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NEGATIVE EMOTIONS AS PREDICTORS OF RESPIRATORY SYMPTOMS

Presented by

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Design Issues

Research investigating the role of negative emotions in immune system-mediated diseases has seldom distinguished between emotions as states and emotions as traits. For example, when people report that they are depressed, does it simply mean that they are depressed only at that moment, or are they depressed most of the time? The former is a state condition, while the latter a trait condition. State and trait conditions may have different implications for the immune response, and it is only by distinguishing between them that we will be able to understand how an emotional response influences immune-mediated diseases.

In addition to distinguishing between the nature of the psychological variables, it is important that disease outcomes be assessed with biological markers of pathology rather than subject self-report. This is because psychological characteristics can result in biases in sensitivity to and reporting of symptoms of an illness (Cohen and Williamson, 1991). People experiencing negative emotions are more likely to pay attention to their bodies and to define ambiguous physical sensations as symptoms indicative of disease (Cohen and Williamson, 1991; Pennebaker, 1982). This can be independent of any pathophysiology and be attributable entirely to how people view their symptoms. Thus, it is important for studies to provide biological markers of disease and hence allow researchers to distinguish between psychological effects on self-report versus effects on underlying pathophysiology.

Negative Emotions and Symptom Reporting

Negative emotional states and traits have been assessed in healthy individuals who were then exposed to either an influenza virus or a rhinovirus to determine whether these psychological characteristics influence the severity of upper respiratory infections (Cohen et al., 1995). Only those who were both infected and exhibited symptoms were considered. The questions that were posed were (a) do negative emotions influence symptom reporting for people who have colds, and (b) if they do, is it because of an underlying emotional trait or because of a current emotional state? Another issue is whether the emotional influences that correlate with progression of illness are due to biases in symptom reporting or to pathophysiological changes.

The experimental model is as follows. Prior to being exposed to a virus, trait and state negative emotions (anxiety, depression, anger and fatigue) and upper respiratory symptoms were measured by questionnaire, antibodies to the inoculation virus were assessed in blood samples, and current infectious status determined by looking for the inoculation virus in nasal secretions. Following the collection of these samples and information, each subject was exposed (using nasal drops) to either the rhinovirus or influenza virus. Daily for six days following viral inoculation, follow-up nasal washes and self-reported symptoms were collected, as well as the amount (weight) of mucous the subject produced. Twenty-one days later, a second blood sample was taken to assess the production of antibody to the inoculation virus. Seventy-one subjects were used with a mean age of 25.8 and 51% being female. All were physically healthy, not pregnant, and HIV negative.

To assess 'trait' negative emotion, people were asked to what extent each of a series of adjectives described how they are "most of the time." To assess 'state' emotion they rated the same adjectives but instead were asked the degree to which they experienced these feelings within "the past 24 hours." Since the measures of anxiety, depression, fatigue, and anger were all highly

intercorrelated, they were combined into single measures of state and trait negative emotion. Eight symptoms were used in the symptom protocol, including congestion, runny nose and sneezing. Daily mucous weights were used as a marker of how sick the subjects were. By comparing their symptom reports with mucous weights, it was possible to compare individuals' self-reports with an objective marker of pathophysiology. In order to meet criteria to be included in the study, all subjects had to report at least two more symptoms than they reported before they were exposed to a virus, and had to be positive on one of the two biological indicators of infection -- antibodies produced against the particular virus that they had been exposed to, or viral replication (shedding) in nasal secretions. In the analysis, we controlled for a number of factors including whether or not the person had been exposed previously to the virus, their age, gender, level of education, and whether they received the rhinovirus or the influenza virus.

The results revealed that people who score higher on trait negative emotion report more symptoms over the course of the cold. This is also true of those individuals who are high with respect to state negative emotion. A regression analysis revealed that state and trait are independent predictors of symptoms, even though their associations with symptom reporting are basically the same. Moreover, state and trait emotion were not associated with symptom reporting before exposure to the virus, only after persons were infected. This indicates that these psychological variables influence response to illness but do not result in reports of upper respiratory symptoms outside of the illness.

A remaining question is whether the negative emotion is associated with increased sensitivity to true symptoms of illness or simply with reports of symptoms with no pathophysiological basis. Those with higher levels of state negative emotion produced more mucous over the course of the trial than those with lower levels. However, trait negative emotion was not associated with this marker of pathophysiology. Moreover, path analysis was consistent with a model in which state negative emotion influenced

symptom reporting through its effects on the pathophysiology of the disease (as indicated by mucous weights), but that the effect of trait negative emotion on mucous weights was independent of disease pathophysiology and hence attributable to biases in symptom reporting.

In summary, trait and state negative emotion were both associated with more health complaints of people with respiratory illness. In the case of state negative emotion, the association is attributable to underlying illness, and in the case of trait negative emotion, the association is attributable to psychological or cognitive biases in reporting symptoms.

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