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Emotional inhibition and physical health: Fact or fiction?

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Introduction

In popular lay beliefs and folk psychology, there are many examples that the expression of emotions, including crying, is considered to be beneficial for one's health, whereas inhibition and repression, accompanied by chronic activation of the body, will result in ill health. In addition, people are generally convinced that talking about emotional experiences with others is helpful and facilitates recovery (e.g., Zech, 2000). Freud encouraged patients to remember traumatic events and to re-experience the negative emotions as vividly as possible. Although he had already some doubts concerning the efficacy of cathartic therapy and abandoned it, many others in the medical community did not. In the forties, there are several examples of publications in which the positive effects of this approach were described. Symonds (1954) concluded in his review of the literature that catharsis was the most frequent cause of success in psychotherapy.

In recent decades, there is renewed interest in the topic of emotional expression, in particular stimulated by the work of the American social psychologist James Pennebaker (see Pennebaker, 1997; Smyth, 1998), who used a writing paradigm in which study participants are requested to write for some days about traumatic or emotional experiences. At the same time, there is a growing interest of psychologists to examine the relationship between individual differences in self-expression and health. In many cases, expression or inhibition of emotions is a crucial element of the personality features under investigation; e.g., alexithymia, repression, concealment, impression management, social desirability and even neuroticism. Some of these individual difference variables may operate on a conscious level (e.g., impression management) while others clearly refer to unconscious processes that may affect self-expression (e.g., repression).

There also have been devised new personality constructs in which the (non)expression theme plays a major role; i.e., Type C coping (Temoshok, 1987) and “distressed” personality or type-D (Denollet et al., 1996). In addition, there are several examples of questionnaires measuring emotional expressiveness as a predispositional personality characteristic (e.g. Gross & John, 1995; King & Emmons, 1990; Roger & Narajian, 1989; Watson & Greer, 1983). Finally, psychophysiologicalists started studying the immediate effects of expressing or withholding of emotions on physiological, and in particular cardiovascular, functions (e.g., Brosschot & Thayer, 1998; Gross & Levenson, 1993, 1997; Labott et al., 1990).

Remarkably, the issue whether the hypothesized negative effect of inhibition holds for both positive and negative emotions, or just for negative ones, has largely been overlooked. Additionally, one may wonder whether there are any qualitative differences between withholding the expression of emotions (and its physiological costs) and the inhibition of behavior in general. Moreover, there is an increasing awareness that the expression of emotions rarely occurs in a social vacuum. Emotions are important social signals with a strong impact on the social environment which, in turn, responds to the (non)expression. Most recently, theoretical models have been developed making clear that (non)expression of emotions may be dependent on different stages of a decision process, with different consequences for one's well-being (Kennedy-Moore & Watson, 1999). To put it differently, there might be considerable qualitative differences in (non)expression, associated with very different effects on subjective well-being.

Below, we will systematically summarize some of the most important research findings with respect to the relation between (non)expression and health. Does evidence support the general hypothesis that the expression of emotions is healthy and emotional inhibition is health-damaging? This review is guided by two directives. First, we will discuss the epidemiological guidelines that should be met in order to be able to conclude that there is a causal relationship between (psychosocial) antecedents and (health) consequences. Second, we will provide five theoretical models that may govern research on emotional inhibition and health. We will conclude with a brief statement about what needs to be done in the near future.

Investigating effects of (non)expression

Kasl and Jones (in press) list the following five requirements that have to be met in psychosocial epidemiological research to be able to conclude that there is a causal relationship between - in this case - psychological factors and the development of disease:

- (1) a correct temporal sequence of cause and effect. This implies that one should exclude the possibility that emotional inhibition is the result of the affected health status, rather than the cause. This requirement can only be met in prospective (or at least quasi-prospective studies in order to eliminate the possible effects of awareness of the disease) and experimental studies, with disease conditions with a clearly identifiable onset.
- (2) consistency of evidence. Most valuable is consistent evidence from studies that have used different methodologies and therefore have different weaknesses.
- (3) strength of the association. Although this guideline may be appropriate for most biomedical risk factors, Kasl and Jones have serious doubts whether this requirement makes as much sense in studies on psychosocial risk factors that never may be considered necessary nor sufficient conditions to produce ill-health.
- (4) dose-response effect (biological gradient). Although this guideline may make sense for real causal relations, one should not overlook the possibility that biases and confounders may also be responsible for such relationships. In addition, one may not exclude beforehand other, non-linear relationships.
- (5) biological plausibility. This requirement emphasizes the importance of experimental, psychobiological studies. If it can be demonstrated that the inhibition of emotions has an impact on biological processes, it is more reasonable to assume that habitual inhibition also may have somatic consequences. On the other hand, one should be aware that a plausible biological mechanism often is not a very discriminating requirement, since almost all psychosocial variables can be linked to psychobiological processes. In addition, one should realize that the fact that climbing up a stairs increases the blood pressure, does not necessarily mean that this specific behavior may be considered a risk

factor for hypertension. In other words, frequent transient effects do not necessarily imply a risk for chronic conditions.

We can translate these epidemiological guidelines into specific research models relevant for the present issue of (non)expression and physical health. Vingerhoets and Scheirs (1998; in press) previously described five models to investigate the effects of crying on health. For the purpose of the present paper, crying may be substituted by emotional (non)expression, yielding the scheme, represented in figure 1.

 Insert Figure 1 about here

Models A and B refer to the immediate and long term psychological and psychobiological effects of emotion expression. The difference between A and B is that in the latter model, a mediating role for the social environment is hypothesized. Emotion expression per se may or may not have any effects, but in case it will elicit social support, expression may be beneficial for one's health. Models C, D, and E refer to alternative relationships between emotion (non)expression as a personality characteristic and (long term) health status. In model C, the possibility of a third variable is introduced. It may be that the (non)expression of emotions itself is not associated with health status, but that it is linked to another personality or coping characteristic that has strong links with health. Model D schematically represents a buffer model for emotion expression - very similar to the buffer model of social support (Cohen & Wills, 1985). This implies that emotion expression is not relevant for one's health, unless one has been confronted with a stressful life event. In the final model E, health status is the cause, rather than the consequence of one's tendency to express emotions.

(Non)expression of emotions and health: Summarizing the evidence

Considering the above presented guidelines and models -and without being too exhaustive- we will address the following issues. (1) What are the *immediate* psychological and physiological consequences and what are the *long-term* effects of the inhibition and expression of emotions? (2) What are the findings of prospective follow-

up studies that focused on trait-like individual differences in (non)expression? In addition, some attention will be paid to the social consequences of the expression of emotions and the qualitatively different kinds of non-expression.

Immediate consequences

Concerning the first question, in a number of experimental studies the effects of different forms of emotion regulation on psychophysiological functioning have been examined. In addition, there is the work in the Pennebaker tradition, in which study participants are requested to write about stressful experiences they have experienced. Finally, there is some work specifically focused on the immediate effects of crying on well-being and psychophysiological processes.

Gross and Levenson (1993, 1997) conducted studies in which the participants were exposed to emotional films. Half of the subjects were instructed not to show any of the experienced emotion and the other half to simply watch the films. Subjects who suppressed the expression of emotions demonstrated elevated sympathetic activation. In more recent experiments, Gross (1998) exposed participants to a disgusting film. Subjects were assigned to a control condition, a suppression condition, or a reappraisal condition. Both the reappraisal and the suppression condition were effective in reducing emotion-expressive behavior. Only participants in the suppression condition demonstrated elevated sympathetic activation, however.

Pennebaker (1997) initially felt that there was a connection between the inhibition of emotions and a chronic physiological activation. However, more recently this investigator came to conclude that the resolution of this increased chronic arousal is not the (only) factor that explains the beneficial effects of his writing paradigm. Rather, he suggests that writing helps to facilitate cognitive processing by changing the meaning or significance of stressful experiences to make them more consistent with existing self- and world-views. Pennebaker (1997) and Smyth (1998) aptly summarize the wide variety of positive effects of the writing task, which include self-reports (well-being), psychophysiological functions, behavioral indices (academic performance, and “objective” biomedical outcomes (spirometric measures in asthma patients). Of further

interest is that no effects have been found on health behaviors, like smoking, alcohol use, level of exercising, etc.

Some examples are the following. The Amsterdam writing project, initiated by Lange (see Schoutrop et al., 1997) focused on psychic trauma. In four studies they showed that patients who had suffered from a wide variety of traumas including sexual or physical abuse, divorce, severe illness, or serious problems at work, significantly improved on variables related to general psychopathology measures. The participants also reported that they re-experienced the traumatic effects less often in thoughts and dreams and that they showed less avoidance behavior, an effect that was maintained for at least six weeks. In a final study, comparing mere habituation and cognitive reappraisal, they showed that cognitive reappraisal was superior in diminishing avoidance behavior. The authors thus concluded that structured writing assignments have positive effects on psychological well-being after exposure to traumatic events. Further valuable findings include the observation that the beneficial effects were greater at 6-8 weeks follow up than immediately after the treatment and that both the quality and quantity of the written text did not seem very important.

Smyth et al. (1999) conducted a study to determine if writing about stressful experiences affects disease status in patients with asthma or rheumatoid arthritis using standardized quantitative outcome measures. Patients with asthma and with rheumatoid arthritis were assigned to write for 20 min. on three consecutive days either about the most stressful experience they had ever undergone or about their plans for the day (control group). Evaluations four months after treatment revealed that asthma patients in the experimental group improved significantly in lung function as assessed by spirometry, while the control group showed no change. In addition, rheumatoid patients in the experimental group showed significant improvements in overall disease activity as determined in a clinical interview by a rheumatologist. These findings thus strongly suggest that patients with mild to moderately severe asthma or rheumatoid arthritis who write about stressful life experiences show clinically relevant changes in health status, which cannot be attributed to the standard medical care.

Cornelius (1997) reviewed the available studies on the effects of crying on self-reported mood. It appeared that the results of several studies were rather consistent if one

took into account the specific research setting. Quasi-experimental studies in which participants were exposed to sad movies, after which criers and non-criers were compared demonstrated that the crying subjects reported more negative mood than the non-criers. In contrast, when people are requested to recollect their last crying episode and are asked how they felt afterwards, they relatively often (in approximately 40% of the cases, see Becht & Vingerhoets, 1996) indicate that their mood was improved. It is not clear how this discrepancy in results have to be explained. Is it related to the different time frames? Or do people remember crying episodes resulting in mood improvement better than when they experience a decrease in mood? Or is the explanation that in the film condition there is no social environment, which responds to the crier offering comfort and social support? These are some of the possible explanations that must be critically evaluated in further research.

With respect to effects of crying on psychobiological processes, also a rather consistent pattern emerged. Gross et al. (1994) reported increases in physical arousal and in two studies focusing on an immunological parameter (Labott et al, 1990; Martin et al, 1993), the results suggest a decrease in immune functions rather than an increase.

To summarize, experimental studies have yielded evidence showing that the inhibition of emotions is associated with increased somatic activation, whereas, on the other hand, crying also appears to result in an increase in arousal. In addition, writing about emotional experiences also seems to promote health; however, it is not yet clear what mechanisms can explain these effects. In addition to the resolution of chronic arousal, Pennebaker (1997) also emphasizes the role of cognitive processes.

Long-term effects of trait-like individual differences

Concerning the relationship between personality and health, there is a wealth of psychological constructs in which the (non)expression of emotions takes a rather central position (see for example Vingerhoets et al., in press; Martin & Friedman, in press). However, it is not always clear how different constructs do relate to each other and to what extent the sometimes seemingly subtle differences may nevertheless be important.

For example, one may wonder whether it is crucial that people are aware that they inhibit the expression of their emotions. Alexithymia and repression, for example, are

constructs which emphasize the unconscious -or at least not purposeful- inhibition of emotions. In contrast, Type C individuals (Temoshok, 1987), type-D individuals (Denollet et al., 1996) and individuals who have ambivalent feelings towards emotional expression (King & Emmons, 1990) use a deliberative strategy of not expressing emotions in order to please others or to avoid interpersonal conflicts. Type C individuals typically suppress negative emotions and are passive in the face of stress (Temoshok, 1987); this type is sometimes referred to as the “cancer prone personality” (Eysenck, 1995).

Type-D refers to individuals who simultaneously tend to experience negative emotions (as indicated by a high score on negative affectivity) and inhibit the expression of these emotions in social interaction (as indicated by a high score on social inhibition). In a first study, out of the 268 men and 35 women with coronary heart disease, 85 were classified as type-D and 218 patients as not type-D (Denollet et al., 1996). Rate of death after 6-10 years of follow-up was significantly higher for type-D patients (23/85= 27%) than for non-type-D patients (15/218= 7%), $p < 0.00001$. After controlling for biomedical risk factors, the impact of type-D personality on prognosis remained significant. A second study indicated that type-D may also predict prognosis in myocardial infarction patients with a serious cardiac condition (Denollet & Brutsaert, 1998).

In a third study, the findings of a 5-year prospective follow-up in 319 patients with coronary heart disease confirmed that type-D represents a high-risk category deserving of special care (Denollet, Vaes & Brutsaert, 2000). This study examined the prognosis of patients who received optimal treatment in terms of medication, surgery and rehabilitation. At follow-up, there were 22 cardiac events (6 cardiac deaths and 16 non-fatal myocardial infarctions). Multivariate analysis yielded disease severity (OR 3.9; $p = .009$) and type-D personality (OR 8.9; $p = .0001$) as independent predictors of a poor prognosis. In addition, failure to quit smoking, symptoms of depression, as well as type-D personality emerged as independent predictors of impaired quality of life as assessed 5 years after the index event. These findings suggest that suppression of negative emotions may adversely affect cardiovascular disease outcome.

However, it is important to note the difference between Type C and Type D on the one hand, and repression on the other hand. Whereas repression typically refers to the

combination of self-reported low negative affect and high defensiveness as a result of an unconscious process, by which negative emotions are excluded from awareness, type-D refers to high negative affect/ high social inhibition and the conscious suppression of emotions/behavior in order to avoid disapproval by others. This conscious suppression of emotions is also characteristic of Type C coping. These -at first glance- subtle differences once more illustrate the importance of clear construct validation and model-building in this field.

Overviewing the evidence, one has to conclude that the number of (quasi)prospective studies, in which these concepts are validly assessed are rather limited. In addition, the results of these studies sometimes disconfirm findings of retrospective studies. To mention some examples, Bleiker and coworkers (see Bleiker & Van der Ploeg, 1997) failed to find supportive evidence for any "established" psychosocial risk factor, like repression or rationality – anti-emotionality in a big breast cancer screening study in the Netherlands. A recent Finnish epidemiological study in the general population (Salminen et al, 1999) failed to confirm the importance of alexithymia as a risk factor of somatic health problems. However, such results do not necessarily imply that there is not a kernel of truth in the theory; they may as well point to the fact that the operationalization and/or assessment of the construct under study has its limitations. A similar pattern of findings has been reported some time ago, when it was demonstrated that the Type A interview appeared to be superior to the Jenkins Activity Survey as predictor of future cardiac incidents (see Edwards, 1991).

On the other hand, there are also some examples of prospective studies, suggesting an association between inhibition of behavioral tendencies and health. One impressive example is the Type D study, revealing the clinical relevance of this concept in cardiac rehabilitation, discussed above (Denollet et al., 2000).

Cole et al. (1996a,b) conducted two longitudinal studies among gay men in which they examined the health effects of concealing their homosexual identity. In the first study, they followed HIV-seronegative gay men during a five year period. They established the degree to which participants concealed their homosexual identity and recorded the incidence of cancer and infectious diseases. It appeared that participants who concealed the expression of their homosexual identity experienced a significantly

higher incidence of cancer (odds ratio = 3.18) and several infectious disease (pneumonia, bronchitis, sinusitis, and tuberculosis; odds ratio = 2.91). These effects were maintained after controlling for life style, demographic variables, anxiety, depression and repressive coping. In a second study, these investigators examined the course of HIV infection in HIV-seropositive gay men as a function of concealment of their homosexual identity. Outcome measures were: time until a critically low CD4 T lymphocyte level, time until AIDS diagnosis, and time until AIDS mortality. It appeared that, on all measures, HIV infection advanced more rapidly in a dose-response relationship to the degree participants concealed their homosexual identity. Effects were maintained after control for lifestyle and other psychological variables. The findings of these studies thus favor a broadening of the concept emotional inhibition to more general psychological or behavioral inhibition, which includes the suppression of social actions and behavioral impulses.

Some theoretical reflections

In research on the relationship between emotional expressivity and health, it is implicitly assumed that these personality characteristics are relatively stable over time. However, there are some reasons to question this assumption. For example, Laan (2000) in her study on emotional expression among male and female nurses and police officers, reported that as many as 39% of the respondents indicated that their crying proneness had been changed more permanently after having experienced a certain life event, such as the death of a family member or intimate, a serious disease or major injury of oneself, or – especially for women – the transition to motherhood. Referring to Cole et al's (1996) study, one may wonder whether a psychological intervention aimed at learning the concealers to come out, may indeed also influence their health status. Another problem is that expression and inhibition may both be the result of very different processes, which has become clear by the recent work on emotion regulation (see Gross, 1998; Kennedy-Moore & Watson, 1999).

The more recent theoretical distinction between different ways of emotion regulation, like for instance Gross and Munoz' (1995) antecedent-focused and response-focused emotion regulation or Kennedy-Moore and Watson's (1999) elaborated

distinction of the various levels at which a "decision" is made to express or not to express, clearly illustrates that just focusing on the outcome of a process (expression or nonexpression) does not do justice to all critical factors involved and may rather easily result in wrong conclusions. These models make clear that people may apply different strategies yielding the same result, but with very different psychobiological implications. As already mentioned before, Gross (1998) showed how different strategies both resulting in nonexpression resulted in elevated sympathetic activation only for those who suppressed the expression.

Kennedy-Moore and Watson (1999) emphasize that expression or non-expression seldom occurs in a social vacuum. Since humans are social animals, they spend a great deal of time interacting with others, using verbal and nonverbal signals to communicate their needs and wishes. It must be recognized that the emotional support, received in response to emotional expression may have stronger effects on our well-being than the mere expression or inhibition itself. In addition, dependent on the personality type different purposes may be served with expression or inhibition. To give some examples, as goals of expression these authors mention attention and intimacy. Whereas in the first case, a connection with the histrionic and charismatic personality is assumed, in the second example a link with being an "opener", who values and tends to elicit intimate disclosures from others is supposed. In a similar vein, motives for nonexpression or for expressing desired and not expressing undesired emotions can be very different. For example, Kennedy-Moore and Watson (1999) discuss self-protection and emotional self-control as goals for nonexpression, which also are linked with specific personality features.

Conclusion

From the above discussion, the following conclusions can be drawn. First, there is indeed experimental evidence that the acute effects of inhibiting emotions include elevated sympathetic activation. In contrast, nonexpression resulting from antecedent-focused emotion regulation (i.e., the "reappraisal"-condition in Gross, 1998) does not seem to have acute effects on psychobiological functions. On the other hand, it has been

demonstrated that crying is immunosuppressive and increases sympathetic arousal, whereas the inhibition of shedding tears does not seem to have any effects on immunity. It thus becomes increasingly clear that just talking about expression or nonexpression does not do justice to the complexity of this concept. Many different forms of expression and nonexpression have to be distinguished, all specifically linked to certain aims and goals and with specific consequences for the social environment and psychobiological functions.

To date, only few prospective studies have been conducted on the long-term effects health of emotional inhibition. In some cases, they have yielded impressive results and definitely need replication and further elaboration.

There is a strong need for experimental and prospective studies in order to obtain better insight into the nature of the association and the specific elements that renders emotional inhibition toxic. We feel that the challenges we are confronted with have in particular to do with the precise conditions in which different forms of emotional expression are beneficial or not. In addition, until now no adequate attention has been paid to the possibility that (non)expression may be more positive (or negative) for some individuals than for others.

We are convinced that emotional (non)expression is certainly not the least important psychological factor with regard to health consequences. However, until now, the concept appears to be too little elaborated and strong designs are needed in order to be able to make adequate predictions of its differential effects for specific groups of individuals. Here is a major task for both investigators and clinicians.

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Figure caption

Fig. 1. Five theoretical models to explain and to investigate the possible relationships between emotional (non)expression health.