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Ivan Nyklí^a; Ad Vingerhoets^a; Johan Denollet^a

^a Department of Clinical Health Psychology, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands.

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EMOTIONAL (NON-)EXPRESSION AND HEALTH: DATA, QUESTIONS, AND CHALLENGES

IVAN NYKLÍČEK*, AD VINGERHOETS and JOHAN DENOLLET

*Department of Clinical Health Psychology, Tilburg University,
P.O. Box 90153, 5000 LE Tilburg, The Netherlands*

The available evidence on the relationship between expression and non-expression of emotions (E/NE) and health is selectively and critically reviewed. It is concluded that research in this field still lacks conceptual lucidity with regard to the many existing E/NE concepts. Despite the fact that few studies adopted appropriate designs for examining causal relationships, some intriguing results have been reported showing promise for the future. These results involve prospective associations between E/NE and chronic disease, such as cardiovascular disease and HIV infection related outcomes. Future studies have to better discriminate between (i) various forms of E/NE, (ii) different (social) contexts of E/NE as well as different cognitive decision processes underlying E/NE, and (iii) individuals for whom different forms of E/NE may be adaptive. We recommend that besides (quasi)experimental studies on the potential mechanisms involved, more prospective studies are conducted in this field in order to allow for causal inferences.

Keywords: Emotion; Expression; Inhibition; Health

In popular lay beliefs and folk psychology the expression of emotions, including crying, is often considered to be beneficial for one's health. Accordingly, inhibition and repression of emotions is believed to result in maladaptive chronic activation of the body and, consequently, ill health. In addition, people are generally convinced that talking about emotional experiences with others is helpful and facilitates emotional recovery (e.g., Zech, 2000). Freud encouraged patients to remember traumatic events and to re-experience the negative emotions as vividly as possible (Freud, 1915/1957). Although he already had some doubts concerning the efficacy of cathartic therapy and abandoned it, many others in the medical community did not. In the 1940s, there were several examples of publications in which the positive effects of this approach were described. Symonds (1954), for example, concluded in his review of the literature that catharsis was the most frequent cause of success in psychotherapy.

The past decade has witnessed renewed interest in the role of emotional expression and non-expression (E/NE) in health (e.g., Kennedy-Moore and Watson, 1999).

*Corresponding author. Tel.: +3113 4662391. Fax: +3113 4662370. E-mail: I.Nyklíček@KUB.NL

Studies on emotional disclosure in relation to health have been stimulated by the work of the American social psychologist James Pennebaker (Pennebaker and Beal, 1986, see also reviews by Pennebaker, 1997; Smyth, 1998). This author introduced a paradigm in which individuals write for some days about traumatic or emotional experiences. The effects of this written self-expression on psychological and physiological functioning are then examined. In addition, psychophysicists started studying the immediate effects of expressing or holding back emotions on physiological, in particular cardiovascular, functions (e.g., Labott *et al.*, 1990; Gross and Levenson, 1993, 1997; Brosschot and Thayer, 1998). Finally, there has been a growing interest of psychologists to examine the relationship between individual differences in E/NE, considering it as a stable personality trait, and health.

Non-expression of emotions seems to be a crucial element of many personality features which have been related to health, including alexithymia (Sifneos, 1973), defensiveness/repression (Weinberger *et al.*, 1979), and the Type C (Temoshok *et al.*, 1985) and Type D (Denollet *et al.*, 1996) coping styles. Even negative affectivity (Watson and Pennebaker, 1989) can be considered to have an important emotional expression component. Consequently, there are several examples of questionnaires measuring emotional expressiveness as a personality characteristic (e.g., Watson and Greer, 1983; Roger and Narajian, 1989; King and Emmons, 1990; Gross and John, 1995).

Below, we will summarize some of the most important research findings with respect to the (causal) relation between E/NE and health. First, however, we will discuss some conceptual issues concerning the personality constructs in which emotional (non-) expression plays an important role. Second, we will provide theoretical models that may govern research on E/NE and health and some epidemiological guidelines that should be met in order to be able to conclude that there is a causal relationship between E/NE and health. Third, we will briefly review research testing the general hypothesis that the expression of emotions is healthy and emotional inhibition is health-damaging. Since the issue of causality is central to this hypothesis, correlational studies, which do not permit conclusions regarding causal directions, will not be discussed here. Finally, we will conclude with some theoretical reflections relevant for future research.

CONCEPTUAL ISSUES

There is a wealth of psychological constructs reflecting individual differences in which E/NE, especially emotional non-expression, takes a rather central position (see for example Martin and Friedman, *in press*; Sanderman and Ranchor, 1997; Vingerhoets *et al.*, 2001). Accordingly, research on the relevance of these personality constructs for health is based on the notion that more or less stable individual differences in emotional coping styles may be at least as important as the experience of negative emotion *per se*.

However, it is not always clear how these different constructs relate to each other, or to what extent the sometimes seemingly subtle differences may nevertheless be of crucial importance. For instance, one may wonder whether it is relevant that people are *aware* that they inhibit the expression of their emotions. Alexithymia and repression are examples of constructs that emphasize the unconscious – or at least not purposeful – inhibition of emotions. Alexithymia is even claimed to reflect a neurophysiological deficit in the processing of emotional information, resulting in low insight into and

low ability to verbally express one's emotions (Lane *et al.*, 1997). Defensiveness, a concept in which the tendency to minimize negative emotions and experiences and to exaggerate positive ones is important (usually measured by the Marlowe–Crowne Social Desirability Scale; Crowne and Marlowe, 1964) has been shown to comprise both unconscious and conscious components (Paulhus, 1984; Sackheim and Gur, 1978). Below it will be shown that this distinction may be important in relation to hypertension. Type C individuals (Temoshok, 1987), Type D individuals (Denollet *et al.*, 1996) and individuals who have ambivalent feelings towards emotional expression (King and Emmons, 1990) use a deliberate strategy of not expressing emotions in order to please others or to avoid interpersonal conflicts. Type C individuals deliberately suppress negative emotions and are passive in the face of stress (Temoshok, 1987); remarkable similarities can be found with the description of the 'cancer prone personality' (Eysenck, 1995). Type D (Denollet *et al.*, 1996) refers to individuals who simultaneously tend to experience negative emotions (as indicated by a high score on negative affectivity) and to inhibit the expression of these emotions (as indicated by a high score on social inhibition). It is important to note the difference between Type C and Type D, on the one hand, and repression, on the other hand. 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. In contrast, Type D refers to both high negative affect and high social inhibition (related to neuroticism and introversion, respectively, see De Fruyt and Denollet, this issue) where the conscious suppression of emotions/behavior is the working mechanism in order to avoid disapproval by others. This conscious suppression of emotions is also characteristic of Type C coping, but in Type C the tendency to experience negative emotions is less stressed. Nevertheless, more research is needed to examine the precise shared and unique variance of related concepts such as Type C and Type D. The potentially subtle differences illustrate the importance of clear construct validation and model-building in this field.

MODELS AND EPIDEMIOLOGICAL GUIDELINES

Vingerhoets and Scheirs (1998; 2001) have presented five models, which describe the possible associations between crying and health. In a more broad context, crying may be substituted by emotional expression, yielding the scheme as represented in Fig. 1. For the time being, we will consider expression and non-expression as two poles of one dimension. Note, however, that this may not be a correct representation, as discussed below (see also Panagopoulou *et al.*, this issue).

Models A and B refer to both the immediate and long term effects of E/NE for both psychological and somatic well-being. The difference between A and B is that in the latter model a mediating role of the social environment is hypothesized. Emotion expression per se may not have any direct effects, but only in case it will result in a favorable change in a mediating variable (e.g., higher social support), expression may be beneficial for one's health. Most researchers prefer to have model A or B as their theoretical framework. Models C, D, and E refer to alternative relationships between E/NE and (long term) health status. In model C, the possibility of a third variable is introduced. It may be that E/NE itself is not causally related to health status, but that another personality or coping characteristic, or a physiological predisposition,

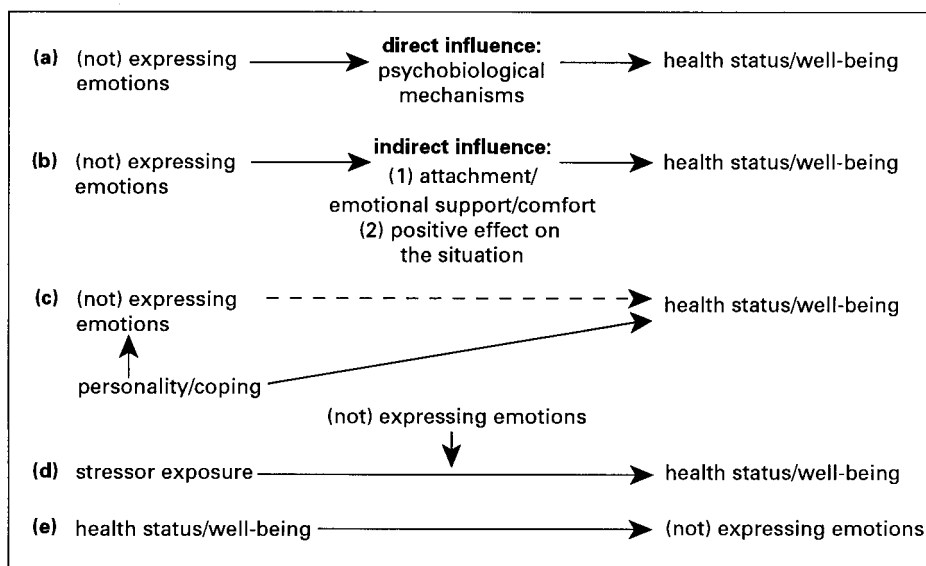


FIGURE 1 Five theoretical models to explain and to investigate the possible relationships between emotional (non-)expression and health.

has strong links to both health and E/NE. Model D schematically represents a buffer model for emotion expression – very similar to the buffer model of social support (Cohen and Wills, 1985). This implies that E/NE is not relevant for one's health, unless one has been confronted with a stressful life event. In the latter case, the beneficial effects of expression may take place along either of the routes, described in models A (direct psychobiological effect) and B (indirect effect, via mediating effects). In the final model E, health status is the cause, rather than the consequence of one's tendency to express emotions.

It should be kept in mind that the models described here are by no means mutually exclusive. It is quite well possible that a combination of two or more of these models will provide a better description of the real situation than either of these models in isolation. It should also be clear that results of correlational studies generally do not provide much information as to which of these models should be preferred. Obviously, in order to be able to draw conclusions about the causality of the relations found, one should apply research designs other than correlational ones.

Kasl and Jones (in press) list a number of 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 – E/NE and health. These requirements can be summarized as follows:

1. A correct temporal sequence of cause and effect, i.e., the causal factor is first in time, followed by a change in the outcome variable. This requirement can only be checked in prospective studies (or at least semi-prospective studies, in which participants' psychological characteristics are assessed just before a physical examination, in order to eliminate the possible effects of awareness of the disease) with disease conditions having a clearly identifiable onset. In addition, experimental studies

examining the effects of experimentally manipulated behavior on clearly defined psychological or physiological outcome variables may provide information about possible mechanisms.

2. Consistency of evidence across studies. 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 probably never may be considered necessary nor sufficient conditions to produce ill-health.
4. Dose–response effect (biological gradient). Although this guideline applies to most real causal relations, one should not overlook the possibility that markers of a risk factor or confounders may also show such relationships. In addition, one should 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 relevant physiological processes, it is more reasonable to assume that habitual inhibition also may have more long-lasting somatic consequences. On the other hand, 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.

When evaluating reported studies and designing new investigations on the plausibility of causal associations, one should keep in mind these guidelines.

E/NE AND HEALTH: SUMMARIZING THE EVIDENCE

Considering the above presented models and guidelines – and without the pretention of being exhaustive – we will address the following issues.

1. What are the psychological and physiological consequences of experimental manipulations aiming at inhibiting or facilitating the expression of emotions?
2. What are the findings of prospective longitudinal studies that focused on the role of trait-like individual differences in E/NE in future health?

In addition, attention will be paid to the social consequences of the expression of emotions and the qualitatively different kinds of non-expression.

Consequences of Experimentally Manipulated E/NE

A number of experimental studies have examined the effects of different forms of emotion regulation on short-term psychophysiological functioning. In addition, there are intervention studies aiming at enhancing expression, such as Pennebaker's work, in which study participants are requested to write openly 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 and to freely express any present emotion. As expected, 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. However, only participants in the suppression condition demonstrated elevated sympathetic activation. In other words, the results of this study suggest that it is important to take into account the underlying process that results in non-expression when examining the relationship between E/NE and health.

Related to this is the study reported by Rohrmann *et al.*, in this issue. These investigators manipulated the appraisal of the participants in such a way to mimic the repressive or sensitizing information processing style. Consistent with trait-like studies in this field, they were able to show low self-reported distress in combination with enhanced physiological arousal in the repressing condition, while in the sensitizing condition the reverse finding was obtained. These results thus suggest that these coping styles may be less stable and more subject to manipulations or interventions than previously thought. Also in this issue, enhanced physiological reactivity in the laboratory is reported for elderly individuals scoring high on alexithymia (Waldstein *et al.*) and for persons scoring low on certain aspects of emotional intelligence (Salovey *et al.*).

Pennebaker and Beal (1986) initially speculated that there was a connection between the inhibition of emotions and chronic physiological activation. Indeed, evidence shows that emotion inhibition is associated with increased cardiovascular reactivity (Gross and Levenson, 1997), decreased cardiovascular recovery (Brosschot and Thayer, 1998), and decreased heart rate variability (Horsten *et al.*, 1999). However, more recently Pennebaker (1997) came to conclude that the resolution of increased chronic arousal is not the only factor that explains the beneficial effects of his writing paradigm. Rather, he suggests that writing also 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 typically consists of writing openly for about 20 min on three consecutive days about a trauma or a stressful experience. In the control condition, participants write about trivial topics, such as plans for the day. Reported beneficial effects include positive effects on self-reported well-being, psychophysiological functions, academic performance, and "objective" biomedical outcomes, such as spirometric measures in asthma patients. Of note, the health benefits were not due to changes in health behavior, like smoking, alcohol use or level of exercising.

In this Special Issue on the role of E/NE in health, several studies on the effects of expressive writing are reported. Lepore and Greenberg show a wide range of positive effects of expressive writing after a relationship breakup, including less tension, fatigue and upper respiratory symptoms, especially when experiencing intrusive thoughts or avoidance responses. Smyth *et al.* examined whether essay characteristics and the beneficial effects of expressive writing are influenced by individual trait-like differences in emotional expression and cognitive avoidance. Except for denial and avoidance, which predicted poorer narrative structure, no clear effects were found. Finally, Graybeal *et*

al., investigated to what extent narrative structure or “storyness” may be an important component of the beneficial effects of expressive writing. They report that storyness could be assessed reliably, but it did not correlate with personality dimensions or health. Due to only few incidence cases of overall health problems, these data on health should be viewed with caution, however.

Cornelius (1997) reviewed the available studies on the effects of crying on self-reported mood. The pattern of results was rather consistent, indicating that those participants who cried when exposed to a sad movie reported more negative mood than the non-criers. This finding seems discrepant with outcomes of retrospective questionnaire studies finding that when people are requested to recollect their last crying episode, they often indicate that their mood was improved afterwards (see Becht and Vingerhoets, 1996). However, it is clear that these two approaches differ in many aspects, which may account for the seemingly contradictory results, such as differences in experienced sadness. It is plausible that the manipulation in the quasi-experimental studies was more successful with respect to sadness induction in those individuals who cried. In contrast, everyone cried in the questionnaire study, suggesting that when one is sad, crying may improve mood afterwards in some individuals in some contexts. Future research should examine the precise conditions in which crying may improve mood or make it worse.

Consistent with the worse mood found in the laboratory in persons who cried when seeing a sad movie, are the results of studies investigating effects of crying on psychological processes. Gross *et al.* (1994) reported increases in physiological 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, associated with crying.

To summarize, experimental studies have yielded evidence showing that the inhibition of expression of experienced emotions is associated with increased somatic activation. On the other hand, crying also appears to result in an increase in arousal. Furthermore, writing about emotional experiences seems to promote health, sometimes even several months later. It is not yet clear what mechanisms may explain these effects. In addition to the resolution of chronic arousal, Pennebaker (1997) also emphasizes the role of cognitive restructuring as a potential health promoting mechanism.

Health Effects of Individual Differences in E/NE

Let us first note that the number of (semi-)prospective studies, in which the various E/NE concepts are validly assessed are rather limited. In addition, the results of (semi-)prospective studies often are mutually inconsistent or disconfirm findings of retrospective studies (see the review of Sanderman and Ranchor, 1997). For example, Bleiker *et al.* (1996) failed to find supportive evidence for several potential psychosocial risk factors, like emotional suppression and Type C, except for a weak effect of anti-emotionality, in a large population based semi-prospective breast cancer study in the Netherlands. This finding is clearly at variance with the significant associations that have been observed between emotional non-expression and cancer diagnosis, prognosis, or survival in other semi-prospective studies and intervention studies (see for a review, e.g., Sanderman and Ranchor, 1997). For instance, Type C personality has been found to be predictive of poor prognosis in malignant melanoma (Temoshok *et al.*, 1985).

Among other things, these discrepancies point at the possibility of suboptimal operationalization and/or assessment of the constructs under study at present.

Nevertheless, there are also examples of prospective studies, especially in the areas of cardiovascular disease and HIV infection, suggesting clear associations between inhibition of emotional and behavioral tendencies and poor health. Defensiveness, for instance, has earlier been shown to be associated with hypertension in cross-sectional studies (Jorgensen *et al.*, 1996; Nyklíček *et al.*, 1999). Only very recently, in a prospective study, Rutledge and Linden (2000) have been able to show that a finer grained distinction of aspects forming this construct may be important to identify the toxic element relevant for the development of hypertension. These authors have reported a more than sevenfold risk of becoming hypertensive three years after the initial measurements in participants scoring high on self-deception. In contrast, no significant results were obtained for the more deliberate impression management. Prospective studies have also found constructs related to emotion inhibition to be associated with carotid atherosclerosis (Matthews *et al.*, 1998), incidence of coronary heart disease (Haynes *et al.*, 1980) and overall mortality, including cardiac death (Graves *et al.*, 1994).

An impressive example of consistent positive findings has been provided by Denollet and coworkers (1996, 2000). Their Type D personality has been linked to mortality risk and recurrence of cardiac events in patients with coronary heart disease (Denollet *et al.*, 1996, 2000). In a first study, death rate after 6–10 years of follow-up was much higher for Type D patients (27%) than for non-Type D patients (7%). After controlling for biomedical risk factors, the impact of Type D personality on prognosis remained significant. A second study indicated that Type D also predicts prognosis in myocardial infarction patients with a relatively serious cardiac condition (Denollet and Brutsaert, 1998). A third study examined the 5-year prognosis of coronary patients who received optimal treatment in terms of medication, surgery and rehabilitation (Denollet *et al.*, 2000). At follow-up, there were 6 cardiac deaths and 16 non-fatal myocardial infarctions. Once again, Type D personality emerged as an independent predictor of these cardiac events (odds ratio = 8.9).

Another example of studies finding clear associations between E/NE and future health outcome are the longitudinal studies conducted by Cole and colleagues among gay men (Cole *et al.*, 1996a, b). In the first study, they followed HIV-seronegative gay men during a five year period. 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, HIV infection advanced more rapidly in a dose-response relationship to the degree HIV-seropositive gay men concealed their homosexual identity, even after controlling for lifestyle and other psychological variables.

Overall, the findings of these studies in coronary disease and HIV infection favor a broadening of the concept of emotional inhibition to a more general psychological or behavioral inhibition. This includes emotionally motivated suppression of social actions and behavioral impulses.

In the present Special Issue of the journal, three longitudinal studies are reported. Despite some methodological shortcomings (e.g., no control for a possible confounder), Merari *et al.*, have related differences in expression of distress to subsequent success in In-Vitro-Fertilization (IVF) treatment. Solano and coworkers found that Type C

coping was predictive of disease progression in a subsample of HIV seropositive individuals with a relatively low CD 4 cell count. Finally, Kokkonen *et al.*, show that low self-control of emotions in adolescents – a concept rather related to the tendency to express emotions in an uncontrolled and socially undesirable way – was associated with self-assessed poor health and physical symptoms many years later. These results underscore the importance of discriminating between different ways and contexts of E/NE (see the discussion below).

SOME THEORETICAL REFLECTIONS

Remarkably, the issue has seldom been raised whether non-expression of emotion is the opposite of emotional expression or should be treated as a separate construct (see the meta-analysis on the effects of E/NE in patient samples by Panagopoulou and coworkers, this issue). In addition, 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. Furthermore, 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.

Another methodological issue is related to the implicit assumption in much research that individual differences in emotional expressivity are relatively stable over time. However, there are some reasons to question this assumption. For example, Laan (2000, personal communication) in her study on emotional expression among 230 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 major life event. Referring to Cole *et al.*'s (1996) study, one may wonder whether a psychological intervention aimed at learning the concealers to come out, may influence their future health status.

But perhaps most importantly, the end product E/NE may be the result of very different underlying processes, which has become clear by the recent work on emotion regulation (see Gross, 1998; Kennedy-Moore and Watson, 1999). For instance, Gross and Muñoz (1998) differentiate between *antecedent-focused* and *response-focused* emotion regulation and Kennedy-Moore and Watson (1999) have made an elaborated distinction of the various levels at which a “decision” is made to express or not to express. These fine-grained differentiations clearly illustrate that just focusing on the outcome of a process (expression or non-expression) 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 potentially very different psychobiological implications. As already mentioned above, Gross (1998) showed how different strategies, all resulting in non-expression, produced elevated sympathetic activation only in those individuals who had the instruction to suppress the expression.

Kennedy-Moore and Watson (1999) emphasize that expression or non-expression seldom occurs in a social vacuum. E/NE regulates to a large extent the reactions of the social environment. At present, it cannot be ruled out that the emotional support received in response to emotional expression might 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 emotional expression or inhibition.

Also, motives for expressing desired and not expressing undesired emotions can be very different. As examples, Kennedy-Moore and Watson (1999) mention attention and intimacy as goals of expression, while self-protection and emotional self-control may serve as goals for non-expression. These different goals are claimed to be linked with specific personality features. It can be hypothesized that these different goals may also be linked to different psychobiological consequences.

CONCLUSION

In sum, the following conclusions can be drawn. First, there is experimental evidence that the acute effects of inhibiting emotions include elevated sympathetic activation. Non-expression resulting from antecedent-focused emotion regulation (i.e., the “reappraisal”-condition in Gross, 1998) does not seem to have acute effects on psychobiological functions, however. It has also 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. Prospective studies on long-term effects of emotional non-expression have been very heterogeneous as to the design, predictor and outcome variables, sample characteristics, context of the study etc., and so have been the results. Nevertheless, some impressive findings have been obtained, such as the predictive power of Type D personality for adverse cardiac events.

Taken together, it becomes increasingly clear that just talking about expression or non-expression does not do justice to the complexity of these concepts. Many different forms of expression and non-expression have to be distinguished, all specifically linked to certain aims and goals and with specific consequences for the social environment and psychobiological functions.

There is a strong need for more experimental and prospective studies in order to obtain better insight into the specific elements and contexts that renders emotional inhibition toxic and emotional expression beneficial. We feel that the challenges we are confronted with have in particular to do with the precise conditions in which different forms of E/NE have their beneficial or maladaptive psychobiological effects. In addition, until now, no adequate attention has been paid to the possibility that E/NE may be more positive (or negative) for some individuals than for others.

We are convinced that expression and inhibition of emotions are psychological factors that may impact on emotional and physical health. However, to date, these concepts appear to be too little elaborated. Attempts to establish clear conceptual distinctions between the various E/NE constructs, resulting in clear terminology and assessment should be encouraged. Finally, appropriate research designs are needed in order to be able to examine the differential effects of E/NE for specific groups of individuals. Obviously, here is a major task for both investigators and clinicians.

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