'Life force' linked to body's ability to withstand stress

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Our ability to withstand stress-related, inflammatory diseases may be associated, not just with our race and sex, but with our personality as well, according to a study published in the July issue of the journal *Brain, Behavior and Immunity*. Especially in aging women, low levels of the personality trait extraversion may signal that blood levels of a key inflammatory molecule have crossed over a threshold linked to a doubling of risk of death within five years.

An emerging area of medical science examines the mind-body connection, and how personality and stress contribute to disease in the aging body. Long-term exposure to hormones released by the brains of people under stress, for instance, takes a toll on organs. Like any injury, this brings a reaction from the body's immune system, including the release of immune chemicals that trigger inflammation in an attempt to begin the healing process. The same process goes too far as part of diseases from rheumatoid arthritis to Alzheimer's disease to atherosclerosis, where inflammation contributes to clogged arteries, heart attacks and strokes.

The current study found that that extroverts, and in particular those high "dispositional activity" or engagement in life, have dramatically lower levels of the inflammatory chemical interleukin 6 (IL-6). Swiss psychiatrist Carl Jung defined extroverts as focused on the world around them and most happy when active and surrounded by people. Introverts looked inward and were shy.

The definitions of extraversion and other personality traits were refined by American psychologist Gordon Allport beginning in the 1930s. He reviewed all adjectives in the dictionary used to describe personality, and attempted to group them into clusters. Over the next several decades, researchers statistically analyzed these dictionary terms and discovered that they tended to cluster into five general dimensions: extraversion vs. introversion, emotional stability vs. neuroticism, openness vs. closed-minded, agreeable vs. hostile, and conscientiousness vs. unreliability. These dimensions, known as the "Five Factor Model" of personality, served to organize hundreds of specific traits like "activity" for psychologists, similar to the way the Periodic Table organizes elements for physicists.

"Our study took the important first step of finding a strong association between one part of extroversion and a specific, stress-related, inflammatory chemical," said Benjamin Chapman, Ph.D., assistant professor within the Rochester Center for Mind-Body Research (RCMBR), part of the Department of Psychiatry at the University of Rochester Medical Center, and lead author of the study. "The next step is to determine if one causes the other. If we knew the direction and mechanism of causality, and it were low dispositional activity causing inflammation, we could design treatments to help high-risk patients become more engaged in life as a defense against disease."

Some past studies had contended, and the current analysis agreed, that women and minorities have higher levels of IL-6 than white males on average. Women may be more vulnerable to stress because of hormonal differences and minorities because of factors like perceived racism, but those questions have yet to be fully answered. While these trends exist, variations within these large groups are so great that further risk markers are needed to better determine any given patient's actual risk. The current study looked whether particular personality traits, including low extraversion, were associated with IL-6 levels in a sample of 103 urban

primary care patients aged 40 and older.

You Must Have Been a Calm Baby

According to landmark studies in the early 1990s, extraversion is a personality trait with three parts: a tendency toward happy thoughts, a desire to be around others and "dispositional energy," a sense of innate vigor or active engagement with life ("I'm bursting with energy; my life is fast-paced"). Other dimensions of extraversion, such as sensation-seeking, have also been proposed.

While the first two extrovert qualities were not found to track with inflammation, the current study found increases in "dispositional activity" came with statistically significant decreases in IL-6 ($p = .001$). P values measure the weight that should be attributed to a finding, with values less than .05 usually deemed significant.

In the current study, a patient's degree of extroversion was determined by standard tests, including the NEO Five-Factor Inventory, an instrument based on the Five Factor Model. The study found that the difference between the 84th percentile of dispositional activity and the 16th translated roughly into a 1.29 picogram increase in IL-6 per milliliter of blood.

Those findings took on meaning when comparisons revealed that, for both white and minority women, the difference between high and low dispositional energy was enough to shift IL-6 levels above 3.19 pg/ml, the threshold established by a large, epidemiological study (Harris et al., 1999) over which five-year mortality risk was found to double.

"If this aspect of personality drives inflammation, dispositional energy and engagement with life may confer a survival advantage," Chapman said. "But we don't know if low dispositional activity is causing

inflammation, or inflammation is taking its toll on people by reducing these personality tendencies, so we must be cautious in our interpretation of this association."

The findings recall an idea described as early as 1911 by French philosopher Henri Bergson that he called élan vitale or "life force," according to the authors. This aspect of adult personality may be linked to childhood temperament as well. Some babies are very relaxed, others active. Activity level may reflect a fundamental, biologically-based energy reserve, although no one has explained the biochemistry behind it.

The team gauged the magnitude of IL-6 associations for gender, race/ethnicity and personality by examining the degree to which each factor was associated with differences between people in IL-6. Of the differences in inflammation found in the patient sample in levels of IL-6, about 9 percent of the difference was due to gender, 6 percent was due to dispositional activity levels and another 4 percent to race/ethnicity. That a personality trait may contribute more to IL-6 levels than race/ethnicity was "a great surprise."

Along with Chapman and Jan Moynihan, Ph.D., director of the RCMBR, Ayesha Khan, Mary Harper, James Walton, Paul Duberstein, Nancy Talbot and Jeffrey Lyness assisted in the study.

Doug Stockman and Kevin Fiscella from the departments of Family Medicine and Community and Preventive Medicine at the Medical Center made important contributions as well. The work was supported by the General Clinical Research Center (GCRC) at the Medical Center and by the National Center for Research Resources, part of the National Institutes of Health.

While it may difficult for patients to change their nature, part of the

solution may be physical exercise as a therapy. The activity component of extraversion has been linked with exercise by past studies, as has daily physical activity with lower IL-6 levels in the aging. Still, the team is not convinced that exercise represents the whole answer.

"Beyond physical activity, some people seem to have this innate energy separate from exercise that makes them intrinsically involved in life," Chapman said. "It will be fascinating to investigate how we can increase this disposition toward engagement. Potentially, you might apply techniques developed to treat depression like 'pleasurable event scheduling' to patients with low dispositional energy, where you get people more involved in life by filling their time with things they enjoy as a therapy."

Source: University of Rochester Medical Center (news : web)