  $SD = 0.34$ ) than men ( $M = 1.86$ ,  $SD = 0.28$ ). Because anxiety was measured by self-report, this relationship may also exhibit greater social acceptance for women to admit to fear or other “unmanly” emotions (Larsen & Diener, 1987; Simon & Nath, 2004).

When the anxiety – state scores were submitted as the dependent variable to the same ANCOVA, it also revealed only a significant main effect of gender:  $F(1,145) = 5.74$ ,  $p < .005$ ,  $\eta^2 = .04$ . As in the case of trait anxiety, women

declared a higher level of trait anxiety ( $M = 1.84$  on a scale of 1 to 4,  $SD = 0.42$ ), than men ( $M = 1.70$ ,  $SD = 0.34$ ).

Then, the depression scores were submitted to a 2 x 2 (diagnosis: cancer, non-cancer x gender) ANCOVA with the covariate age. It revealed a significant main effect of diagnosis:  $F(1,145) = 8.39$ ,  $p < .005$ ,  $\eta^2 = .06$ , where cancer patients reported a higher level of depression ( $M = 0.37$  on a scale of 0 to 3,  $SD = 0.28$ ) than the control group ( $M = 0.17$ ,  $SD = 0.20$ ). There was also a significant main effect of gender:  $F(1,145) = 16.69$ ,  $p < .001$ ,  $\eta^2 = .10$  – women declared a higher level of depression ( $M = 0.33$ ,  $SD = 0.29$ ) than men ( $M = 0.17$ ,  $SD = 0.18$ ) – and a significant interaction effect of diagnosis and gender:  $F(1,145) = 9.17$ ,  $p < .005$ ,  $\eta^2 = .06$ . The simple main effects analysis showed that men – both sick and healthy – did not differ declaring (very low) level of depression ( $M = 0.19$ ,  $SD = 0.19$  and  $M = 0.17$ ,  $SD = 0.18$ ;  $p = 0.97$ ). In turn, women with cancer reported a higher level of depression ( $M = 0.46$ ,  $SD = 0.28$ ) than healthy women ( $M = 0.17$ ,  $SD = 0.21$ ;  $p < .001$ ), as well as a higher level than men with cancer ( $p < .001$ ).

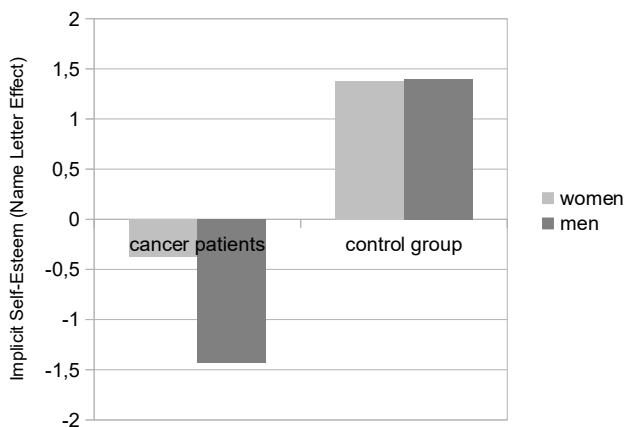
#### ESE and ISE

The ESE as a trait scores were submitted to a 2 x 2 (diagnosis: cancer, non-cancer x gender) ANCOVA with age as a covariate. It revealed a significant main effect of diagnosis:  $F(1,145) = 20.02$ ,  $p < .001$ ,  $\eta^2 = .12$  with cancer patients reporting a lower level of explicit self-esteem as a trait ( $M = 4.18$  in scale 1 to 5;  $SD = 0.49$ ) than the control group ( $M = 4.52$ ,  $SD = .32$ ). There was also a significant main effect of gender:  $F(1,145) = 6.92$ ,  $p < .05$ ,  $\eta^2 = .03$  with women declaring a lower level of self-esteem ( $M = 4.24$ ,  $SD = 0.49$ ) than men ( $M = 4.43$ ,  $SD = 0.38$ ) and a significant interaction effect of diagnosis and gender:  $F(1,145) = 3.00$ ,  $p = .09$ ,  $\eta^2 = .02$ . The simple main effects showed that sick and healthy men were not different in reporting (high) self-esteem ( $M = 4.31$  in scale 1–5,  $SD = 0.41$  and  $M = 4.51$ ,  $SD = 0.35$ ;  $p = .11$ ), but women suffering from cancer reported slightly, but significantly

lower self-esteem ( $M = 4.04$ ,  $SD = 0.51$ ) than healthy women ( $M = 4.52$ ;  $SD = 0.29$ ;  $p < .001$ ), as well as lower than men with cancer ( $p < .001$ ). Symmetrical results were obtained for the ESE as a state.

The same ANCOVA for the dependent variable ISE showed a significant main effect of diagnosis:  $F(1,145) = 142.17$ ,  $p < .001$ ,  $\eta^2 = .5$  where the ISE of cancer patients proved to be much lower ( $M = -0.73$ ,  $SD = 1.25$ ) than controls ( $M = 1.42$ ,  $SD = 1.04$ ). Also, a significant main effect of gender,  $F(1,145) = 8.16$ ,  $p < .01$ ,  $\eta^2 = .05$ , revealed that ISE of women was higher ( $M = 0.38$ ,  $SD = 1.43$ ) than men ( $M = 0.33$ ,  $SD = 1.76$ ) and a significant interaction effect of diagnosis and gender was shown:  $F(1,145) = 7.78$ ,  $p < .01$ ,  $\eta^2 = .05$  (Figure 1). The simple main effects analysis revealed that healthy women did not differ significantly on the level of ISE ( $M = 1.45$ ,  $SD = 0.83$ ) with healthy men ( $M = 1.39$ ,  $SD = 1.21$ ;  $p = .85$ ), but they had significantly higher self-esteem than women suffering from cancer ( $M = -0.37$ ;  $SD = 1.27$ ;  $p < .001$ ) and higher than men suffering from cancer ( $M = -1.46$ ,  $SD = 0.84$ ;  $p < .001$ ) – Figure 1.

**Figure 1. Implicit self – esteem (ISE) in both groups of participants for both genders**



#### The number of stressful events – hypothesis 1

A 2 x 2 (diagnosis: cancer, non-cancer x gender) ANCOVA with age as a covariate was conducted for the dependent variable *number of stressful events*. It revealed a significant main effect of the diagnosis:  $F(1,145) = 19.45$ ,  $p < .001$ ,  $\eta^2 = .12$  where cancer sufferers reported more stressful events during the 10 years before the illness ( $M = 1.72$ ,  $SD = 1.33$ ) than controls over the last 10 years ( $M = 0.57$ ,  $SD = 0.90$ ) which is consistent with **hypothesis 1**. A significant main effect of gender was shown:  $F(1,145) = 8.45$ ,  $p < .005$ ,  $\eta^2 = .06$ , with women reporting more stressful events ( $M = 1.38$ ,  $SD = 1.41$ ) than men ( $M = 0.79$ ,  $SD = 0.94$ ). This result probably stems from the fact that women are more willing to admit to problems such as misunderstandings in the family or financial problems.

An identical ANCOVA was conducted for the dependent variable *number of deaths in the immediate*

*family* and it revealed only a significant main effect of the diagnosis:  $F(1,145) = 21.85$ ,  $p < .001$ ,  $\eta^2 = .13$ . As expected, more deaths of close relatives were experienced over the last 10 years by people with cancer ( $M = 0.53$ ,  $SD = 0.50$ ) than controls ( $M = 0.13$ ,  $SD = 0.34$ ). There was also a difference between the genders in line with the above.

Symmetrical relationships were obtained when stressful events were weighted by value.

#### Self-esteem defensiveness – hypothesis 2

The indicator of the dominance of ESE over ISE was formulated as the difference between a standardized rate of ESE and standardized rate of ISE. The rate we call *self-esteem defensiveness* (SeD) according to the assumption that it demonstrates a tendency to build ESE in a way that compensates for (low) ISE.

A 2 x 2 (diagnosis: cancer, non-cancer x gender) ANCOVA with age a covariate, conducted for the dependent variable SeD, revealed only a significant main effect of diagnosis:  $F(1,145) = 13.75$ ,  $p < .001$ ,  $\eta^2 = .09$ . According to **hypothesis 2**, the index had a higher value for people with cancer ( $M = 1.09$ ,  $SD = 0.83$ ) than in the control group ( $M = 0.68$ ,  $SD = 0.63$ ).

#### Suppression of negative emotions and Self-esteem defensiveness – hypothesis 3 and 4

Three hierarchical regression analyses were performed for the 3 criteria: depression, anxiety trait and anxiety state. Each criterion was regressed in the first step on age (for statistical adjustment of the participants in terms of age), in the second step on the group of participants (-1 non-cancer patients vs. 1 cancer patients), in the third step on the number of stressful events during the 10 years prior to disease, and in the fourth step on the SeD. All three models were significant:  $F(4,145) = 19.29$ ,  $p < .001$ ;  $F(4,145) = 13.44$ ;  $p < .00$  and  $F(4,145) = 7.51$ ,  $p < .001$ , respectively. Significant  $R^2$  changes for step 1 confirmed that the level of depression, anxiety-trait and anxiety-state increase significantly with age. The positive and significant coefficients  $\beta$ , for the group (or diagnosis) variable showed that cancer patients (as a whole group) reported higher levels of depression, anxiety-trait and anxiety-state than the control group. Significant  $R^2$  changes in step 2 reveal that the cancer diagnosis adds incremental validity in explaining depression, anxiety-trait and anxiety-state (over and above age). The drop of  $\beta$  weights in step 3 demonstrates that the statistical control of the number of stressful events weakens the association of cancer with each of the three considered criteria. To evaluate the significance of this drop, we used the Sobel test. The positive connection of cancer diagnosis and depression became significantly weaker after the number of stressful events was controlled ( $z = 2.50$ ;  $p < .05$ ). But the connection of cancer and anxiety-state as well as anxiety-trait was not significantly weaker while controlling for the number of stressful events ( $ps > 0.05$ ). **Hypothesis 3** was thus confirmed only in the case of explaining depression, but was not confirmed when explaining anxiety. The  $R^2$  changes in step 3 informed that

**Table 2. Indices  $\beta$  and  $\Delta R^2$  after the subsequent steps of regression of 1) depression, 2) anxiety as a state and 3) anxiety as a trait on age (step 1), group of participants (group – step 2), number of stressful events (stress – step 3) and Self-esteem defensiveness (SeD – step 4), understood as dominance of ESE over ISE**

	step 1	step 2		step 3			step 4			
	age	group		group stress			group stress			SeD
	$R^2$	$\beta$	$\Delta R^2$	$\beta$	$\beta$	$\Delta R^2$	$\beta$	$\beta$	$\beta$	$\Delta R^2$
1. depression	.14**	.31**	.09**	.22**	.25**	.04*	.31**	.21**	-.29**	.08**
2. anxiety-trait	.04**	.18*	.03*	.13	.15	.02	.27**	.09	-.45**	.19**
3. anxiety-state	.03*	.20*	.04*	.21*	-.03	.00	.32**	-.08	-.34**	.11**

\*  $p < .05$ , \*\*  $p < .001$ , two-tailed.

The intercorrelation of stress and Self-esteem defensiveness is insignificant ( $r = 0.004$ ;  $p = .96$ )

the number of stressful events adds significant incremental validity in explaining depression (over and above age and group of participants), but this supplement was not significant in explaining anxiety trait or anxiety state. In step 4, after controlling for the predominance of ESE over ISE (called SeD) the size of the correlation between the group of participants and the level of depression (as well as the level of anxiety-trait and anxiety-state) increased again. To estimate the significance of this increase, the Sobel test was used. The connection of cancer diagnosis and depression, anxiety-state and anxiety-trait became significantly stronger after SeD was included in the equation ( $z_s = 2.64$ ;  $3.03$ , and  $2.73$ , respectively,  $ps < .05$ ). It can be said that SeD is a suppressor of the relationship between the diagnosis (cancer vs. non-cancer) and depression as well as between the diagnosis and anxiety. This result confirms **hypothesis 4**. The  $R^2$  changes in step 4 showed that the predominance of ESE over ISE adds significant incremental validity in explaining the variance of depression and anxiety – over and above age, the cancer diagnosis and the number of stressful events. Symmetrical results were obtained when, instead of the number of stressful events alone, the number of stressful events weighted by their value was introduced into the regression analysis.

### Discussion

In the conducted study, the assumption that people suffering from cancer experienced more trauma in their lives was verified. The obtained results provide the basis for such a conclusion. Cancer patients participating in the study experienced, in the 10 years preceding the illness, larger numbers and intensity of stressful events than those who had never suffered from cancer (the latter were asked about the experience in the past 10 years). The result is consistent with contemporary evidence (Costanzo, Sood, & Lutgendorf, 2011) that severe stress weakens the immune system.

This greater number of traumatic events in the history of cancer patients may be, of course, the cause

of their increased depression. We examined the change in the relationship between diagnosis (i.e., belonging to the group of respondents with or without cancer) and the level of reported depression, when the participants were statistically aligned in terms of the amount of traumatic experiences. As expected, participants from the two groups significantly differed less in declared depression while controlling for experienced stress. However, the difference between the two groups remained significant. This result confirmed some earlier research findings indicating greater depressiveness in cancer patients. But one cannot determine from the results of this study whether the cause is the illness and its course, or whether the cancer patients were more depressed than controls already before the illness. Both causes are not mutually exclusive; however, cancer patients, in fact, reported a low level of depression as well (this is about 0.4 on a scale of 0 to 3). The same applies to reported anxiety, although the control of the number of traumatic events does not significantly reduce the relationship between anxiety and diagnosis. In other words, a slightly higher level of anxiety, declared by cancer patients, is not significantly connected to the stronger trauma experienced before the illness. The reason for this difference between groups can be the course of the disease, as well as the greater anxiety disposition in cancer patients.

These relatively small differences in declared, negative emotional states (such as depression or anxiety) between people suffering and not suffering from cancer can be explained by a specific tendency in personality of cancer patients. This so-called C-type personality (Themoshok, 1987) has as a key feature the suppression of negative emotions – the prevention of awareness of unpleasant feelings or not displaying it. The efficiency of immune protection against this illness may be just as important as the occurrence of stressful events, and probably often determining, is personal response to it. The results of some studies suggest that not only helplessness in the face of stressful events, but also inhibition of adequate emotional response to them weakens the efficiency of the immune system (Israel, 1979). The suppression of emotions is not

easy to demonstrate in research because we never know how different is what the participants report in a survey from what they really feel. In the present study, it was assumed that the phenomenon of suppression is related to a compensation of original (or more precisely – the fastest, because relying on uncontrolled associations) affective self-assessment, which is called ISE. In other words, in cancer patients we expected that this first, negative affect, connected to the self is compensated by positive ESE. Indeed, results have shown that ISE in cancer patients was both negative as well as significantly lower than in the control group. And despite the fact that the ESE of cancer patients was also significantly lower than in controls, it reached high values (over 4 in a 1–5 scale). The built rate of the predominance of ESE over ISE (called SeD indicator), turned out to be significantly higher in cancer than in control patients according to the assumed supposition. The high ESE of cancer patients can be seen largely as a result of avoiding the awareness of low ISE or avoiding accepting it. To show explicitly that this automatism is related to the suppression of negative emotions in cancer patients, we examined whether the relationship between belonging to a group (i.e., between diagnosis: cancer and non-cancer) and reported negative, emotional states increases while SeD is statistically controlled. The results confirmed that the connection of cancer diagnosis and depression as well as cancer diagnosis and anxiety became significantly stronger after this control. Thus, the conclusion that SeD is a suppressor of the relationship between the diagnosis (cancer vs. non-cancer) and depression as well as between the diagnosis and anxiety is statistically legitimate. We can therefore conclude that if we control (at least in part) a mechanism based on the avoidance of negative affect on the level of self-esteem, we reveal more fully the negative emotional states (depression, anxiety) of cancer patients, because study groups differ in this respect more strongly than in deliberate reports. Thus in reference to inconsistent results of previous studies, the question of whether people suffering from cancer experience stronger anxiety and depression should be answered in the affirmative – knowing that the incomplete disclosure of these negative states in cancer patients corresponds to the phenomenon of suppression of negative affect, which is greater in these patients and visible at the level of self-esteem. In the entire group of respondents, this phenomenon of SeD provided additional incremental validity in explaining the depression and anxiety states – over and above age, the cancer diagnosis and the number of stressful events.

### Limitations

The presented results do not allow for definite conclusions about the impact of traumatic events on the incidence of cancer. It can not be ruled out that the subjective assessment of the experience of traumatic events by people suffering from cancer, taking place in a period of 10 years before the episode, is not conditioned by the current situation of patients (despite the exclusion of the impact of depression and despite the fact that the duration

of the disease is not correlated with measured variables). Moreover, the fact that oncology patients often experienced the loss of a loved one can result from genetic determinants of certain types of cancer, which also requires analysis in future studies.

### Clinical implication of the study

Results of our study suggest that there is a need to include the cancer patients' psychological therapy. The change of established patterns of their reactions seems to be important in diminishing the risk related to their physiological predisposition. These patterns may contain a tendency to repress negative affect especially connected to the self and therapy would include the learning of proper communication of emotions and clear expression of needs. We believe that psychological care for cancer patients is as important as the medical care. This type of therapeutic intervention may contribute also to lower incidence of cancer among relatives of patients with cancer, taking into account the heritability.

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